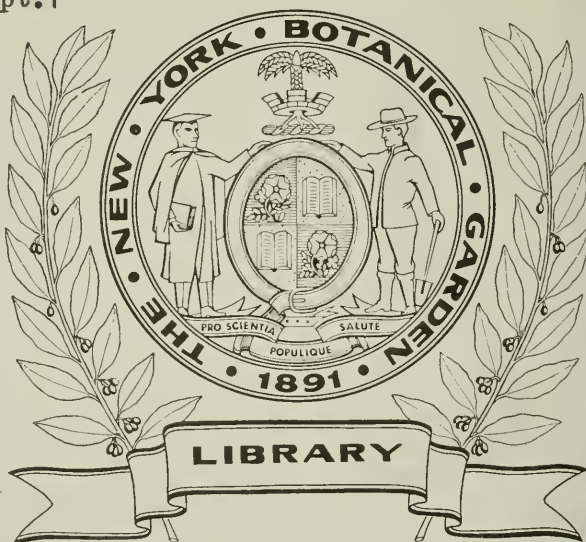


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SYNOPTICAL
FLORA OF NORTH AMERICA.

SYNOPTICAL

FLORA OF NORTH AMERICA.

BY ASA GRAY, LL.D.,

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VOL. II. — PART I.

GAMOPETALÆ AFTER COMPOSITÆ.

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P R E F A C E.

THIS volume commences where the Flora of North America by Torrey and Gray stopped, thirty-five years ago, namely at the close of the great order of Compositæ; and the present part comprises the remaining Gamopetalæ. It is intended to complete this Synoptical Flora in two volumes, of about 1200 pages each; the first to cover the ground which was gone over in the work referred to (now wholly out of print as well as antiquated), that is, to contain the orders from Ranunculaceæ to Compositæ, newly elaborated. The next ensuing part of the present volume will be devoted to the Apetalæ and Gymnospermæ, and the final portion to the Monocotyledones and the Vascular Cryptogamia.

Botanists will need no particular explanation of the plan of this work. Geographically it comprises the United States and all the North American continent and islands northward, Greenland excluded. The series of Natural Orders adopted is that of Bentham and Hooker's *Genera Plantarum*. The generic characters are given synoptically, but with essential completeness, at the beginning of each order. The characters of sections of genera, when of comparatively high rank, are designated by the sectional mark (§) and printed in the larger type; and those of first importance, such as may be termed subgenera, are distinguished by having a substantive name. Subsections, and also primary divisions when of low rank, are in small type. Such subdivisions are very freely made, for convenience of analysis and to save repetition of identical phrases under the included species; and they are preferred to artificial keys to the species, because enabling these to be grouped more naturally. If somewhat less facile for rapid determination, they are more exhaustive and less liable to mislead; and they permit the ultimate specific

characters to be more simply diagnostic. In monotypic genera, it has been found more convenient to give the details under the species, in the form of a specific character. Throughout the work, from the order down to the species or variety, the endeavor is to avoid repetition of statement.

The names of introduced species, sufficiently established to claim a place in our flora, are printed in small capitals, as are such adventitious or extraneous species as require mention.

In the accentuation of generic, sectional, and specific names, no attempt is made (as in the Manual of Botany of the Northern United States and other works) to mark the quality of the accented vowel, but only to designate the syllable upon which the principal accent falls.

Compactness being essential, only the leading synonymy and most important references are given, and these briefly. All deficiency in this respect will be amply supplied by the Bibliographical Index to North American Botany, prepared at the Harvard University Herbarium by Sereno Watson, and now in course of publication by the Smithsonian Institution. The first part of this most important adjunct to the present work, which is just issued, gives the full bibliography of the Polypetalæ (the subject of the first volume of Torrey and Gray's Flora of North America, published in 1838 and 1840), with revision, critical corrections, and additions up to the present time. Its continuation may be expected to proceed *pari passu* with this Flora.

HARVARD UNIVERSITY HERBARIUM,

Cambridge, Massachusetts, April 10, 1878.

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SYNOPTICAL

FLORA OF NORTH AMERICA.

DIVISION II. GAMOPETALOUS DICOTYLEDONOUS PLANTS

CONTINUED AFTER COMPOSITÆ.

ORDER LXXIV. GOODENIACEÆ.

SHRUBBY or herbaceous plants, chiefly with alternate leaves and no proper stipules, most resembling *Lobeliaceæ*, especially in having the corolla cleft down between two of the lobes more deeply than between the rest; but without milky juice, the anthers separate, and a cup-like indusium around and at first enclosing the stigma. Mainly Australian and Oceanic, one or two species of the following genus reaching or overpassing the northern tropic.

1. *SCÆVOLA*, L. (Diminutive of *scæva*, a left-handed person; application obscure.) Calyx adnate to the 2-celled ovary; the limb 5-cleft or a mere border around the base of the epigynous 5-lobed corolla, the tube of which is cleft down one side to the base; its lobes valvate-induplicate in the bud. Stamens 5, epigynous, or lightly connected with the base of the corolla, alternate with its lobes, distinct. Ovules solitary or a pair in each cell, erect. Fruit drupe-like, or when dry nut-like. Flowers in axillary cymes, or sometimes solitary. — L. Mant. 145; Benth. & Hook. Gen. ii. 539.

S. Plumiéri, Vahl. Low and shrubby, with fleshy obovate entire leaves, woolly-bearded in the axils, otherwise smooth: limb of the calyx a truncate border: corolla white, an inch long; the tube as long as the lobes, very woolly inside. — *Lobelia*, Plum. Ic. t. 165; Catesb. Car. i. t. 79. — Seashore, S. Florida. (W. Ind., S. Afr., S. Asia.)

ORDER LXXV. LOBELIACEÆ.

Herbs (out of the tropics), the juice usually milky and acrid, with alternate simple leaves, no stipules, racemose inflorescence, and perfect 5-merous flowers; having the calyx-tube adnate to the ovary, epigynous irregular corolla and stamens, the latter as many as the lobes of the corolla and alternate with them, and

usually both syngenesious and monadelphous. Limb of the calyx divided down to the ovary, which is wholly inferior or sometimes a large part free; its lobes generally persistent. Corolla (with the stamens) inserted just where the calyx becomes free from the ovary, its lobes mostly valvate or induplicate in the bud, commonly deeper cleft or completely split down between two of the lobes, the cleft mostly on the upper side (next the axis of inflorescence) in the open blossom, but becoming so by a twist; in the early bud the cleft looks toward the bract. The 5 petals occasionally disposed to separate from below upward, and the limb to be bilabiate irregular. Filaments generally free from the corolla, sometimes more or less adherent to its tube: anthers 2-celled, introrsely dehiscent, firmly united around the top of the style into a ring or short tube (except in an anomalous tribe). Ovary 2-celled with placentæ projecting from the axis, or sometimes 1-celled with 2 parietal placentæ. Style entire: stigma commonly 2-lobed, girt with a rim of hairs. Ovules and seeds mostly indefinitely numerous, small, anatropous. Embryo small or narrow, straight, in the axis of fleshy albumen. (Too near the *Campanulaceæ*, and nearly passing into them, therefore united by recent authors; but as there are two dozen genera, agreeing in the indefinite inflorescence, irregular corolla, and mostly in the syngenesious anthers, it seems best to retain the order.)

TRIBE I. CYPHIÆ. Anthers entirely separate, merely surrounding the stigma.

1. *NEMAACLADUS*. Calyx partly or wholly free. Corolla bilabiate irregular; lower lip 3, upper 2-lobed or parted. Filaments monadelphous above the middle: anthers oval, glabrous. Style incurved at tip: stigma capitate, 2-lobed, obsolete annulate. Capsule 2-celled, 2-valved from top, 20–40-seeded.

TRIBE II. LOBELIÆ. Anthers syngenesious. Corolla truly gamopetalous, at least above, in ours distinctly bilabiate, two lobes turned away from the other three.

* Corolla open down to the base on one (the apparently upper) side.

2. *LOBELIA*. Calyx-tube short. Corolla with tube commonly straight; the lobe each side of the cleft erect or turned backwards; the three others larger and somewhat combined to form the spreading or recurved (apparently) lower lip. Stamens free from the tube of the corolla, monadelphous except near the base. Capsule thin-walled, 2-celled, many-seeded, loculicidally 2-valved at the top or free upper part.

* * Corolla with a closed tube: capsule wholly inferior.

3. *PALMERELLA*. Calyx-tube turbinate; the lobes slender. Corolla with an elongated linear and straight tube, not at all dilated at the throat; the short limb abruptly spreading; two lobes small, spatulate-linear and recurving; the three larger obovate or oblong and slightly united at base. Filaments more or less adnate to the corolla up to near the throat, then monadelphous and free, or farther adnate on one side only: anthers oblong; the three larger naked; the two shorter tipped with a tuft of very unequal stout bristles. Stigma, ovary, and probably capsule as in *Lobelia*.
4. *LAURENTIA*. Calyx-tube turbinate or oblong. Corolla with its tube as long as the limb, which is like that of *Lobelia*. So are the stamens, pistil, &c. Capsule short, 2-valved at the summit.
5. *DOWNINGIA*. Calyx-tube very long, stalk-like. Corolla with a very short tube, and an ample bilabiate limb; lips spreading, the larger 3-lobed and broad; the two distinct divisions of the smaller narrower. Anther-tube incurved: one or both of the shorter anthers tipped with a stout bristle-like point; the others naked. Ovary at first two-celled. Capsule very long and linear, crowned with the foliaceous and linear calyx-lobes, terete or 2–3-angled, early becoming 1-celled with 2 parietal and many-seeded filiform placentæ, remaining closed at the narrow apex, dehiscent longitudinally by from one to three long fissures or valves.

1. *NEMÁCLADUS*, Nutt. (*Níμα*, a thread, and *κλάδος*, branch, from the very slender stem and branches.)—Two small annuals a span high, at length excessively branched and diffuse: leaves minute; the radical obovate; cauline reduced to subulate bracts: pedicels capillary, racemose on zigzag branches: corolla flesh-color.—Gray in Jour. Linn. Soc. xiv. 28.

N. ramosissimus, Nutt. Glabrous, except the minutely pubescent tuft of radical leaves: calyx 5-cleft; its tube turbinate, adnate to the lower third of the ovary and roundish capsule, which does not exceed the rather unequal lobes: corolla short (a line long), soon separating into 3 or 5 parts or petals: filaments monadelphous above: seeds oblong-oval. — Pl. Gamb. (Trans. Am. Phil. Soc. n. ser. viii.), 254; Torr. Mex. Bound. 108, t. 35. — Gravelly or sandy soil, California to New Mexico.

N. longiflorus, Gray. Radical leaves more canescent: calyx 5-parted, free from and much shorter than the narrow oblong capsule, its lobes equal: corolla narrower, firmly gamopetalous, fully 3 lines long, 3 or 4 times longer than the calyx: filaments long-monadelphous: seeds short-oval. — Proc. Am. Acad. xii. 60. — S. California, *Wallace, Lemmon*.

2. **LOBÉLIA**, L. (Commemorates *Matthias de l'Obel*, latinized *Lobelius*, an early Flemish herbalist.) — Ours herbs, flowering in summer, some of them showy; common in the Atlantic, almost absent from the Pacific United States. Tube of the corolla more or less disposed to split up in age into three pieces or into its five petals; at least the two shorter anthers with a bearded tuft at tip.

§ 1. **HOMŌCHÍLUS**, A.DC. Lips of the corolla somewhat equal; one of them 3-toothed, the other 2-parted: flowers long-peduncled from the axil of leaves or large leafy bracts, in ours red and yellow: perennials.

L. laxiflora, HBK., var. **angustifolia**. Tall and branching: leaves lanceolate or even linear, 3 or 4 inches long, denticulate: peduncles 2 to 4 inches and corolla an inch long: calyx-lobes hardly longer than the tube. — *L. persicæfolia*, HBK., not Lam. *L. Cavanillesii*, Mart.; Hook. Bot. Mag. t. 3600. — Damp ground, just below the Mexican border of Arizona, north of Arispe, *Thurber*. (Mex.) A form intermediate in the breadth of the leaves between the var. and the *L. Cavanillesii*, Cav. Ic. t. 518, or the plant cultivated as *Siphocampylus bicolor*. Anthers sometimes long-hirsute externally, sometimes nearly naked.

§ 2. **EULOBELIA**. (*Eulobelia*, *Hemipogon*, & *Holopogon*, Benth. & Hook.) Larger lip of the corolla 3-parted or 3-cleft and spreading or dependent; the other two lobes either erect or turned backward: flowers racemose or spicate.

* Flowers bright red, large and showy, on erect or ascending pedicels in a virgate raceme: larger anthers naked at tip: perennial from slender offshoots, the flowering plants dying throughout in autumn.

L. cardinalis, L. (CARDINAL-FLOWER.) Minutely pubescent or glabrous: stem 2 to 4 feet high, commonly simple: leaves from oblong-ovate to oblong-lanceolate, tapering to both ends, irregularly serrate or serrulate: lower bracts leafy: tube of calyx and capsule hemispherical, much shorter than the subulate linear lobes: tube of the corolla about an inch long: seeds oblong, rugose-tuberculate: the intense red of the corolla varying rarely to rose-color or even white. — Bot. Mag. t. 320; Bart. Med. Bot. t. 48. — Wet ground, New Brunswick to the Saskatchewan, Florida, and the borders of Texas.

L. splendens, Willd. More slender, glabrous or nearly so: leaves lanceolate or almost linear, glandular-denticulate, all but the lower sessile: seeds less tuberculate: otherwise very like the preceding. — Hort. Berol. t. 86, the corolla-lobes larger and longer than in wild specimens. *L. Texensis*, Raf. Ann. Nat. (1833) 20. — Wet grounds, Texas and through New Mexico and Arizona to southern borders of San Diego Co., California, *Palmer*. Also Mexico. Lobes of the corolla in our plant (as in many Mexican) only 3 to 6 lines long. Anthers sometimes a little hairy on the back.

* Flowers blue or partly white, sometimes varying to white: tips of the three larger anthers naked or short-bearded, or rarely with a tuft like the other two.

+ Flowers rather large (tube of the corolla half or over a third of an inch long), spicate-racemose: capsule short and broad: stems leafy: plants perennial, mostly by offsets.

++ Leaves short and small (about half an inch long), thickish, very numerous up to the inflorescence, and passing into foliaceous bracts.

L. brevifolia, Nutt. Glabrous or minutely pubescent: stem virgate and simple, a foot or two high: leaves rather fleshy, strongly toothed, mostly 2 lines broad; the lowest

obovate or spatulate; the upper oblong-linear, often crowded and widely spreading or reflexed, sometimes even pinnatifid-toothed, the teeth callous: spike-like raceme few-many-flowered: short pedicels mainly appressed and equalled by the short foliaceous bracts: calyx-lobes lanceolate or ovate-lanceolate, strongly and pectinately toothed, auriculate-appendaged at base, fully half the length of the puberulent tube of the corolla: anthers all hairy above, but only the two shorter with conspicuous beard at tip: capsule very short. — A.DC. Prodr. vii. 377; Bertol. Misc. x. 28. *L. crassiuscula*, Hook. Comp. Bot. Mag. i. 100. — Open pine barrens, Louisiana, Alabama, and Florida; flowering late. Tube of the corolla nearly half an inch long.

++ ++ Leaves rather large and broad (1 to 5 inches long), from ovate to broadly lanceolate, numerous; the upper passing into foliaceous bracts: lip and upper part of the tube of the corolla glabrous within.

L. syphilítica, L. Somewhat pubescent with scattered hairs: stem rather stout, very leafy, 2 or 3 feet high: leaves thinnish, lanceolate or oblong and tapering to both ends, irregularly serrate or repand-denticulate (the larger 5 or 6 inches long): spicate raceme leafy below, a span to a foot long: calyx-lobes mostly hairy or ciliate, moderately shorter than the tube of the corolla, the sinuses conspicuously appendaged by deflexed auricles: larger anthers wholly naked at tip. — Dill. Elth. t. 242; Jacq. Ic. Rar. t. 597; Bot. Reg. t. 537. *L. glandulosa*, Lindl. Bot. Reg. xxxii. t. 63. — Wet grounds, Canada to Georgia, Louisiana, and west to Kansas and Dakotah. Runs into some varieties: var. *Ludoviciana*, A.DC., is a south-western smoother form, with thickish leaves: there are also garden hybrids. Auricles of the calyx sometimes reaching the base of the ovary, sometimes short. Corolla bright light blue, rarely varying to white or purple; its tube broader than in the following, half an inch long.

L. pubérula, Michx. Soft-pubescent with very short and fine hairiness, 2 feet high: leaves from ovate to oblong, mostly obtuse and an inch or two long, pale or slightly hoary, callous-denticulate or more toothed; the upper passing into ovate foliaceous lower bracts of the strict and virgate spike-like raceme: flowers mostly crowded, becoming horizontal on the short appressed pedicels: calyx-lobes lanceolate, little shorter than the tube of the corolla (about 4 lines long, rarely shorter in proportion); the auricles at the sinuses short and rounded, commonly very short, often inconspicuous: larger anthers minutely short-bearded at tip: ovary generally hirsute. — Fl. ii. 152. *L. amana*, Ell. ? A.DC. Prodr. vii. 377, not Michx. *L. glandulosa*, Engelm. & Gray, Pl. Lindh. i. 14. — Damp sandy grounds, New Jersey to Illinois, Florida, and Texas. Passes insensibly into

Var. glabélla, Hook. (Bot. Mag. t. 3292, not of Ell.): a greener form, with slender, more glabrous, and usually more naked virgate spike, glabrous calyx, &c., and flowers more secund. — *L. glandulosa*, var. *obtusifolia*, A.DC. l. c.; Bertol. Misc. x. 29. — N. Carolina to Florida and Texas.

L. amœna, Michx. Green and glabrous throughout, or nearly so: stem 1 to 4 feet high, in the larger plants leafy to the virgate raceme: leaves thinnish, oblong-lanceolate or narrower, mostly tapering to both ends, 2 to 4 inches long, irregularly serrate or denticulate; the upper passing into conspicuous lanceolate or linear bracts; these often glandular-denticulate, and the foliaceous lower ones equalling the flowers: calyx-lobes long and very slender, little shorter than the narrow tube of the corolla, from filiform to linear-subulate, commonly quite entire, little widened and not auriculate at base: larger anthers wholly naked or merely puberulent at tip: ovary glabrous: lobes of the large lip of the corolla broadly ovate. — *L. syphilítica*, Walt. Car. 218; Juss. Ann. Mus. xviii. t. 1, f. 1. *L. puberula*, var. *glabella*, Ell. Sk. i. 267. *L. glandulosa*, var. *glabra*, A.DC. l. c. *L. colorata*, Don, Brit. Fl. Gard. n. ser. t. 180, and *L. hortensis*, A.DC. l. c., are a hybrid form of this. — Deep swamps, N. Carolina to Florida. Raceme a span to a foot long; tube of bright blue corolla half an inch long. Calyx-lobes sometimes with a few teeth; the sinuses absolutely naked, or sometimes obscurely bordered. — To this belongs Clayton's plant referred by Gronovius to *L. Cliffortiana*, L.

Var. obtusáta. Cauline leaves oblong, obtuse, and almost entire: spicate raceme virgate and naked: calyx-lobes subulate, shorter, only half the length of the tube of the corolla: larger anthers densely very short-pubescent at tip. — *L. amana*, Chapm. Fl. in part. — Middle Florida, Chapman.

Var. glandulifera. A foot or two high, often slender and sparsely leaved, below sometimes hirsute-pubescent; leaves from oval to lanceolate-oblong, an inch or two long,

mainly obtuse and the margins beset with glandular salient teeth: raceme secund, slender and loosely or few-flowered: bracts mostly shorter than the calyx; these and the slender calyx-teeth beset with slender gland-tipped teeth or lobes: sinuses of the calyx sometimes decidedly auriculate-appendaged: anthers as in the preceding var. or more hairy. — *L. glandulosa*, A. DC. in part. — Moist grounds, S. Virginia to Florida and Alabama. — These three forms clearly run together.

++ ++ ++ Leaves long (2 to 5 inches) and narrow; the upper few and sparse: lip of corolla pubescent at base: usually a pair of glands or small glandular bractlets toward the base of the short pedicel.

L. glandulosa, Walt. Glabrous, or sometimes stem sparsely and often the calyx-tube densely hirsute: stem slender, 1 to 4 feet high: leaves thick and smooth, bright green, lanceolate or linear ($1\frac{1}{2}$ to 4 lines wide), callous- or glandular-denticulate: raceme or spike loosely few-many-flowered, secund, often as it were long-peduncled: bracts linear and subulate, more strongly glandular-toothed: calyx-lobes subulate, half the length of the tube of the corolla, bearing few or numerous salient gland-bearing teeth or lobes, or occasionally quite entire; the sinuses not auriculate-appendaged: tube of the light blue corolla 5 or 6 lines long: anthers all bearded at the tip. — Ell. Sk. i. 265; A. DC. l. c. (excl. vars.); Chapm. Fl. 254. *L. crassiuscula*, Michx. Fl. i. 252; Nutt. Gen. ii. 76. — Pine-barren swamps, S. Virginia (*Bailey*) to Florida: fl. autumn.

+ + Flowers smaller or small: tube of the corolla not exceeding 2 or 3 lines in length.

++ Stem scape-like and mostly simple, hollow: leaves all or mainly in a rosulate cluster at the base, fleshy: bracts of the raceme shorter than the pedicels: lobes of the calyx subulate and entire, the sinuses naked or nearly so: fibrous-rooted and mostly aquatic very glabrous perennials, with pale blue or whitish flowers half an inch long.

L. paludosa, Nutt. A foot or two or even 4 feet high: stem in the larger plants sometimes branching above and bearing several few-many-flowered racemes: leaves flat, from linear-spatulate to oblong, repand-denticulate or entire (1 to 9 inches long), sometimes scattered along the lower part of the stem: corolla pubescent at the base of the lip inside. — A. DC. l. c. 376. — In water (but foliage emerged), Delaware to Florida and Louisiana. *add*

L. Dortmanna, L. Scape a span to a foot high, naked except a few fleshy bracts: leaves in a radical tuft, linear, fleshy, terete, hollow and with a longitudinal partition: raceme loosely few-flowered: lower lip of the corolla almost naked. — Fl. Dan. t. 39. — Borders of ponds, often immersed, New England to Penn., and to subarctic Amer. (Eu.)

++ ++ Stem leafy, mostly simple, strict, and continued into a more or less pedunculate and elongated virgate and naked spike-like raceme: leaves from lanceolate to obovate, barely denticulate or repand: lip prominently 2-tuberculate within at base.

= Flowers or at least the capsules horizontal, secund, scattered in the slender raceme, large for the species, the tube of the corolla $3\frac{1}{2}$ to 2 lines long.

L. Ludoviciana, Gray. Glabrous, 2 or 3 feet high (from a perennial? root), slender: leaves lanceolate, acute, or the lowest spatulate and obtuse, merely denticulate, thickish, an inch or two long (not over 4 lines broad), all with tapering base and the lower petioled: raceme loosely 5-20-flowered: flowers commonly puberulent: corolla half an inch long: calyx with nearly hemispherical tube; its lobes ovate-lanceolate, or rather cordate-lanceolate, being rounded auriculate at the sinuses (their margins entire or obscurely few-denticulate), only half the length of the tube of the corolla, and hardly longer than the capsule: larger anthers densely hirsute at and near the summit, but with no bearded tuft. — Proc. Am. Acad. xii. 00. — Wet prairies, W. Louisiana, *Hale*. Texas near Houston, *Lindheimer*. Tube of the corolla fully a quarter of an inch long: barely a trace of pubescence on the base of the lip. The five short auricles at the sinuses of the calyx broad and entire. Intermediate, as it were, between *L. paludosa* and the following.

L. appendiculata, A. DC. Nearly glabrous, or the strong angles of the slender stem above scabrous, a foot or two high from an apparently annual or biennial root, not rarely branching: leaves thin, mostly denticulate or repand, an inch or two long, obtuse, the lowest obovate, the others oval or oblong and mainly sessile by a broad base: spike-like raceme very slender, several-many-flowered: corolla a third of an inch long: calyx with turbinate tube; its lobes linear-acuminate from a broader base, minutely hispid-ciliate, equalling the tube of the corolla, their bases sagittately extended into the deflexed auricles, which are sometimes subulate and all 10 distinct, but more commonly united partially or wholly into 5 lobes which not rarely cover the tube: base of capsule hemispherical, much

shorter than the calyx-lobes: larger anthers slightly hirsute on the back, but naked at tip. — Prodr. vii. 376. — Moist grounds, W. Louisiana, Arkansas, and E. Texas: flowering early. Tube of the bluish corolla 2 to 2½ lines long. Calyx-appendages, as in all these species, very variable.

== = Flowers or at least the fruit-bearing pedicels ascending, mostly very numerous and hardly second in the elongated and virgate spike-like raceme: tube of the corolla barely 2 lines long: upper leaves passing into bracts in the stronger plants: calyx-lobes loose and spreading in flower.

L. leptóstachys, A. DC. Calyx-tube short-turbinate and in fruit becoming hemispherical, the sinuses each with a pair of subulate or linear strictly deflexed appendages, which mostly soon equal or even exceed the tube; otherwise as the next. — Prodr. vii. 376.

— Sandy dry soil, Ohio to Illinois and Missouri, and Virginia to Georgia: fl. early summer.

L. spicáta, Lam. Puberulent: stem virgate, 1 to 4 feet high (from a biennial? root): leaves pale, barely denticulate, obtuse; the radical and lowest obovate, 1 to 4 inches long; the upper spatulate, gradually smaller, and at length linear-oblong or lanceolate and bract-like: spike-like raceme from 3 to 18 inches long: tube of the calyx turbinate; the lobes subulate or linear-subulate and shorter than the tube of the (light blue, pale, or rarely white) corolla; the sinuses not appendaged. — Dict. iii. 587. *L. Claytoniana*, Michx. Fl. ii. 153. *L. pallida*, Muhl. Cat., Ell., &c. *L. goodenioides*, Willd. Hort. Berol. t. 30. *L. nivea*, Raf. Ann. Nat. 1820, 15, white-flowered form. — Gravelly or sandy and mostly dry soil, N. New England to Saskatchewan, Louisiana and Arkansas: fl. through summer.

Var. parviflora, a small form, with calyx-lobes broadly subulate, and pale corolla only 3 lines long. — *L. pallida*, Muhl.? — Swamps, Lancaster, Penn., Porter: fl. June.

Var. hirtélla, a western form, with somewhat scabrous pubescence, and minutely hirsutely ciliate bracts and calyx-lobes, the latter subulate-linear and fully as long as the tube of the corolla. — Chiefly towards and beyond the Mississippi.

++ ++ ++ Stem very leafy, simple and strict, continued into a very leafy-bracted spike: leaves and bracts laciniate-toothed: lips of the corolla of nearly similar lobes, smooth and naked: seeds with a very smooth and even coat.

L. fenestrális, Cav. Annual or at most biennial, 2 or 3 feet high, nearly glabrous, or the sharp decurrent angles of the stem hairy: leaves oblong or lanceolate, all the upper partly clasping and acuminate, passing into the similar bracts of the long spicate inflorescence, these mostly exceeding the crowded flowers: calyx-tube obovate; the lobes linear and mostly with some slender teeth: tube of the corolla 2 lines long, surpassing the stamens and style: larger anthers short-bearded at tip. — Ic. vi. 8, t. 512; Lindl. Bot. Reg. xxiv. t. 47. *L. pectinata*, Engelm. in Wisliz. Rep. 108. — S. W. Texas to Arizona and Mexico.

++ ++ ++ Stems leafy, often paniculately branched: flowers loosely racemose: sinuses of the calyx not appendaged: mainly biennials or annuals.

= = = Cauline leaves chiefly linear, entire or merely denticulate: capsule not inflated.

a. Tube of the corolla fully 3 lines long: perennial from filiform rootstocks.

L. grúina, Cav. Puberulent or glabrous: stems nearly simple, slender, a foot or two high: leaves all lanceolate or linear, acute, denticulate, an inch or two long: raceme mostly slender-peduncled and few-flowered: calyx-lobes slender-subulate, shorter than the tube of the corolla. — Arizona, in the Sierra Blanca, at 7000 feet, *Rothrock*. Flowers smaller than in Mexican specimens; the tube of corolla only 3 lines long. (Mex.).

b. Tube of the bright blue (rarely varying to white) corolla not over 2 lines long; the two superior lobes small and narrow: plants mainly glabrous, slender and erect: inflorescence disposed to become paniculate.

L. Bóykini, Torr. & Gray. Perennial: stem a foot or two high from a creeping root-stock, fistulous, mostly simple: leaves all small and scattered, filiform or nearly so, an inch or less long and above reduced to setaceous bracts: filiform pedicels rather longer than the flower, spreading: calyx-lobes setaceous-subulate, spreading, very much longer than the short tube, which in fruit is rounded at base: mature capsule half superior: seeds short-oval, rough-rugose. — A. DC. Prodr. vii. 374; Chapm. Fl. 255. — Pine-barren swamps in shallow water, S. Carolina, Georgia, and Florida, beginning to flower in May.

L. Cánbyi, Gray. Perennial from offsets? or annual, 2 feet high, the larger plants paniculately branched above, obscurely puberulent, scabrous or nearly smooth: leaves linear, remotely denticulate-glandular, an inch or two long, a line or two wide: racemes elongated, often leafy at base: pedicels naked, erect or ascending, shorter than the bracts or the flower: calyx-lobes subulate-linear, denticulate-glandular, hardly longer than the wholly

inferior oblong-turbinate capsule: seeds oblong-obovate, rugose-reticulated. — Man. ed. 5. 284. — Wet swamps, New Jersey, Delaware, and S. Carolina: fl. late summer. Corolla about 4 lines long. Capsule 2 lines long.

L. Kálmii, L. Biennial or perhaps perennial from small rosulate offsets, a span to a foot or more high, often paniculately branching, glabrous and smooth or below slightly hairy: radical and lowest cauline leaves oblanceolate or spatulate, and the upper linear, an inch or two long: racemes loosely and mostly few-flowered, often leafy at base or panicled: pedicels equalling or longer than the flowers, mostly 2-glandular or minutely bracteolate above the middle: calyx-lobes subulate, a little longer than the broadly turbinate tube: capsule shorter and blunter at base than in the preceding, or even roundish, wholly inferior: seeds oblong, reticulated. — Bot. Mag. t. 2238. — Wet banks, Lower Canada and Hudson's Bay to L. Winnipeg, and to S. New York and Penn., but rare southward.

L. Nuttállii, Roem. & Schult. Annual, or at most biennial, very slender, a foot or two high, simple or sparingly and loosely branched above: leaves an inch or less in length; the radical ones oblong or oval; the others from lanceolate to linear, denticulate-glandular: racemes slender: pedicels mostly longer than the bract and shorter than the flower; the minute bractlets, if any, near the base: calyx-lobes subulate, considerably shorter than the tube of the pale blue corolla: capsule short and broad, obtuse or rounded at base, half superior: seeds obovate-oval, roughish, these as well as the flowers only half the size of those of *L. Canbyi*. — Torr. Fl. N. Y. i. 240. *L. gracilis*, Nutt. Gen. ii. 77. *L. Kálmii*, var. *gracilis*, Bart. Fl. i. t. 34. — Moist pine barrens, New Jersey and Penn. to Georgia. Whole corolla 3 or at most 4 lines long. — To this belongs the *Rapuntium minimum flore pallido cæruleo*; Clayt., Gronov. Fl. Virg. ed. 2. 134.

= = Leaves chiefly ovate or oblong and more or less serrate or toothed: root annual: stems branching.

a. Capsule not inflated, partly or sometimes mainly superior: pedicels of the pedunculate raceme slender: leaves mostly petioled.

L. Cliffortiána, L. Glabrous or slightly and minutely hairy, a foot or so high: leaves ovate or slightly cordate, obtusely toothed or repand, petioled, or the upper lanceolate and sessile: pedicels filiform, longer than the flowers: calyx-tube obconical; the lobes subulate and shorter than the tube of the corolla: capsule ovoid, obtuse, nearly the upper half free: seeds oval, very smooth and shining. — Hort. Cliff. t. 26, & Sp., excl. syn. Gronov.; Michx. Fl. ii. 152? (Therefore *L. Michauxii*, Nutt. Gen.?) — Occasionally met with in the S. Atlantic States, in waste or cult. grounds: probably introduced from Trop. Amer.

Var. Xalapénsis differs in the fully two-thirds free and rather more oblong capsule (which does not, as in *L. micrantha*, much exceed the calyx-lobes), and the stems are weaker or diffuse. — *L. Xalapensis*, HBK. — Peninsula of Florida (*Canby, E. Palmer, &c.*); perhaps introduced from W. Ind. and Mex.

Var. brachýpoda, a remarkable and distinct form, with cauline leaves from obovate-spatulate to lanceolate, and pedicels (2 or at most 3 lines long) rather shorter than the flower or the capsule, which is that of genuine *L. Cliffortiána*. — *L. Berlandieri*, Torr. Mex. Bound. 107, hardly of A.D.C. — S. W. Texas, *Wright, Parry*. Adjacent parts of Mexico, *Berlandier, &c.* (No. 3177 of the latter may be *L. Berlandieri*, A.D.C., but is from Matamoros, not Tampico: it has long filiform pedicels and seems to be a depauperate form of the true *L. Cliffortiána*.)

L. Feayána, Gray. Slender, a span high, diffusely branched from the base, glabrous throughout: leaves small (a quarter to half inch long), repand-denticulate, roundish or obovate, or the small uppermost spatulate or lanceolate and sessile: raceme loosely 4-10-flowered: pedicels as long as the flower, twice or thrice the length of the subulate bract: calyx-tube and capsule broadly obconical; the latter two-thirds inferior, its free apex about the length of the subulate calyx-lobes; these only half the length of the tube of the bright blue corolla: anthers glabrous (except the bearded tips of the shorter ones): seeds oblong, with a rough cellular coat. — Proc. Am. Acad. xii. 60. — E. & S. Florida, *Dr. Feay, Dr. E. Palmer, Mrs. Treat*. Tube of the corolla under 2 lines long. Pedicels 2 to 4 lines long.

b. Capsule inflated, wholly inferior, longer than the pedicels: leaves sessile.

L. infláta, L. (INDIAN TOBACCO.) Pubescent, a foot or two high, branching above, and the spike-like but loose racemes paniculate: leaves ovate or oblong (an inch or two long), obtusely toothed, veiny; the upper forming foliaceous bracts: uppermost bracts linear-

subulate as long as the pedicels: corolla pale blue or whitish, 2 lines long, hardly surpassing the subulate-linear calyx-lobes: turgid capsule oval, 4 lines long, glabrous, transversely veiny between the ribs: seeds oblong, roughish and reticulated. — Act. Ups. 1741, 23, t. 1; Schk. Handb. t. 269; Barton, Med. t. 16; Bigelow, Med. t. 19; Torr. Fl. N. Y. t. 63. — Open rather dry grounds, Hudson's Bay to Saskatchewan, and to Georgia and Arkansas. Herbage very acrid, formerly much employed in empirical medicine; an acrid-narcotic poison.

3. PALMERÉLLA, Gray. (Named for the discoverer, *Dr. Edward Palmer*.) — A single species. — Proc. Am. Acad. xi. 81, & Bot. Calif. i. 619.

P. débilis, Gray, l. c. A glabrous apparently perennial herb: stems simple or branched above, 2 feet high, slender and rather weak or spreading, very leafy: cauline leaves lanceolate or linear-lanceolate, about 2 inches long, entire or remotely denticulate, very acute; the uppermost passing into foliaceous or at length slender-subulate bracts of the few-many-flowered raceme: pedicels rather slender: lobes of the calyx slender or setaceous-subulate, much longer than the tube, about half the length of the tube of the blue corolla. — In the Tantillas Cañon, just below San Diego Co., California, *Palmer*. Corolla-tube whitish, three-fourths of an inch long, tomentose within, in age disposed to split up from below as in most *Lobelias*, and the filaments then separating, the sinus between the small lobes completely closed, and the filaments most adnate on that side: three larger lobes deep violet-blue, 3 or 4 lines long. Mature fruit not seen.

Var. serráta, Gray; a form with inflorescence and tube of the corolla somewhat puberulent; all but the upper leaves acutely serrate; the lowest broader, spatulate and obovate. — Bot. Calif. l. c.; Rothrock in Wheeler Rep. 1877, t. 16. — Valley of Ojai Creek, Ventura Co., California, *Rothrock*.

4. LAURÉNTIA, Micheli. (In honor of *M. A. Laurenti*, Professor at Bologna early in the 18th century.) — Low herbs, with the aspect and characters of the small species of *Lobelia*, excepting the closed tube of the corolla: flowers blue. Mainly S. Europe, Africa, and S. America: some have ovary almost free. — A.DC. Prodr. vii. 409; Benth. & Hook. Gen. ii. 549. *Porterella*, Torr. in Hayden Rep. 1872, 488.

L. carnósula, Benth. Annual, rooting in the mud, glabrous, 1 to 5 inches high, rather succulent: leaves oblong-linear or lanceolate, entire, sessile, a quarter to half inch long: flowers axillary and above corymbose or racemose, long-pedicelled: calyx-lobes somewhat foliaceous, linear, obtuse, equalling the oblong-obconical or clavate tube, and also that of the corolla: seeds elongated-oblong, smooth. — Gray, Bot. Calif. i. 444. *Lobelia carnosula*, Hook. & Arn. Bot. Beech. 362. *Porterella carnosula* (*carnulosa*), Torr. l. c.; Parry in Am. Nat. viii. 177. — Muddy borders of ponds and streams, from California in the Sierra Nevada to Utah and Wyoming. Limb of corolla deep blue with a white or yellowish throat; three larger lobes round-obovate, 2 or 3 lines long; the other two small and lanceolate.

5. DOWNÍNGIA, Torr. (In memory of *A. J. Downing*, distinguished in landscape gardening, pomology, and horticulture.) — Low and mostly showy-flowered annuals (of Oregon, California, and one in Chili); with entire and sessile slightly succulent small leaves, the upper passing into bracts to the axillary sessile flowers, which, on account of the very long and slender calyx-tube and ovary, seem to be racemose or corymbose. Corolla blue, with white or yellowish throat or broad blotch on the large lip. Capsule sometimes twisted. Seeds oblong, very smooth. — Pacif. R. Rep. iv. 116; Benth. & Hook. l. c. *Clintonia*, Dougl.; Lindl. Bot. Reg. t. 1241.

D. élegans, Torr. Stems a span to a foot long: leaves from ovate to lanceolate, acute (4 to 10 lines long): larger lip of the corolla moderately 3-lobed, the other lobes lanceolate: seeds short-oblong. — *Clintonia elegans*, Dougl.; Lindl. Bot. Reg. t. 1241. *C. corymbosa*, A.DC. Prodr. vii. 347, a more leafy form. — Wet ground, N. California to Washington Terr., and

Nevada to Idaho. Large lip of corolla a fourth to half inch long and broad. Capsule often 2 inches long.

D. pulchella, Torr. Mostly lower or weaker-stemmed; leaves more linear and obtuse: large lip of the corolla deeply 3-lobed; the other two lobes oblong-ovate: seeds elongated-oblong. — *Clintonia pulchella*, Lindl. Bot. Reg. t. 1909; Brit. Fl. Gard. ser. 2. t. 412. — Wet banks, California, nearly through the State, and in the borders of N. Nevada and Oregon. Large lip of corolla much broader than long (9 or 10 by 5 or 6 lines); all the lobes intense blue; the large centre mostly white. — Very like the preceding; both cultivated as ornamental annuals.

ORDER LXXVI. CAMPANULACEÆ.

Herbs, with bland milky juice, alternate simple leaves, no stipules, and regular 5-merous flowers; the tube of the calyx adnate to the 2-5-celled many-ovuled ovary; the corolla and 5 stamens (alternate with its lobes) inserted where the calyx becomes free, or the latter adnate merely to the base of the corolla; fruit a many-seeded capsule, rarely baccate. Calyx persistent, usually divided down to the ovary. Corolla valvate, induplicate, or rarely imbricate in the bud. Stamens mostly distinct: anthers with 2 parallel cells, introrse. Style one, almost always pubescent or puberulent for some distance below the 2 to 5 introrse stigmas. Ovules anatropous, on placenta projecting from the axis. Seeds small, usually smooth. Embryo straight in the axis of fleshy albumen. Flowers often showy; the corolla commonly blue or in the same species white, and withering rather than deciduous. In fertilization proterandrous; the anthers opening in the bud, discharging their pollen upon the style, where it accumulates upon the collecting hairs or pubescence; the stigmas (then firmly conniving) maturing and diverging much later, receiving only pollen conveyed from flower to flower by insects.

TRIBE I. SPHENOCLEÆ. Corolla imbricate in the bud, bearing the short stamens. Style destitute of collecting hairs. Flowers simply spicate, centripetal.

1. **SPHENOCLEA.** Flowers all alike. Calyx with 5 roundish lobes; the short tube adnate almost to the depressed summit of the ovary. Corolla short-campanulate, 5-lobed, deciduous, bearing the stamens on the lower part of its tube. Style very short: stigma capitate-2-lobed. Capsule globular and cuneate at base, 2-celled, with stipitate placenta, circumscissile just below the calyx-lobes, which fall with the lid. Seeds very numerous, oblong.

TRIBE II. CAMPANULEÆ. Corolla mostly valvate or induplicate in the bud, and stamens free or adnate to its very base. Style below the stigmas clothed with pollen-collecting hairs. Inflorescence mostly centrifugal, sometimes centripetal.

* Capsule opening by a perforation at the apex within the calyx.

2. **GITHOPSIS.** Flowers all alike and corolliferous. Tube of the calyx club-shaped, strongly 10-ribbed, adnate up to the very summit of the ovary; limb of 5 long and linear foliaceous lobes. Corolla tubular-campanulate 5-lobed. Filaments short, dilated at the base: anthers long, linear. Ovary 3-celled: stigma 3-lobed. Capsule club-shaped, coriaceous, crowned with the rigid calyx-lobes of its own length, strongly striate-ribbed, many-seeded, opening when the persistent base of the style falls away by a round hole in its place. Seeds fusiform-oblong. — Annual.

* * Capsule dehiscent by one or more small valvular openings on the sides, usually over a partition, rarely disposed also to split septically.

3. **SPECULARIA.** Flowers in Amer. species dimorphous; the earlier ones smaller, with undeveloped corolla, and close-fertilized in the bud. Calyx-lobes in these flowers commonly 3 or 4, in the ordinary corolliferous flowers 5, narrow: calyx-tube more or less elongated and narrow, usually prismatic. Corolla short and broad, rotate when expanded or nearly so, 5-lobed or 5-parted. Anthers linear. Stigmas and cells of the ovary 3, sometimes 2 or 4. Capsule prismatic or elongated obconical, or cylindraceous; the valvular openings either near the summit or near the middle. — Annuals.

4. **CAMPANULA**. Flowers all alike and corolliferous. Calyx-lobes 5, narrow, its tube short and broad. Corolla campanulate or nearly rotate, 5-lobed or 5-parted. Filaments dilated at base: anthers oblong or linear. Stigmas and cells of the ovary 3 to 5. Capsule mostly short, opening on the sides or near the base by 3 to 5 small uplifted valves or perforations.

* * * Capsule bursting indefinitely on the sides by the giving way of the thin walls.

5. **HETEROCODON**. Flowers dimorphous in the manner of *Specularia*. Calyx with large and leaf-like ovate lobes, 3 or 4 in the earlier, 5 in the later flowers, much longer than the obpyramidal tube. Corolla open campanulate, 5-lobed. Stamens, style, &c., as in *Campanula*. Capsule 3-celled, 3-angled, very thin and membranaceous. Seeds numerous, oblong, obscurely triangular. — Annual.

1. **SPHENOCLÉA**, Gærtn. (*Σφήρ*, a wedge, and *κλείω*, to shut up, the bases of the crowded capsules becoming wedge-shaped by mutual pressure.) — A single species, native of tropical Africa or Asia, dispersed over the warmer parts of the world.

S. **ZEYLÁNICA**, Gærtn. Glabrous and somewhat succulent annual, a foot or more high: leaves entire, from obovate to lanceolate, tapering into a petiole: flowers closely sessile in a dense terminal pedunculate spike, small, each subtended by a short bract and pair of bractlets: corolla white, a line or so wide, slightly exceeding the calyx. — *S. Pongatium*, A.DC. Prodr. vii. 548. *Pongatium Indicum* (Juss.), Lam. — Low grounds, nat. in Louisiana.

2. **GITHÓPSIS**, Nutt. (From the resemblance of the calyx to that of *Githago*, the Corn Cockle.) — Nutt. Trans. Am. Phil. Soc. n. ser. viii. 258; Benth. & Hook. Gen. ii. 559; Gray, Bot. Calif. 1. 446. — Single species.

G. **specularioides**, Nutt. Small annual, 2 to 10 inches high, hirsute or glabrate: leaves small, linear-oblong, coarsely toothed, sessile: flowers simply terminating the stem or branches, or becoming lateral, strictly erect: corolla blue: rigid capsule tapering into a very short and stout peduncle. — *G. calycina*, Benth. Pl. Hartw. 321. *G. pulchella*, Vatké in Linn. xxxviii. 714. — Open grounds, California, toward the coast, and Oregon. Calyx-lobes from near half to three-fourths inch long, rigidly 1-nerved, sometimes few-toothed. The form named *G. calycina* has short corolla, exceeded by the long calyx-lobes; the *G. pulchella*, longer corolla surpassing the calyx-lobes.

3. **SPECULÁRIA**, Heister, A.DC. (*Speculum Veneris*, i. e. Venus's Looking-Glass, an early popular appellation of the common European species.) — Annuals, with leafy slender stems, and sessile or short-peduncled flowers, 1-2-bracteolate, terminal or in the axils of the leaves. Corolla blue or purplish. The American species, differing from those of the Old World chiefly in the dimorphism of the flowers, are not to be generically separated. — *Triodanis* (not *Triodallus*), Raf., founded on specimens with only the close-fertilized flowers yet appearing. *Dysmicodon*, section of *Specularia*, Endl., but the true character unnoticed. *Dysmicodon* & *Campylocera*, Nutt. l. c.

§ 1. **CAMPYLÓCERA**, Gray. Flowers dimorphous. Stigmas 2 to 4. Capsule slender, straight or curved, occasionally twisted, in the close-fertilized flowers at least disposed to split longitudinally into valves, sometimes by abortion one-celled. — Proc. Am. Acad. xi. 82. *Campylocera*, Nutt. l. c.

S. **leptocárpa**, Gray. Minutely hirsute and roughish or nearly glabrous: stems (a span or two high) virgate, mostly simple or branched from the base: leaves lanceolate: flowers closely sessile in their axils: stigmas 2 or 3: cells of the ovary as many, or in the lower close-fertilized flowers only one with a parietal placenta: calyx-lobes of the lower flowers 3: capsules nearly cylindrical (half to three-fourths inch long, only a line thick), inclined to curve and rarely to twist, opening by one or two uplifted valves near the summit; the lowest also often splitting longitudinally from the summit: seeds oblong. — Proc. Am. Acad. l. c. *Campylocera leptocarpa*, Nutt. l. c. *Specularia* (*Campanula*)

Linsecomii, Buckley, Proc. Acad. Philad. 1861, 460. — Arkansas to W. Texas and Colorado. Leaves an inch long or less. Expanded corolla half to three-fourths inch wide.

S. Lindheimeri, Vatké. Larger than the last: stems erect or diffuse (1 to 3 feet long), paniculately branched above: leaves oblong-lanceolate or the lower oblong or spatulate: flowers subsessile or short-peduncled, commonly terminating branchlets: stigmas 3 or 4: cells of the ovary as many: calyx-lobes even in close-fertilized flowers 5, about the length of the ovary: capsules angular, narrowed to the base, mostly straight, not twisted, opening by 2 or 3 downwardly turned or irregularly bursting small valves below the summit, and afterwards somewhat disposed to be septicial: seeds almost orbicular, flattened. — Linn. xxxviii. 713; Gray, l. c. *Campanula Coloradoense*, Buckley, l. c. — W. Texas, on the Colorado and Guadaloupe, &c. Larger leaves two inches long. Expanded corolla sometimes an inch broad.

§ 2. *Dysmicodon*, Endl. Flowers dimorphous. Capsule rather short, straight, not disposed to split. — *Dysmicodon*, Nutt. l. c.

S. biflora, Gray. Stem slender, mostly simple or branched from the base, minutely and retrorsely serrulate-hispid on the angles: leaves sessile, ovate or oblong, or the upper reduced to lanceolate bracts, sparingly somewhat crenate: flowers sessile, singly or in pairs in the axils: the lower and close-fertilized ones with 3 or 4 short subulate or ovate calyx-lobes; the upper with 4 or 5 longer lanceolate-subulate calyx-lobes shorter than the developed corolla: capsule oblong and cylindraceous or slightly fusiform, obscurely ribbed, the 2 or 3 valvular openings close under the calyx: seeds lenticular. — Proc. Am. Acad. l. c. *Campanula biflora*, Ruiz. & Pav. Fl. Per. ii. 55, t. 200, f. 6. *C. Monteridensis*, Spreng.? *C. Ludoviciana*, Torr. ined. *C. intermedia*, Engelm. in Nutt. l. c. *Dysmicodon Californicum* & *D. ovatum*, Nutt. l. c. *Specularia ovata*, Vatké, l. c. — Open grounds, often with the next, S. Carolina to Texas and Arkansas; also in California. Leaves half an inch or less in length, the uppermost shorter than the flowers. (S. Am.)

S. perfoliata, A.DC. Stems commonly stouter and simple (8 to 20 inches high), very leafy throughout, hirsute or hispid on the angles, sometimes smoother: leaves round-cordate and clasping, mostly crenate, veiny: flowers sessile singly or clustered in the axils: calyx-lobes of the close-fertilized flowers 3 or 4 and short, of the later and corolliferous flowers as long as the ovary: capsule oblong or somewhat obconical; the 2 or 3 valvular openings at or below the middle: seeds lenticular. — Torr. Fl. N. Y. i. 428, t. 65. *Campanula perfoliata*, L.; HBK. Nov. Gen. & Sp. t. 265. *C. amplexicaulis*, Michx., &c. *Dysmicodon perfoliatum*, Nutt. l. c. — Open gravelly ground, Canada to Texas, Utah, and Oregon. (Mex., &c.)

4. CAMPÁNULA, Tourn. BELL-FLOWER, HARE-BELL. (Italian *Campana*, a bell.) — Flowers mostly showy or pretty and blue or white, in summer. Seeds smooth. A very large genus, dispersed over the northern hemisphere, but scanty in North America. Ours all have a 3-celled ovary, and all but one on our north-western borders have naked sinuses to the calyx. “Canterbury-bells” of the gardens, *C. Medium*, represents the section with reflexed appendages in the sinuses of the calyx, covering the tube, and the cells to the ovary as many as lobes to the corolla.

§ 1. Calyx with deflexed appendages at the sinuses more or less covering the tube: our species perennial and the stigmas and cells of the ovary 3.

C. pilosa, Pall. Stems an inch to a span high, 1-flowered, when young woolly-pubescent: leaves mainly radical, from ovate to spatulate-lanceolate, crenate; the cauline from lanceolate to linear: calyx-lobes ovate-lanceolate: corolla an inch or more long, open-campanulate, internally soft-bearded; its tube longer than the lobes and surpassing the calyx. — Roem. & Sch. Syst. v. 148; Ledeb. Ic. t. 209; Herder in Radde, Reis. iv. 6. *C. dasyantha*, Bieb. Cauc.; Reichenb. Ic. Crit. i. t. 85; A.DC. Camp. t. 10, f. 4. *C. Pallasiana*, Roem. & Sch. l. c. *C. Altaica*, A.DC. l. c. 229, t. 10, f. 3. — Alaska, Aleutian Islands, and northward. (Kamtschatka and Siberia.)

§ 2. Calyx wholly destitute of appendages at the sinuses : stigmas and cells of the ovary 3.

* Style not longer than the corolla, straight : root perennial in all the North American species.

— Openings of the capsule toward its summit : low and one-flowered arctic-alpine plants.

C. lasiocarpa, Cham. An inch to a span high, rather slender : leaves denticulate or lacinate with subulate salient teeth ; the radical spatulate or oblong, mostly acute, and slender-petioled ; cauline few and lanceolate or linear : calyx-tube obconical, villous ; its lobes lanceolate-linear, lacinate-toothed : corolla between half and an inch long, broadly oblong-campanulate, glabrous within ; its tube twice the length of its lobes and surpassing the calyx : capsule turbinate. — Linn. iv. 39 ; Hook. Fl. ii. 28. *C. algida*, Fischer in A.DC. Camp. 338, t. 11, f. 4. — Summit of high northern Rocky Mountains (*Drummond*) ; N. W. Coast and Islands. (Kamtschatka.)

C. uniflora, L. Chiefly glabrous, 1 to 4 inches high : leaves small (an inch or less long), entire or nearly so, thickish ; the lowest spatulate or oblong, obtuse, uppermost linear : flower small (4 to 6 lines long), rather slender-peduncled : calyx-tube often pubescent, nearly as long as the lobes, which are from fully to half the length of the bluish corolla : capsule cylindraceous or clavate (half inch long). — Fl. Lapp. t. 9 ; Fl. Dan. t. 1512. — Arctic regions from Labrador to Aleutian Islands, and south to the Colorado Rocky Mountains. (N. W. Eu., N. E. Asia.)

— Openings of the capsule at or near its base.

++ Rather coarse and large, pubescent, many-flowered European species, escaped from cultivated ground and sparingly naturalized near the Northern Atlantic coast.

C. RAPUNCULOIDES, L. Minutely roughish-pubescent : stem 1 to 3 feet high, simple or at length branching : leaves more or less crenate and acuminate ; the lower and radical ones cordate and long-petioled ; upper lanceolate and passing into bracts of the loose virgate mostly one-sided true raceme : corolla oblong-campanulate deeply 5-lobed (an inch long), blue : capsule globular, nodding on a short pedicel. — Fl. Dan. t. 1327. — Roadsides and fields, Canada to Penn. (Nat. from Eu.)

C. GLOMERATA, L. Pubescent, a foot high : leaves serrulate ; the lowest and radical cordate-oblong and slender-petioled ; the others closely sessile, ovate-lanceolate or oblong : flowers sessile in a few terminal and upper axillary clusters, exceeding the leafy bracts : corolla (an inch long) oblong-campanulate : capsule erect, opening near the base. — Fl. Dan. t. 1328. — Roadsides, E. Massachusetts : rare. (Nat. from Eu.)

++ Slender or low species, with filiform rootstocks, mostly glabrous, one-several-flowered (inflorescence centrifugal) : peduncles or pedicels slender,

= When several racemously disposed on the simple smooth stem : capsule nodding : radical leaves roundish or ovate and often cordate, at least on sterile shoots. (HARE-BELLS.)

C. Scheuchzeri, Vill. Stem a span to a foot high, 1-4-flowered, more commonly 1-flowered : cauline leaves linear or narrowly lanceolate, sessile, not rarely denticulate ; lowest cauline spatulate : flower-bud nodding : campanulate corolla half to three-fourths inch long, little or moderately exceeding the slender linear-subulate calyx-lobes. — Prosp. 22 (1779), & Dauph. ii. 503, t. 10 ; Koch, Syn. 538. *C. linifolia*, Willd. ; A.DC. l. c., &c., in part, not Lam. (1785). *C. dubia*, A.DC. Camp. 236. *C. Langsdorffiana*, Gray in Am. Jour. Sci. xxxiv. 254. — Alpine and subalpine or subarctic, Newfoundland and Labrador, and Alaska ; Rocky Mountains down to Colorado, *Parry, E. Hall*. The latter specimens strictly 1-flowered, with the base or lower part of the leaves hirsute-ciliate, and calyx-lobes sparingly denticulate. (Eu., N. Asia.)

Var. heterodoxa. Stems more diffuse and leafy : cauline leaves from lanceolate to ovate-lanceolate (2 or 3 to even 5 lines wide), often sharply denticulate, nearly all tapering into margined petioles ; the radical round-cordate or ovate (sometimes an inch in diameter) : corolla two-thirds to a full inch long : slender calyx-lobes more spreading or even reflexed, especially in fruit. — Vest in Roem. & Sch. Syst. v. 98 ; Bong. Sitk. 144. *C. Langsdorffiana*, Fischer. *C. linifolia*, var. *Langsdorffiana*, A.DC. Camp. 279, in part. *C. linifolia*, var. *heterodoxa*, Ledeb. Fl. Ross. ii. 888. *C. pratensis*, A.DC. l. c. 287 ? excl. var. — Newfoundland, *Plylie* ; Alaska and islands to the Shumagins.

C. rotundifolia, L. Stems diffuse or erect, a foot or two long, or sometimes dwarfer, 1-9-flowered : orbicular or cordate slender-petioled leaves only on radical shoots ; cauline

leaves linear: flower-buds erect on the slender pedicel: campanulate corolla from half to even an inch long: calyx-lobes setaceous-subulate. — Fl. Dan. t. 855 & 1036. — *C. petiolata*, A.DC. l. c., is apparently this rather than the foregoing. — Rocky banks through the sub-arctic regions, and common northward, ranging south to the Alleghany Mountains, New Mexico, and the northern borders of California. Calyx-lobes from a third to half the length of the bright blue corolla, and erect or spreading; or sometimes nearly equalling it, almost filiform, and widely spreading after the flower opens. (Eu., N. Asia.)

== Peduncles when several cymose or paniculate, erect in blossom and fruit: angles of the weak stem and midrib or margins of leaves commonly retrorsely scabrous: flowers small.

C. aparinoïdes, Pursh. Stem a foot or two high, almost filiform, equally leafy to the top; its sharp angles rough with almost prickly short retrose bristles: so also the midrib beneath and the margins of the lanceolate or linear sessile leaves: flower-buds drooping: corolla open-campanulate, deeply 5-cleft (the lobes 2 lines long or less): calyx-lobes triangular, short, about equalling the tube of the pale blue or whitish corolla. — Fl. i. 159. *C. erinoides*, Muhl., Nutt., &c., not L. — Wet grassy grounds, Canada to Georgia, and from the Saskatchewan to the mountains in Colorado. Leaves varying from linear, and 20 lines long by one wide, to lanceolate-oblong, less than an inch long and 3 lines wide.

C. Floridána, Watson, in herb. Glabrous and smooth throughout: stems filiform, simple or sparingly branched, a span high; leaves from oblong to linear-lanceolate, remotely serrulate, almost sessile, about half an inch long: flowers few, terminating the stem or branches: corolla 5-parted, blue, somewhat rotate; the divisions ovate-lanceolate, equalled by the slender lanceolate-linear smooth and spreading calyx-lobes. — E. and S. Florida: Pease River, *Dr. Feay*; and Indian River, &c., *Dr. E. Palmer*. Calyx lobes 2 to at length 4 lines long.

C. linnæifolia, Gray. A span to a foot high, simple or sparingly branched at summit: leaves from roundish to ovate-oblong, obtuse, crenately serrate, nearly sessile, half inch or less long; the margins and the sharp angles of the stem retrorsely hispid-ciliate: flowers solitary terminating the branches: corolla pale blue, campanulate, 5-cleft (barely half inch long), its tube somewhat exceeding the broadly lanceolate calyx-lobes, which are retrorsely ciliate like the leaves: capsule globular. — Proc. Am. Acad. vii. 366, & Bot. Calif. i. 448. *Wallenbergia Californica*, Kellogg, Proc. Calif. Acad. ii. 158 ? — Swamps, Mendocino Co., California, *Bolander*, &c.

* * Style filiform and straight, exceeding the narrow campanulate corolla: capsule hemispherical or short-turbinate, the openings near the middle or base: leaves sharply or laciniately serrate: root perennial: inflorescence centrifugal,

+ Racemiform. Pacific species.

C. Scoüleri, Hook. Glabrous or a little pubescent, stems slender, a span to a foot or so long, at length spreading, often branching: leaves from ovate to lanceolate, mostly tapering at base into a margined petiole: flowers more or less panicle, on long filiform pedicels: corolla oblong in the bud, rather longer than the slender calyx-lobes, somewhat deeply 5-cleft (4 lines long); its lobes ovate-oblong. — A.DC. Camp. 312; Hook. Fl. ii. 28, t. 125. — Open coniferous woods, Puget Sound to the mountains in N. California.

C. prenanthoides, Durand. Glabrous or roughish-puberulent: stems more erect, a foot or two high: leaves more numerous and shorter (half to an inch or so long), more copiously and sharply serrate, from ovate-oblong to lanceolate; the cauline mainly sessile: flowers racemose, scattered or clustered, generally numerous, short-pedicelled: corolla slender-cylindrical in the bud, twice the length of the slender calyx-lobes (5 or 6 lines long), almost 5-parted; its lobes narrowly lanceolate and 2 to 4 times the length of the tube. — Jour. Acad. Philad., n. ser. ii. 93; Gray, Proc. Am. Acad., l. c. & Bot. Calif. i. 448. *C. filiflora*, Kellogg, Proc. Calif. Acad. ii. 5. *C. Roezli*, Regel, Animad. Pl. Hort. Petrop. 1872, 6. — Coniferous woods and open grounds, California, along the coast from Monterey to Mendocino Co., and through the northern part of the Sierra Nevada. Capsule thin-walled, and with broad and retuse base.

+ + Effusely paniculate. Alleghany species.

C. divaricata, Michx. Glabrous: stems paniculately branched, 1 to 3 feet high, slender: leaves oblong to linear-lanceolate, acuminate at both ends, strongly or laciniately serrate in the middle, slightly petioled (2 or 3 inches long): panicle very open and compound: filiform pedicels as long as the flowers: corolla pale blue, campanulate, barely 3 lines long; its

lobes and the subulate calyx-teeth considerably shorter than its tube. — *C. flexuosa*, Michx. Fl. i. 109, appears to be only a low form of this from the higher mountains. — Rocks and banks, along the Alleghanies from Virginia and E. Kentucky to Georgia.

* * * Long filiform style declined and upwardly curved, much exceeding the rotate corolla: capsule oblong-clavate, sessile, erect; the openings close to the summit: inflorescence truly spicate (centripetal): root annual or at most biennial.

C. Americána, L. Sparsely hairy or almost glabrous: stem mostly simple, a yard or two high: leaves thin and large, ovate and ovate-lanceolate or the lowest cordate, petioled; upper passing into bracts of the elongated and loosely many-flowered virgate spike: corolla white or blue, almost 5-parted; its lobes ovate or ovate-lanceolate, half an inch long, exceeding the divergent subulate-setaceous calyx-lobes: capsules half an inch long. — *C. obliqua*, Jacq. Schœnb. t. 336. *C. acuminata*, Michx. Fl. i. 108. *C. declinata*, Moench. *C. Illinoensis*, Fresenius, a branched state with paniculate leafy spikes, which is not uncommon. — Shaded low ground, W. New York to Iowa, south to Georgia and Arkansas.

C. PLANIFLORA, Lam. (*C. nitida*, Ait.), long ago described from cultivated specimens, vaguely attributed to North America, is wholly unknown in the wild state; apparently allied to *C. persicifolia*, L., and not N. American.

5. HETEROCÓDON, Nutt. (*Ετέρα*, different, and *κόδων*, a bell, from the two kinds of campanulate flowers.) — A single species, near *Campanula*, to which Bentham joins it. — Nutt. in Trans. Am. Phil. Soc. n. ser. viii. 255.

H. rariflorum, Nutt. A delicate little annual, sparsely hirsute: stems filiform, diffusely spreading, leafy, branching: leaves orbicular with cordate partly clasping base (a fourth to half inch long), coarsely many-toothed: flowers solitary, terminal and lateral, also axillary; the later ones only with well-developed pale blue corolla, which barely exceeds the ovate and sparingly toothed foliaceous calyx-lobes; these one to three lines long. — Shady and grassy places, Vancouver's Island to California and Nevada, along the coast ranges and the Sierra Nevada.

ORDER LXXVII. ERICACEÆ.

Trees, shrubs, or some perennial herbs, with simple and undivided leaves destitute of stipules and commonly alternate, symmetrical (4-5-merous) and perfect flowers, either regular or occasionally irregular, stamens free or nearly free from the corolla and as many or more commonly twice as many as its lobes or petals, the anthers 2-celled and in most opening by pores (in many awned or otherwise appendaged), the pollen composed of 4 united grains (except in the fourth suborder and a part of the third), and the style single. Calyx imbricated or sometimes valvate in the bud, free and the corolla and stamens hypogynous, except in the first suborder. Corolla not rarely 5- (or 4-) petalous, in the bud imbricated or in some convolute. Anthers introrse, or in the *Pyrolinæ* primarily and normally extrorse, but in anthesis introrsely inverted! Ovary 4-10-celled (or the cells rarely 3 or 2 and fewer than the petals), with placenta in the axis (a tribe of *Monotropeæ* excepted); the ovules numerous, generally very numerous, sometimes solitary, anatropous. Stigma not rarely girt with a ring, entire or merely lobed; only in *Clethra* is the apex of the style 3-cleft. Fruit capsular, baccate, or drupaceous. Embryo small or minute, in fleshy albumen; the cotyledons small and short or undeveloped. (*Ericaceæ*, *Vacciniaceæ*, *Pyrolaceæ*, & *Monotropeæ* of authors, all merging into one large family.)

SUBORDER I. VACCINIEÆ. Calyx-tube adnate to the ovary (or to the greater part of it), which in fruit is baccate, either a true berry or drupaceous, crowned with the calyx-teeth. Corolla always gamopetalous, and with the disk

epigynous. Anthers erect, introrse; the cells partly separate or prolonged at apex into a tip or a tubular appendage, where they open by a pore or chink. Pollen-grains compound, of four united grains. Stigma not indusiate. Seeds with a close and firm coat. — Shrubby or suffrutescent, with scaly buds: leaves all alternate.

* Ovary wholly inferior: herbage not aromatic.

1. **GAYLUSSACIA**. Ovary 10-celled, 10-ovuled. Fruit baccate-drupaceous, with 10 seed-like nutlets.

2. **VACCINIUM**. Ovary 4-5 celled, or by false-partitions from the back of these cells 8-10 celled: ovules numerous. Fruit a berry; its cells several-many-seeded.

* * Ovary at first one third to one half superior: herbage aromatic as in *Gaultheria*.

3. **CHIOGENES**. Ovary and white berry 4-celled, many-seeded. Corolla short-campanulate, 4-cleft. Stamens 8: anthers awnless, 4-cuspidate at apex.

SUBORDER II. ERICINÆ. Calyx free from the ovary. Corolla gamopetalous, rarely polypetalous or nearly so, hypogynous. Disk generally annular or 8-10-lobed. Anthers upright, introrse. Pollen-grains compound. Shrubs or small trees.

TRIBE I. ARBUTEÆ. Fruit fleshy, either baccate or drupaceous. Corolla urceolate or globular, 5-toothed or rarely 4-toothed, deciduous. Stamens twice as many as the corolla lobes, included. Buds scaly. Leaves alternate.

4. **ARBUTUS**. Anthers compressed, bearing a pair of reflexed awns on the back, each cell opening at the apex anteriorly by a terminal pore. Ovary 5- (rarely 4-) celled, ripening into a granular-coated and many-seeded berry, with firm endocarp.

5. **ARCTOSTAPHYLOS**. Ovary 4-10-celled, with solitary ovules in the cells, in fruit forming a drupe with as many seed-like nutlets or a solid stone.

TRIBE II. ANDROMEDEÆ. Fruit a loculicidal chiefly 5-celled and many-seeded capsule; the valves usually bearing the partitions, which separate from the persistent placentiferous axis or columella. Corolla gamopetalous, deciduous. Stamens twice the number of the corolla-lobes (mostly 10), more or less included. Leaves mainly alternate.

* Anther-cells opening through their whole length, not appendaged: stigma 5-lobed; the lobes adnate to a surrounding ring or cup.

6. **EPIGÆA**. Calyx of 5 nearly distinct and strongly imbricated dry and scarious sepals. Corolla salver-form, 5-lobed. Stamens 10, mostly equalling the tube of the corolla: filaments filiform: anthers linear-oblong, blunt.

* * Anthers opening only at the top: stigma usually entire.

+ Calyx becoming fleshy and baccate in fruit, enclosing the small capsule.

7. **GAULTHERIA**. Calyx 5-cleft; its lobes imbricated. Corolla ovate-urceolate to campanulate. Stamens 10: filaments dilated towards the base: capsule deeply umbilicate; placentæ ascending.

+ + Calyx unchanged and dry under the capsule.

++ The lobes or sepals valvate or open in the bud, never overlapping.

8. **ANDROMEDA**. Corolla from globular-urceolate to cylindraceous, 5-toothed or 5-lobed. Ovary and capsule 5-celled, umbilicate: placentæ borne on the summit or middle of the columella; the seeds pendulous or spreading in all directions.

++ ++ Sepals or calyx-lobes more or less imbricated, at least in the early bud.

= Corolla cylindraceous or conical-urceolate, 5-toothed: anthers fixed toward their base: leaves plane, usually large and broad: capsule not thickened at the dorsal sutures.

9. **OXYDENDRUM**. Calyx short, early open, naked at base. Corolla minutely canescent. Anthers linear, unappendaged, narrower than the broadly subulate filaments; the cells opening by a long chink. Capsule ovoid-pyramidal: placentæ on the short columella at the base of the cells. Seeds all ascending or erect, scobiform, with loose reticulated coat extended at each end much beyond the linear nucleus. Bracts and bractlets minute and deciduous.

10. **LEUCOTHOE.** Calyx slightly or in one section much imbricated. Filaments subulate: anthers oblong, obtuse, blunt; the cells opening by a terminal pore or chink, either pointless, or 2-mucronate, or sometimes 1-2-awned from the apex: filaments subulate. Capsule depressed-globose, 5-lobed; valves mostly thin, entire; placentæ borne on the summit or upper part of the columella. Seeds pendulous or in all directions; the coat various but usually loose.

11. **CASSANDRA.** Calyx of rigid and much imbricated ovate sepals, subtended by a pair of similar bractlets. Filaments subulate (glabrous): anthers awnless; the cells tapering into a tubular beak, which opens by a pore at the apex. Capsule depressed-globose: pericarp in dehiscence separating into two layers; the chartaceous epicarp loculicidally 5-valved; endocarp cartilaginous, at length 10-valved; sutures not thickened; placentæ on the summit of the short columella. Seeds imbricated in 2 rows, compressed and obtusely angled; the smooth and shining coat much thickened on the side next the placenta.

= = Corolla open-campanulate, 4-5-lobed or parted: anthers short, fixed nearly by their apex: fruticulose and heath-like, with small thick or acerose mostly imbricated leaves.

12. **CASSIOPE.** Calyx ebracteolate, of ovate imbricated sepals. Anther-cells each opening by a large terminal pore, and tipped by a slender recurved awn. Capsule globose or ovoid, 4-5-valved; the valves 2-cleft. Seed-coat thin and close.

TRIBE III. ERICEÆ. Fruit a loculicidal or sometimes septicial 4-5-celled capsule. Corolla gamopetalous, marcescent-persistent; the lobes convolute in the bud. Stamens twice the number of the corolla-lobes (8, rarely 10). Heath-like leaves commonly opposite or verticillate.

13. **CALLUNA.** Corolla campanulate, 4-parted, shorter and less conspicuous than the 4 concave colored sepals, both scarious and persistent. Anthers with a pair of auriculate appendages on the back; the cells opening by a long chink. Ovary 8-angled: ovules numerous, pendulous: style filiform. Capsule globose-4-angular, septicially 4-valved.

TRIBE IV. RHODODENDREÆ. Fruit a septicial capsule; the valves (except in *Leiophyllum*, &c.) in dehiscence separating from the persistent placentiferous columella. Corolla deciduous, its lobes or petals chiefly imbricated in the bud. Anthers destitute of awns or appendages. Stigma not rarely surrounded by a ring or border. (*Rhodoreæ* Don, name changed by Maximowicz, because *Rhodora* falls into *Rhododendron*.)

* Anthers opening by a pore or chink at the apex of each cell.

+ Corolla gamopetalous: scaly leaf-buds none: flowers from the axils of coriaceous-foliateous persistent (seldom scale-like or scarious) bracts, or rarely from those of ordinary leaves: filaments and style filiform: capsule globular, 4-5-valved from above.

14. **BRYANTHUS.** Corolla from campanulate to ovoid, 4-6-lobed; the lobes simply imbricated in the bud. Stamens 8 to 10, straight. Leaves heath-like, alternate but crowded.

15. **KALMIA.** Corolla crateriform or saucer-shaped, with a short narrow tube, 5-lobed, 10-saccate below the limb. Stamens 10; the short anthers lodged in the sacs of the corolla in the bud, so that the filaments are strongly recurved when this expands. Capsule tardily septicial. Leaves alternate, opposite, or whorled, flat.

+ + Corolla gamopetalous: buds, at least flower-buds, scaly-strobilaceous; the thin or scarious scales caducous or deciduous: capsule 4-5-valved (or sometimes more) from apex to base: seeds usually (but not always) scobiform, having the loose coat produced or appendaged at both ends: calyx often much reduced or obsolete.

16. **MENZIESIA.** Flowers usually 4-merous. Corolla from globular-urceolate to cylindraceous, 4-toothed or lobed. Calyx bristly-ciliate. Stamens included, mostly 8: filaments subulate: anthers mostly linear-sagittate; the cells opening by an oblique pore or short chink. Style included: stigma truncate. Capsule short.

17. **RHODODENDRON.** Flowers almost always 5-merous. Corolla various (but not contracted at the orifice), lobed or cleft, or even parted, often somewhat irregular. Stamens sometimes as few as the corolla-lobes, more commonly of twice the number, usually declined: filaments filiform or slender-subulate: anthers short; the cells opening by a terminal orbicular pore. Style filiform: stigma capitate or somewhat lobed.

+ + + Corolla polypetalous or very nearly so: filaments filiform: seeds scobiform or linear: placenta borne on the summit of the persistent columella.

18. **LEDUM.** Calyx 5-lobed or parted, small. Petals oval or obovate, widely spreading. Stamens 5 to 10. Capsule oval or oblong, 5-celled, 5-valved from the base upward; the columella slender. Flowers umbellate or corymbose from separate strobilaceous buds.

19. **BEJARIA.** Calyx 4-5-lobed. Petals obovate or spatulate, somewhat erect. Stamens 12 or 14. Capsule depressed-globose, 6-7-lobed, 6-7-valved from above; the columella short. Flowers (in ours) racemose: no strobilaceous buds.

* * Anthers opening longitudinally from the apex nearly or quite to the base of the cells: corolla of distinct petals, or in *Loiseleuria* 5-cleft: no thin-scaly strobilaceous buds: leaves entire: capsule 3-5- (rarely 2-) valved from above.

+ Low and small-leaved evergreens: coriaceous persistent leaves mostly opposite: flowers small, corymbose or fascicled: pedicels subtended by coriaceous foliaceous persistent scales or bracts: calyx 5-parted: style and slender filaments not declined: anthers globose-didymous: seeds oval, with a thin close coat.

20. **LEIOPHYLLUM.** Petals 5, obovate-oblong, spreading. Stamens 10: filaments and style filiform, exserted. Placentæ borne on the middle of the columella, but carried away with the 2 or 3 valves in dehiscence.

21. **LOISELEURIA.** Corolla broadly campanulate, deeply 5-cleft. Stamens 5: filaments and style stout-filiform and included. Capsule 2-3-valved, and valves at length 2-cleft; the placentæ left on the columella.

+ Erect shrubs, with deciduous alternate leaves: flowers larger, from leafy shoots of the season: anthers oblong: filaments flat and subulate or linear: style long, more or less declined and incurved, thickened at the apex and annulate around the discoid stigma: placentæ persistent on the short columella: seeds with a loose cellular or fungous coat.

22. **ELLIOTTIA.** Petals (3 to 5) mostly 4, long and narrow. Stamens as many or twice as many: filaments short. Flowers in conspicuous terminal racemes or panicles.

23. **CLADOTHAMNUS.** Petals 5, oblong, spreading, equalled by the somewhat foliaceous sepals. Stamens 10: filaments dilated below. Capsule 5-6-celled, depressed-globose. Flowers solitary, terminating short leafy branches or sometimes axillary.

SUBORDER III. PYROLINEÆ. Calyx free from the ovary. Corolla polypetalous, hypogynous, deciduous. Anthers erect and extrorse in the bud, with apex often pointed, emarginate or 2-horned at base, where each cell opens by a pore, in anthesis mostly introrsely resupinate on the filament, so that the really basal pores become apical and the point or apex basal. Disk obsolete or obscure. Fruit a loculicidal capsule. Seeds with a loose cellular coat. Sepals and petals imbricated in the bud; the former persistent. (Proc. Am. Acad. xii. 61.)

TRIBE I. CLETHREÆ. Shrubs or trees. Pollen-grains simple. Ovary and capsule of the 5-merous flower 3-celled. Stigmas 3, distinct, over the placentæ. Embryo cylindraceous, as in *Ericineæ*.

24. **CLETHRA.** Petals 5, obovate or obcordate. Stamens 10: anthers sagittate and pointed, after inversion obsagittate, the diverging lobes opening by a chink or large pore. Style filiform, persistent, commonly 3-cleft at the apex: stigmas thickish and truncate. Capsule globose or 3-lobed, 3-valved, and the valves at length 2-cleft; the many-seeded prorect placentæ remaining attached to the upper part of the columella.

TRIBE II. PYROLEÆ. Herbs or nearly so, from perennial slender rootstocks, glabrous, with evergreen foliage, one species leafless. Pollen-grains compound. Cells of the ovary and capsule as many as the petals or sepals (5, or rarely 4): valves of the capsule remaining attached to the columella. Seed-coat very loose and cellular, enclosing a small nucleus. Embryo very minute.

* Stems leafy: flowers corymbose or sometimes solitary: stigma orbicular-peltate, barely 5-crenate, concealing the very short obconical style, which is immersed in the umbilicate summit of the ovary and capsule: the latter dehiscent from above downwards: valves not woolly on the edges.

25. **CHIMAPHILA.** Petals 5, widely spreading, regular, orbicular, concave. Stamens 10: filaments short, dilated and mostly hairy in the middle.

* * Scape naked or leafy only at base: style mostly elongated.

26. **MONESES.** Flowers solitary, sometimes 4-merous, regular. Petals widely spreading, orbicular. Stamens 10, or sometimes 8: filaments subulate, naked. Style straight: stigma large, peltate, and with 5 or sometimes 4 narrow (at first erect, at length radiating) lobes. Valves of the capsule not woolly on the edges.

27. **PYROLA**. Flowers in a raceme, 5-merous. Petals concave or incurved and more or less converging. Stamens 10, often declined: filaments subulate, naked. Style often declined or turned downward: stigma 5-lobed or toothed and annulate. Capsule depressed-globose and 5-lobed, umbilicate at apex and base, dehiscant from the base upward; the edges of the valves cobwebby when opening.

SUBORDER IV. **MONOTROPEÆ**. Calyx free from the ovary. Pollen-grains simple. Capsule loculicidal. — Herbaceous root-parasites or saprophytes, scaly, destitute of all green herbage, one closely related to *Pyroleæ*, one to *Eri-cineæ*, the others more peculiar. (Proc. Am. Acad. vii. 370.)

TRIBE I. **EUMONOTROPEÆ**. Ovary 5-celled, or sometimes 4-celled; the placenta projecting from the thick central columella.

* Anthers extrorse, in flower becoming introrsely pendulous: corolla none.

28. **ALLOSTROPA**. Calyx of 5 roundish sepals, marcescent under the capsule. Stamens 10: anthers didymous, on long and slender filaments: cells opening by a chink from the apparent apex to the middle. Disk none. Style short: stigma large, peltate-capitate. Capsule globose. Seeds scobiform, linear.

* * Anthers introrse or introrsely pendulous from the first: corolla gamopetalous, and with the calyx persistent or marcescent,

+ Globular-ovate, with 5 short recurved lobes or teeth: anthers 2-awned.

29. **PTEROSPORA**. Calyx deeply 5-parted. Corolla globular-urceolate; the lobes convolute or mostly so in the bud. Stamens 10, included: filaments subulate-filiform: anthers ovate-didymous, introrse, erect, or in bud horizontal-inflexed, fixed near the base, there dorsally 2-awned; the slender awns deflexed; the cells opening lengthwise. Disk none. Style short: stigma 5-lobed. Capsule depressed-globular, 5-lobed. Seeds broadly winged from the apex.

+ + Corolla campanulate, with barely spreading lobes, rather fleshy: anthers muticous: seed-coat reticulated, but conformed to the nucleus: sepals 5, oblong, erect, nearly equaling the corolla, persistent: filaments slender.

30. **SARCODES**. Stamens 10, shorter than the cylindraceous-campanulate corolla: anthers linear-oblong, erect, inserted above the base; the two cells strictly combined throughout, the whole apex opening by a large introrsely oblique terminal pore. Disk none. Ovary low-conical and 5-lobed: style columnar, rather long: stigma capitate and somewhat 5-lobed. Capsule depressed-5-lobed. Seeds oval and with a small conical protuberance at the apex.

31. **SCHWEINITZIA**. Stamens 10, hardly shorter than the oblong-campanulate corolla, this 5-gibbous at base: anthers short, somewhat didymous, introrsely pendulous, being attached dorsally near the apex; the saccate cells opening by the whole apex as a large pore. Disk 10-crenate. Ovary globose-ovate: style short and thick: stigma large, 5-sided, umbilicate.

* * * Anthers innate or transverse on the apex of the filament, opening across the top; the cells more or less confluent: corolla 4-5-petalous and with the sepals or bractlets tardily deciduous.

32. **MONOTROPA**. Sepals of 2 to 5 lanceolate bract-like scales. Corolla of 4 to 6 erect and oblong or spatulate scale-like fleshy petals, which are gibbous or saccate at base. Stamens twice the number of the petals: filaments filiform-subulate: anthers somewhat reniform; the valves moderately or very dissimilar. Disk 8-12-toothed; the teeth deflexed. Style columnar, tubular: stigma funnelform, with obscurely crenate margin. Capsule ovoid; the columella very thick and fleshy. Seeds innumerable, very small, scobiform; nucleus minute in the loose-cellular elongated coat.

TRIBE II. **PLEURICOSPOREÆ**. Ovary one-celled or spuriously 4-5-celled; the 4 or 5 placenta parietal and 2-lamellate. Disk none or obscure: anthers linear or oblong, erect, introrse, fixed by the base to the long and slender filaments, opening longitudinally.

33. **PLEURICOSPORA**. Calyx complete, of 4 or 5 oblong-lanceolate scale-like sepals, their margins fimbriate-laciniate. Corolla of 4 or 5 oblong and fimbriate-lacerate plane petals, resembling but rather shorter than the sepals. Stamens 8 or 10, glabrous: filaments ligulate-filiform: anthers linear, apiculate; the cells opening from base to apex into two equal valves. Ovary ovate, strictly one-celled: style columnar: stigma depressed-capitate or somewhat funnelform. Capsule fleshy? Seeds obovate, with a smooth or polished close coat.

34. **NEWBERRYA.** Calyx incomplete, of 2 bract-like entire sepals. Corolla tubular-urceolate, 4-5-lobed, marcescent. Stamens 8 or 10: filaments filiform, long-hairy above the middle: anthers oblong; the cells opening from apex to base into two unequal valves. Ovary ovate, contracted at apex into a long style, tipped with a depressed-capitate umbilicate and pervious stigma: placenta 4, with broad divergent lamellæ, which meet at adjacent edges, ovuliferous on both sides, giving the appearance of four exterior cells surrounding a central larger one.

1. **GAYLUSSÁCIA, HBK. HUCKLEBERRY.** (In honor of a distinguished French chemist, *Gay-Lussac*.) — Shrubs (of Eastern N. and S. America); with either evergreen or deciduous leaves, commonly glandular or resinous-atomiferous, flowers in lateral racemes from separate scaly buds, bracteate and often bracteolate pedicels, reddish or greenish or white corolla, and edible fruit. Flowering in spring; fruit ripe in summer, blue or black. — Torr. Fl. N. Y. i. 448; Gray, *Chloris* (Mem. Am. Acad. iii.), 51. & Man. Bot. *Decachæna*, Torr. & Gray in Am. Jour. Sci. xlii. 43 (1841). *Decamerium*, Nutt. in Trans. Am. Phil. Soc. n. ser. viii. 260 (1843).

§ 1. Leaves thick and evergreen, somewhat serrate, destitute of resinous atoms.

G. brachýcera, Gray. Very smooth and glabrous, the young parts barely puberulent, a foot high or less: branches angled: leaves oval (half to full inch long): racemes in the axils, short, almost sessile, of few crowded flowers: bracts and bractlets scaly, caducous: corolla cylindraceous-campanulate, white or flesh-color, 2 lines long: anthers slightly pointed, shorter than the ciliate filament. — Man. ed. 1, 259. *Vaccinium brachycerum*, Michx. Fl. i. 234. *V. buxifolium*, Salisb. Parad. t. 4; Bot. Mag. t. 28; Bot. Cab. t. 648. — Wooded hills, Alleghanies, from Perry Co., Penn. (*Baird*), to Virginia. Sussex Co., Delaware, A. Commons. Leaves like those of Dwarf Box.

§ 2. Leaves deciduous, entire, more or less sprinkled with minute resinous or waxy atoms: racemes from axils of the former year.

* Leaves thickish and almost coriaceous, green both sides, the upper face shining: bracts foliaceous and persistent: anthers with filiform tubular appendages longer than the cells and almost equalling the corolla.

G. dumósa, Torr. & Gray. A foot or two high from a creeping base, somewhat hairy and glandular: leaves obovate-oblong or lanceolate-spatulate, veiny, conspicuously mucronate: racemes loose: bracts oval, as long as the slender 2-bracteolate pedicels: ovary either glandular-pubescent or hairy: corolla campanulate, white or rose-red: fruit black, mostly pubescent, watery and rather insipid. — Gray, Man. 1. c. *G. hirtella*, Torr. Fl. N. Y. i. 448. *Vaccinium dumosum*, Andr. Bot. Rep. t. 112; Bot. Mag. t. 1106; Dunal in DC. Prodr. vii. 566. *V. frondosum*, Michx. 1. c., not L. *Decamerium dumosum*, Nutt. 1. c. — Sandy swamps, Newfoundland, and along the coast to Florida and Louisiana; southward especially passing freely into

Var. hirtélla, Gray, 1. c. Branchlets and especially racemes and ovary, and sometimes the leaves, glandular-hirsute or hispid. — *G. hirtella*, Klotzsch in Linn. xiv. 48. *Vaccinium hirtellum*, Ait. Kew. ed. 2, ii. 357; Dunal, 1. c. — Chiefly Southern States.

* * Leaves thinner, dull or paler: bracts much smaller, deciduous.

† Branches slender and widely spreading; flowers in very loose racemes, on long filiform pedicels: corolla between globular and campanulate, greenish-purplish, 2 lines or less in length.

G. frondósa, Torr. & Gray. Glabrous, or puberulent when young, from 3 to 6 feet high, with light gray branches: leaves oblong or oval-obovate, obtuse or retuse, pale, whitish and very veiny beneath: bracts tardily deciduous: anthers with rather long tubular tips: fruit dark blue and glaucous, sweet and edible (**BLUE TANGLE** or **BLUE HUCKLEBERRY**). — *Vaccinium frondosum*, L.; Andr. Bot. Rep. t. 140. *V. venustum*, Ait. Kew. ed. 1, ii. 11. *V. glaucum*, Michx. 1. c. *V. decamerocarpon*, Dunal, 1. c. excl. syn. Wang. *Decamerium frondosum*, Nutt. 1. c. — Low and shaded grounds, coast of New Hampshire and mountains of Penn. to Kentucky, Louisiana, and Florida.

Var. tomentósa, a form with foliage and shoots tomentose-pubescent. — *Vaccinium tomentosum*, Pursh, ined. — Georgia, *Engelm.* E. Florida, *Dr. E. Palmer*.

G. ursina, Torr. & Gray. Somewhat pubescent, 2 to 4 feet high: leaves green and membranaceous, lanceolate-obovate or oblong, acuminate (2 to 4 inches long), loosely veiny: bracts rather scaly, caducous: anthers with very short tips. fruit reddish, turning black, insipid (BEAR HUCKLEBERRY). — Gray, *Chloris*, 49, t. 10; *Chapm. Fl.* 258. *Vaccinium ursinum*, M. A. Curtis in *Amer. Jour. Sci.* xliv. 82. — Moist woods, confined to the mountains of the southern part of North Carolina and adjacent parts of South Carolina, *Curtis, Buckley, &c.*

+ — Branches erect: flowers short-pedicelled in short sessile racemes: corolla ovate-conical and 5-angular, becoming campanulate or cylindraceous, reddish, as are the scale-like caducous ovate bracts.

G. resinosa, Torr. & Gray. A foot to a yard high, rigid, glabrous or minutely pubescent, when young very clammy: leaves yellowish-green, from oval to lanceolate-oblong, commonly obtuse, mucronulate, of rather firm texture and paler beneath when mature: racemes secund, drooping, 5–8-flowered: corolla 2 or 3 lines long: anthers with tubular tips: fruit black, rarely varying to white, without bloom, pleasant (the common HUCKLEBERRY or BLACK HUCKLEBERRY of the market). — *Vaccinium resinosum*, Ait. *Kew. l. c.*; *Michx. Fl.* i. 232; *Bot. Mag. t.* 1288. *V. parviflorum*, Andr. *Bot. Rep. t.* 125. *Andromeda baccata*, Wang. *Amer.* 111, t. 30, fig. 69. *Decamerium resinosum*, Nutt. *l. c.* — Rocky woodlands and swamps, Newfoundland to Saskatchewan and south to Upper Georgia. The only species in the northern Mississippi States, where it is rare.

2. VACCINIUM, L. BLUEBERRY, BILBERRY, or sometimes HUCKLEBERRY, and CRANBERRY. (Classical Latin name.) — Shrubs or suffrutescent plants (chiefly of the northern hemisphere), with either deciduous or evergreen leaves; the flowers white or reddish, either solitary in the axils, or in racemes or fascicles, mostly nodding. Corolla small, of thinnish texture, and various in form. Stamens 8 or more, commonly 10: filaments usually hairy or ciliate: anthers awned on the back or awless, opening by a terminal hole or slit of the tubular apex of each cell. Flowers in spring: berries ripe in summer or autumn, sweetish or sometimes acid, mostly edible. — *Vaccinium & Oryzococcus*, Pers.; Benth. & Hook, *Gen.* ii. 573, 575. The following are excluded, viz.: —

V. mucronatum, L., which was founded, not on “one of the *Mespilus* or *Pyrus* tribe,” as Smith opined, but on a fruiting specimen of *Nemopanthes Canadensis*.

V. album, L., founded on a specimen of *Lonicera ciliata*, from Kalm, who sent it as a *Vaccinium* with white berries.

V. ligustrinum, L., founded on a specimen of *Andromeda paniculata*, also from Kalm.

V. glabrum, Wats. *Brit. t.* 125, d., probably *Guylussacia resinosa*.

V. obtusum, Pursh, from Oregon, collected by Menzies, probably *Gaultheria Myrsinites*.

V. humifusum, Graham in *Edinb. Phil. Jour.* 1831, 8, probably also *Gaultheria Myrsinites*.

§ 1. **BATODÉNDRON, Gray.** Corolla open-campanulate, 5-lobed: anthers tipped with long and slender tubes, and 2-awned on the back: ovary and (hardly edible or mawkish) berry spuriously 10-celled (ripening in autumn): leaves deciduous, but of rather firm texture: flowers axillary and solitary or in leafy-bracted racemes, slender-pedicelled: bractlets minute or none. — *Chloris*, *l. c.* 52.

* Flower articulated with its pedicel: anthers included: berry black, many-seeded. (*Batodendron*, Nutt. *Trans. Am. Phil. Soc.*, ser. 2, viii. 261.)

V. arboreum, Marshall. (FARKLE- or SPARKLE-BERRY.) Shrub 6 to 25 feet high, with spreading branches, glabrous or somewhat pubescent: leaves thinnish-coriaceous, very smooth and shining above, reticulate-veiny, obscurely glandular-denticulate or entire, from obovate or round-oval to oblong: flowers profuse, axillary along the branches and leafy-racemose: corolla white, moderately 5-lobed: awns of anthers more than half the length of the tubular tips: berry globose, small, with a dry rather astringent pulp. — *Arbust.* 157; *Lodd. Bot. Cab. t.* 1885. *V. diffusum*, Ait.; *Bot. Mag. t.* 1607. *V. mucronatum*, Walt., not L.

Batodendron arboreum, Nutt. l. c., & Sylv. iii. 43. — Sandy soil, Florida and Texas to N. Carolina and S. Illinois. There is an unusually narrow-leaved form in Texas.

* * Flower not articulated with the pedicel: anthers much exserted: berry greenish or yellowish, ripening few and proportionately large seeds. (*Picrococcus*, Nutt. l. c.)

V. stamineum, L. (DEERBERRY.) Shrub 2 or 3 feet high, with divergent branches, minutely pubescent, or at length glabrous: leaves pale and dull or glaucous, especially beneath, from oval to lanceolate-oblong: ovary glabrous: flowers nearly all axillary: corolla dull purplish or yellowish-green, deeply 5-cleft: awns of the anthers very much shorter than the elongated tubes: berry large, pear-shaped or globular, mawkish. — Andr. Bot. Rep. t. 263. *V. elevatum*, Solander; Dunal, in DC. l. c. 567 (excl. var.) *V. album*, Pursh, Fl. i. 28, not L. *Picrococcus stamineus*, *elevatus*, & *Floridanus*, Nutt. l. c. — Dry woods, Maine to Michigan and south to Florida and Louisiana: rare west of the Alleghanies. (1. *Kunthianum*, Klotzsch, the *V. stamineum*, HBK. t. 353, has much shorter anther-tubes, and a hairy ovary.)

§ 2. **CYANOCÓCCUS**, Gray. (BLUEBERRY.) Corolla from cylindraceous to campanulate-oblong or ovoid, 5-toothed: filaments hairy: anthers included, awnless: ovary and berry completely or incompletely 10-celled by a spurious partition or projection from the back of each carpel: berry blue or black with a bloom, juicy, sweet and edible, many-seeded: flowers (white or rose-color) in fascicles or very short racemes, developed with or a little before the leaves from large and separate scaly buds, short-pedicelled: scaly bractlets as well as bracts mostly caducous or deciduous. (Atlantic North-American with one exception.)

* Evergreen leaves coriaceous: bracts of firmer texture, reddish, and tardily deciduous.

V. nitidum, Andr. Diffusely much branched and very leafy, a foot or two high: leaves flick-coriaceous, shining, at least above, slightly veined, from obovate to oblanceolate-oblong, a fourth to half inch long, obscurely denticulate and glandular: calyx-teeth and almost persistent bracts roundish and very obtuse: corolla rose-red or turning white, rather short and broad (2 lines long): berry "somewhat pear-shaped, black." — Bot. Rep. t. 480; Dunal in DC. l. c.; Chapm. Fl. 259. — Low pine barrens, Florida and Georgia. Near to or passing into the next.

V. Myrsinítes, Lam. A span to 2 feet high, much branched: branchlets, &c., when young puberulent: leaves from obovate and obtuse to oblong-lanceolate and acute or spatulate, often cuspidate, from a third to a full inch long, sometimes denticulate, moderately coriaceous, mostly shining above, dull or paler and sometimes glaucous underneath, more veiny: bracts from ovate to lanceolate, less persistent; calyx-teeth acute or acutish: corolla at length cylindraceous, 2 or 3 lines long, soon white: "berry globose, blue." — Dict. i. 73; Michx. Fl. i. 233; Pursh, Fl. i. 290 (with vars. *lanceolatum* and *obtusum*); Dunal, l. c.; Chapm. l. c. *V. nitidum*, var. *decumbens*, Sims, Bot. Mag. t. 1550? — Sandy pine barrens, Florida to Louisiana and N. Carolina.

V. glaucum. A low form, with small leaves dull or glaucous above and very glaucous beneath, at least when young. — New Orleans? (*Drummond*) to Alabama, &c.

* * Leaves thinner, deciduous: scaly bracts more deciduous.

+ Corolla when developed cylindrical or cylindraceous. Southern species, the leaves far southward sometimes persisting until flowering the next spring.

V. formósum, Andr. Two or 3 feet high: leaves ovate or oblong, entire (an inch or two long), smooth and bright green above, either glabrous or pubescent beneath, of firmer texture than in the others of the section: flower-clusters loose: calyx and tardily deciduous bracts red or reddish: corolla rose-red, 4 or 5 lines long. — Bot. Rep. t. 97. — Georgia or Florida, "Wm. Young," James Reed: specimens by the latter with flower-clusters in the axils of persistent leaves. Related to large-leaved forms of the preceding, and may probably pass into the next.

V. virgátum, Ait. Low, or a yard or so high, more or less pubescent: leaves from ovate-oblong to cuneate-lanceolate, or oblong-lanceolate, usually acute or pointed and minutely serrulate, thinnish, lucid at least above, commonly an inch or so in length: flower-clusters sometimes virgate on naked branches: bracts more deciduous: corolla rose-color,

3 or 4 lines long: berry black, sometimes with a bloom. — Hort. Kew. ed. 1, ii. 12; Andr. Bot. Rep. t. 181; Hook. Bot. Mag. t. 3522. *V. ligustrinum*, Pursh, not L. *V. fuscum*, Ker. Bot. Reg. t. 302 (not Ait.), a form with deep rose-colored flowers, and red pedicels and bracts, approaching *V. formosum*. — Swamps, Florida to S. Carolina and Louisiana.

Var. tenellum, a low form, mostly small-leaved, with nearly white flowers in shorter or closer clusters: corolla barely 3 lines long and less cylindrical. — *V. tenellum*, Ait. Kew. l. c.; Chapm. Fl. 260. *V. galeans*, Michx. Fl. i. 232. *V. galiformis*, Smith in Rees. Cycl. — Virginia to Arkansas and southward.

Var. parvifolium, a peculiar form, with leaves half to three-fourths inch long, entire or nearly so, mostly oblong and obtuse; stems tender, 3 to 8 feet high: flowers also small. — *V. myrtilloides*, Ell. Sk. i. 500, not Michx., nor Hook. *V. Elliottii*, Chapm. l. c. — S. Carolina to Arkansas and Louisiana. An ambiguous form.

+ + Corolla shorter and broader, from ovate-urceolate to at most oblong-campanulate, white or obscurely rose-colored.

+ + Ovary and berry glabrous, as in the genus generally: scarious bracts and bractlets early deciduous. (EDIBLE BLUEBERRIES or BLUE HUCKLEBERRIES.)

V. Pennsylvanicum, Lam. Dwarf, a span to a foot or more high, with green and warty stems, mostly glabrous, and branches: leaves oblong-lanceolate or oblong, green, and somewhat shining both sides, glabrous, or not rarely hairy on the midrib beneath, distinctly serrulate with bristle-pointed teeth: flowers very short-pedicelled: corolla campanulate with orifice slightly contracted, barely $2\frac{1}{2}$ lines long: berries ripening early, large and sweet, bluish-black and glaucous. — Dict. i. 72; Michx. Fl. i. 223; Hook. Bot. Mag. t. 3434; Gray, Man. ed. 1, 261. *V. myrtilloides*, Michx. l. c. *V. tenellum*, Pursh, Fl. i. 288, not Ait. *V. ramulosum* & *V. humile*, Willd. Enum. Suppl. 20? *V. multiflorum*, Wats. Dendr. Brit. t. 125? — Dry hills and woods, from Newfoundland to Saskatchewan and southward to New Jersey and Illinois; commoner northward. The lowest and earliest-fruited of the blueberries.

Var. angustifolium, Gray, l. c. (*V. angustifolium*, Ait. l. c.), a more dwarf form, a span or less high, with lanceolate leaves. — *V. salicinum*, Aschers. in Flora, 1860, 319, not Cham. — Labrador and Hudson's Bay, Newfoundland, and alpine region of the White Mountains of New Hampshire.

V. Canadense, Kalm. A foot or two high, with branchlets and both sides of the elliptical or oblong-lanceolate entire leaves downy with soft spreading pubescence: flowers few in the clusters: corolla shorter (2 lines long), greenish-white, and more open-campanulate: otherwise as in the preceding. — Richards. in Frankl. ed. 2, 12; Hook. Fl. ii. 32, & Bot. Mag. t. 3446. *V. album*, Lam. l. c., not L. — Swamps or low woods, Hudson's Bay to Bear Lake and the northern Rocky Mountains, south to N. New England, mountains of Penn. and Illinois. Named by Kalm in herb. Leche, now in herb. Banks.

V. vacillans, Solander. A foot or a yard high, glabrous: branchlets yellowish-green: leaves obovate, oval, or broadly oblong, entire or nearly so, pale or dull, commonly glaucous, at least beneath: flowers in rather loose clusters: corolla oblong-campanulate or with obscurely narrowed orifice, 2 or 3 lines long, about the length of the pedicel: calyxlobes proportionally large and roundish: berries bluish-black with a bloom, ripening later than the common low blueberries. — Gray, Man. l. c.; Torr. Fl. N. Y. i. 445. *V. virgatum*, Bigelow, not Ait. *V. Pennsylvanicum*, Torr. Fl. N. U. S. i. 416, excl. char., not Lam. — Dry or sandy woodlands and rocky places, New England to N. Carolina and Missouri. Flowers generally on the leafless summits of the twigs, more greenish or yellowish than those of the next, and apt to be tinged with red. The commoner species of the Northern and Middle States west of the Alleghany Mountains.

V. corymbosum, L. Tall, 5 to 10 feet high: branchlets yellowish-green turning brownish: leaves from ovate or oblong to elliptical-lanceolate: flowers more commonly racemously than corymbosely disposed on the naked twigs: corolla from turgid ovate to cylindraceous-campanulate, 3 or 4 lines long, commonly shorter than the pedicels, 3 or 4 times the length of the lax calyxlobes: berries blue-black with a copious bloom (except in one var.), ripening later than the preceding. — Smith in Rees Cycl. no. 13; Gray, Man. l. c. *V. disomorphum*, Michx. l. c. — Swamps and low woods, from Newfoundland and Canada through the Atlantic U. S. to Louisiana, but rare in the Mississippi region. The typical form of this, the common TALL BLUEBERRY or BLUE HUCKLEBERRY, is minutely

more or less pubescent when young, sometimes perfectly glabrous (var. *glabrum*, Gray, Man.), and commonly soon becoming so; the leaves with naked entire margins. There are numerous gradations between the following forms:—

Var. amœnum, Gray, a form with ciliate-serrulate or bristly-ciliate leaves, rather bright green both sides: pubescence slight or sparse. — Man. ed. 5, 292. *V. amœnum*, Ait. l. c.; Andr. Bot. Rep. t. 138; Bot. Reg. t. 400. *V. corymbosum*, var. *fuscatum*, Hook. Bot. Mag. t. 3433? *V. Marianum*, *grandiflorum* & *elongatum*, Wats. Dendr. Brit.? — Mainly in the Middle Atlantic States.

Var. pallidum, Gray, l. c., a pale and very glaucous or glaucescent form, with or without some pubescence, generally low; otherwise nearly as in the preceding. — *V. pallidum*, Ait. l. c.; Gray, Man. ed. 1, 262. *V. albiflorum*, Hook. Bot. Mag. t. 3428. *V. Constablei*, Gray in Am. Jour. Sci. xlii. 42; Chapm. l. c. — Common through the Alleghanies southward, mostly on the tops of the higher mountains, and 2 to 4 feet high.

Var. fuscátum, a tall form, with the mature and entire leaves fuscous-pubescent beneath: flowers virgately somewhat spicate on the naked flowering twigs. — *V. fuscatum*, Ait. l. c. — Alabama and Florida to Arkansas and Louisiana.

Var. atrocóccum, Gray, l. c., the most distinct form, with the permanently and at length rusty pubescent leaves of the foregoing, but with a more diffuse habit, rather smaller flowers, and berries purplish-black, without any bloom. — *V. fuscatum*, Gray, Man. ed. 1, 262. *V. discarpum*, Bigelow, Bost. ed. 2, 151. — Common from N. England to Penn.

++ ++ Ovary and berry glandular-hirsute: bracts less scarious and more persistent.

V. hirsútum, Buckley. A foot or two high: branchlets, entire ovate leaves, and even the ovoid-campanulate corolla pubescent with soft and short persistent spreading hairs: style hairy: hirsute berries bluish-black. — Am. Jour. Sci. xlv. 175; Chapm. l. c. — Mountains of Cherokee Co., N. Carolina, *Buckley*. Rare and little known: the local name is BEAR HUCKLEBERRY.

§ 3. EUVACCÍNIUM, Gray. (BILBERRY.) Corolla from ovate to globular and more or less urceolate, 4-5-toothed, rose-color or nearly white: filaments glabrous: anthers 2-awned on the back, included: ovary and berry 4-5-celled, with no false partitions: leaves deciduous: flowers on drooping pedicels, solitary or two to four together, developing with or soon after the leaves.

* Flowers 2 to 4 in a fascicle, or sometimes solitary, from a distinct scaly bud, in the manner of *Cynococcus*, more commonly 4-merous and 8-androus: leaves quite entire, and usually almost sessile: limb of the calyx deeply 4-5-parted: berries blackish-blue with a bloom.

V. uliginósum, L. A span to a foot or two high, much branched, glabrous or minutely puberulent: leaves thickish, mostly pale or glaucescent, obovate, oval, or oblong-cuneate, obtuse or retuse, reticulate-veiny, especially beneath, half inch or more long: corolla ovate- or globular-urceolate: berry proportionally large, sweetish. — Fl. Dan. t. 581; Reichenb. Ic. Germ. xvii. t. 1168. *V. pubescens*, Hornem. Fl. Dan. t. 1516. *V. gaultherioides*, Bigel. — Arctic America to the alpine region of the mountains of New England, New York, and shore of Lake Superior, westward to Oregon and Alaska. (Eu., Asia.) In our northern regions low, in Oregon sometimes even 4 feet high.

Var. mucronátum, Herder. Depressed-cespitose: leaves small, bright green both sides, conspicuously reticulated, usually roundish, abruptly mucronate or cuspidate. — Alaska and Aleutian Islands to Behring Straits.

V. occidentále, Gray. A foot or more high, glabrous: leaves thinner, glaucescent, obscurely veiny, from oval to obovate-oblong or oblanceolate, obtuse or acutish (half to three-fourths inch long): flower mostly solitary from the scaly bud: corolla oblong-ovate (1 or 2 lines long): berry small, barely 3 lines in diameter. — Bot. Calif. i. 451. — Sierra Nevada of California at 5-7000 feet, from Mariposa to Mt. Shasta, and Uinta Mts., Utah.

V. salícinum, Cham. Depressed-cespitose: leaves cuneate-lanceolate and acuminate (4 to 8 lines long), tapering into a kind of petiole, bright green, coarsely reticulated beneath, entire: flowers solitary: "corolla cylindraceous-urceolate, 3 lines long." — Spreng. Syst. Cur. Post. 147, & Linn. i. 525 (not Aschers. in Flora, 1860, 369). — Unalashka, in moss, *Chamisso*. Perhaps this is only a remarkably narrow-leaved form of *V. uliginosum*, var. *mucronatum*.

* * Flowers solitary in the earliest axils, usually 5-merous and 10-androus: calyx less or very slightly lobed.

+ Dwarf and caespitose: branches not angled.

V. cæspitosum, Michx. Glabrous or nearly so, 3 to 6 inches high: leaves from obovate to cuneate-oblong, obtuse or rarely acutish, thickly serrulate, bright green both sides, reticulate-veiny (one to three-quarters inch long): corolla ovate or ovoid-oblong: berry proportionally large, blue with a bloom, sweet. — Hook. Fl. ii. 33, t. 126; & Bot. Mag. t. 3429. — Hudson's Bay and Labrador, alpine summits of White Mountains of New Hampshire, and Colorado Rocky Mountains to Alaska.

Var. arbúscula. Erect and a foot high, much branched: leaves obovate, thicker, little exceeding half an inch in length: flowers and berries rather smaller. — Sierra Nevada, California, in Plumas Co., *Mrs. Austin*. In Oregon passes into the ordinary form and into the following.

Var. cuneifólium, Nutt. A span to near a foot high, bushy: leaves spatulate-cuneate and with rounded apex, passing in one form (*var. angustifolium*, Gray, Proc. Am. Acad. viii. 393) to spatulate-lanceolate and acute; the earliest not rarely entire. — Mem. Am. Phil. Soc. n. ser. viii. 262. — Mountains of Colorado and Utah to California, British Columbia, and east to Lake Superior.

+ + Low: branches sharply angled and green: leaves small.

V. Myrtillus, L. (WHORTLEBERRY, BILBERRY.) A foot or less high, glabrous: leaves ovate or oval, thin, shining, serrate, conspicuously reticulated-veiny, and with a prominent narrow midrib (in ours half to two-thirds inch long): limb of calyx almost entire: corolla globular-ovate: berries black, nodding. — Schk. Handb. t. 107; Reichenb. Ic. Germ. l. c. t. 1169; Hook. Fl. ii. 33. *V. myrtilloides*, Watson, Bot. King Exp. 209, not of others. — Rocky Mountains, extending as far south as Colorado and N. E. Utah, and north-west to Alaska. (Eu., Asia.)

Var. microphýllum, Hook. l. c.; a remarkable diminutive form, 3 to 6 inches high: leaves 2 to 4 lines long: corolla proportionally small, a line long: berries at first "light red." — Higher Rocky Mountains, south to Colorado and Utah, and in the Sierra Nevada, California, down to 7000 feet.

+ + + Mostly taller or tall, with spreading branches.

V. myrtilloides, Hook. (Gray). Glabrous or glabrate, 1 to 5 feet high: branchlets slightly angled: leaves ovate or oval and oblong, sharply serrulate, membranaceous, green both sides, but not shining, loosely reticulate-veiny, an inch or two long, the larger or later mostly acute or acuminate: limb of calyx entire: corolla depressed-globular or semi-globose-urceolate (nearly 2 lines long and broad, yellowish or greenish-white with a purple tinge): pedicel erect in fruit: berry purplish-black, rather acid. — Gray, Man. ed. 5, 291. *V. myrtilloides*, partly, Hook. Fl. ii. 32, & Bot. Mag. t. 3477 (excl. syn. Ait., &c. and *var. rigidum*), not Michx.! (which is *V. Pennsylvanicum*, *var. angustifolium*). *V. membranaceum*, Dougl. ined.; Torr. Bot. Wilkes Exp. 377, the larger-leaved coast form (*V. myrtilloides*, *var. membranaceum*, Hook. l. c.). — Damp woods, Lake Superior to the coast of Oregon and British Columbia. — There is nothing to prevent the retention of this specific name, going back only to Hooker, and excluding the original of Michaux.

V. ovalifólium, Smith. Glabrous and glaucescent, 4 to 12 feet high, straggling: branchlets more or less angled: leaves oval, mostly obtuse or rounded at both ends, merely mucronulate, entire or with a few irregular serratures, pale or glaucous, at least beneath (one or two inches long): corolla globose-ovoid: pedicel nodding in fruit: berries blue with a bloom. — Rees Cycl. l. c.; Hook. Fl. ii. 33, t. 127; Gray, Man. l. c. *V. Chamoussis*, Bong. Sitk. 525. — Woods, Lake Superior (on the south shore, *Robbins*), and Oregon to Unalashka. (Japan.)

V. parvifólium, Smith, l. c. Glabrous, glaucescent, 6 to 12 feet high and straggling: branches and branchlets slender, sharply and conspicuously angled, green, articulated: leaves oblong or oval, obtuse or rounded at both ends, pale and dull, especially beneath, entire, one to three-quarters inch long: calyx 5-lobed: corolla globular: pedicel nodding in fruit: berries light red, rather dry, hardly edible. — Hook. l. c. t. 128. — Shady and low woods, northern part of California, near the coast, to Alaska and Aleutian Islands.

§ 4. **VITIS-IDÆA, Koch.** Corolla, ovary, &c., as in the preceding section: filaments hairy: anthers awnless (at least in ours): leaves coriaceous and per-

sistent : flowers in short racemes or clusters from separate buds : bracteate and 2-bracteolate.

* Flowers 5-merous, 10-androus.

V. ovátum, Pursh. Erect evergreen shrub, 3 to 5 feet high, rigid : branchlets pubescent : leaves thick and firm, very numerous, from oblong-ovate to oblong-lanceolate, acute, minutely and acutely serrate, glabrous or nearly so, bright green both sides, an inch or so long ; the veins obscure or hidden : flowers in short and close axillary clusters : bracts and bractlets deciduous : corolla campanulate, 2 lines long, rose-color or flesh-color, barely thrice the length of the triangular acute reddish calyx-lobes : berries reddish turning black, small, sweetish. — Fl. i. 290 ; Lindl. Bot. Reg. t. 1354. *V. lanceolatum*, Dunal in DC. l. c. 570, a narrow-leaved form. *Metagonia (Pyrothamnus) ovata*, Nutt. l. c. — Vancouver's Island to Monterey, &c., California, on hills near the coast.

V. crassifólium, Andr. Procumbent, the trailing slender stems 2 or 3 feet long, glabrous or nearly so : leaves small, a quarter to half inch long, from oval to narrowly oblong, sparsely mucronate-serrulate or entire, shining : flowers few and almost sessile in small axillary clusters : bracts scaly-coriaceous, persistent : corolla globose-campanulate, nearly white : anther-cells barely pointed at apex : berries black. — Bot. Rep. t. 105 ; Bot. Mag. t. 1152 ; Chapm. Fl. 259. *V. carnosum*, Pers. Syn. i. 479. *V. myrtifolium*, Michx. Fl. i. 229. *Metagonia myrtifolia*, Nutt. l. c. — Sandy bogs, N. Carolina to Georgia, near the coast. Habit of Cranberry.

* * Flowers 4-merous, 8-androus.

V. Vitis-Idæa, L. (COWBERRY, MOUNTAIN CRANBERRY.) Almost glabrous, tufted, 3 inches to a span or more high from creeping stems : leaves crowded, obovate or oval, emarginate (a quarter to over half inch long), shining above, paler and bristly dark-dotted beneath ; the margins revolute, entire or obscurely serrulate : flowers crowded in a short and terminal secund and nodding raceme : bracts reddish, nearly persistent : corolla white or rose-color, open-campanulate, rather deeply 4-lobed : berries dark red, acid and bitterish, edible when cooked (a fair substitute for cranberries). — Fl. Dan. t. 40 ; Lodd. Bot. Cab. t. 616. *V. punctatum*, Lam. — Round the Arctic circle, south to the coast and mountains of N. New-England, and Lake Winipeg ; on the western coast south to British Columbia. (Greenland to Japan.)

§ 5. **OXYCÓCCUS.** (*Oxyccoccus*, Pers.) Corolla deeply 4-cleft or 4-parted ; the lobes linear or lanceolate-oblong and reflexed : anthers exerted, awnless, with very long terminal tubes : ovary and berry 4-celled, destitute of false partitions : flowers axillary and terminal, nodding on long filiform pedicels, appearing in early summer ; fruit maturing in autumn.

* Erect shrubs, with deciduous membranaceous leaves and berries of *Euvaccinium*, but corolla of true *Oxyccoccus* : flowers solitary in the axils : pedicel bractless but minutely 2-bracteolate at base : corolla conical-rostrate in the bud, deeply 4-cleft : filaments villous. (*V. Japonicum* of Miquel is a very nearly related Japanese species.) — *Vaccinium* § *Oxyccoccoides*, Benth. & Hook.

V. erythrocarpon, Michx. Divergently branching shrub, 1 to 4 feet high, slightly pubescent : leaves oblong-lanceolate or ovate-oblong, acuminate, finely serrate with bristle-tipped teeth, thin, bright green both sides, veiny, acute or merely obtuse at base (1½ to 3 inches long) : pedicel about half the length of the leaf : corolla flesh-color (about half inch long) : berry light red, turning nearly black at full maturity, watery, slightly acid. — Fl. i. 227. *Oxyccoccus erectus*, Pursh, Fl. i. 264. *O. erythrocarpus*, Ell. Sk. i. 447. — Damp woods in the higher Alleghanies, Virginia to Georgia.

* * (CRANBERRY.) Trailing and creeping lignescant plants, with filiform stems, and small persistent leaves with entire revolute margins and the lower face whitened : filiform pedicels 1 to 4 from a terminal scaly bud, erect, and bearing a flesh-colored or pale rose-colored flower nodding from its apex : corolla conical-cylindrical in the bud, deeply 4-parted : filaments puberulent : berry red and acid. — *Oxyccoccus* (Pers.), Benth. & Hook.

V. Oxycóccus, L. (SMALL CRANBERRY.) Stems very slender, creeping : leaves ovate, acute, 2 to 4 lines long ; the margins much revolutè : pedicels 1 to 4 in a fascicle from a terminal and not proliferous thin-scaly bud : filaments commonly fully half the length of the anthers : berry globose, a quarter to a third of an inch in diameter, often spotted when

young. — Fl. Dan. t. 80. *Oxycoccus palustris*, Pers. l. c. *O. vulgaris*, Pursh, l. c. *Schollera Oxycoccus*, Roth. — Sphagnous swamps, around the subarctic zone, from Newfoundland and Labrador south to mountains of Pennsylvania, to the Saskatchewan district, and to Alaska. (Greenland to Japan.)

V. macrocarpon, Ait. (LARGE AMER. CRANBERRY.) Stems stouter, 1 to 4 feet long, and with more ascending branches: leaves oblong or narrowly oval, obtuse, a third to half inch long; the margins less revolute; veins evident: pedicels several and somewhat racemose, the firmer scaly bracts separating as the bud develops above into a proliferous leafy shoot: filaments one third the length of the anthers: berry ovoid or oblong, half to three-fourths inch long (variable in shape and size, much larger than in the preceding). — Ait. Kew. ed. 1, ii. 13, t. 7; Bot. Mag. t. 2806; Emerson, Mass. Rep. ed. 2, t. 30. *V. Oxycoccus*, var. *oblongifolius*, Michx. l. c. *Oxycoccus macrocarpus*, Pursh, l. c.; Bart. Fl. i. t. 17. — Bogs, &c., Newfoundland to N. Carolina, through Northern States and Canada to Saskatchewan. Said by Hooker to abound at the mouth of Columbia River? (Japan?)

3. CHIÓGENES, Salisb. CREEPING SNOWBERRY. (From χιόν, snow, and γένος, offspring, in allusion to the snow-white berries.) — Flowers very small and inconspicuous, solitary in the axils of the small Thyme-like leaves, on short nodding peduncles; a pair of large ovate persistent bractlets under the calyx. Tube of the latter adnate to the lower half of the ovary, or rather more; the limb 4-parted. Corolla little exceeding the calyx, 4-cleft, greenish-white. Stamens 8, included, inserted on an 8-toothed disk: filaments very short and broad: cells of the anther ovate-oblong, separate, neither awned on the back nor produced into tubes, but each minutely 2-pointed at the apex, and opening by a large chink down to the middle or lower. Style columnar. Berry globular, crowned by the 4 short calyx teeth, largely inferior, the calyx-tube being now almost wholly adnate. Seeds rather numerous, obliquely obovate, with a close and firm coriaceous minutely reticulated coat. — Genus naturally related rather to *Gaultheria* and *Pernettya* than to *Vaccinium*, except in the adnation of the calyx.

C. hispídula, Torr. & Gray. A slender trailing or creeping evergreen, with the habit of Cranberry, the aroma and taste of Wintergreen or Sweet Birch: filiform branches strigose-hispid: leaves ovate, with rounded or obtuse base and revolute margins, thick-coriaceous, 2 to 4 lines long, short-petioled, glabrous, except the scattered rusty bristles of the margins and lower surface: bractlets foliaceous and almost equalling the flower: white berry also minutely bristly, slightly spicy but otherwise insipid, ripe late in summer. — Torr. Fl. N. Y. i. 450, t. 68; Gray, Man. ed. 1, 262. *C. serpyllifolia*, Salisb. Trans. Hort. Soc. Lond. ii. 94. *Vaccinium hispidulum*, L. (excl. syn.); Michx. Fl. i. 228, t. 23. *Arbutus filiformis*, Lam. Diet. i. 228. *A. thymifolia*, Ait. Kew. ed. 1, ii. 72. *Oxycoccus hispidulus*, Pers.; Nutt. Gen. i. 251. *Gaultheria serpyllifolia*, Pursh, Fl. i. 283, t. 13 (bad). *G. hispidula*, Muhl. Cat.; Hook. Fl. ii. 36. *Glycyphylla hispidula*, Raf. in Am. Month. Mag. 1819. *Phalerocarpus serpyllifolius*, G. Don, Syst. iii. 841; Dunal in DC. l. c. 577; Klotzsch in Linn. xxiv. 67 (char. bad). — Sphagnous swamps and damp woods, Newfoundland to the northern Rocky Mountains, and in the Atlantic States south to the cooler parts of New Jersey and Pennsylvania, thence along the Alleghanies to North Carolina.

C. JAPONICA, a second species (*C. hispidula*, Miquel), the representative in Japan, has obovate or oval leaves, all acute or tapering at base.

4. ÁRBUTUS, Tourn. (Classical Latin name.) — Low trees or shrubs (of S. Europe and W. America from Oregon to Mexico); with evergreen and coriaceous alternate petiolate leaves, and white or flesh-colored small flowers in a terminal cluster of racemes or panicles. Bracts and bractlets scaly. Calyx small, 5-parted. Corolla from globular to ovate. Ovary on a hypogynous disk: ovules crowded on a fleshy placenta projecting from the inner angle of each cell. Style rather long: stigma obtuse. Berry more or less eatable.

A. LAURIFOLIA, L. f. Suppl. 238, may be *Prunus Caroliniana*, but is indeterminable. *A. LANCEOLATA*, Lam. Dict. i. 227, is possibly the same, but has no valid foundation, having been described solely from a sterile branch of some cultivated shrub of uncertain origin. *A. ACADIENSIS*, L., founded on a phrase cited from Tournefort, which cannot be found, is wholly obscure.

A. Menziésii, Pursh. (MADROÑA.) Tree 80 to 100 feet high, with trunk a foot or two in diameter in northern habitats, a shrub in its southern: bark close and smooth by exfoliation, turning brownish-red: leaves oval or oblong, entire or serrulate, paler beneath, 3 to 5 inches long: spicate racemes minutely pubescent: corolla globular, white: berries dry, somewhat drupaceous, hardly eatable, orange-color. — Hook. Fl. ii. 36; Nutt. Sylv. iii. 42, t. 95; Newberry in Pacif. R. Rep. iv. 23, fig.; Gray, Bot. Calif. i. 452. *A. procera*, Dougl. Bot. Reg. t. 1753. *A. laurifolia*, Lindl. Bot. Reg. xxx. t. 67 (small-leaved Mexican form), not L. f. *A. Texana*, Buckley in Proc. Acad. Philad. Dec. 1861; Vasey, Cat. Forest Trees, U. S. 17, the small-leaved form of Texas and Mexico, possibly distinct, but apparently a mere form of the Pacific species. — Puget Sound and southward through the coast-region of California to Arizona? and W. Texas. (Mex.)

5. ARCTOSTÁPHYLOS, Adans. BEARBERRY, MANZANITA. (Composed of *ἄρκτος*, a bear, and *σταφυλή*, grape or berry.) — Shrubs or small trees; with alternate leaves, and small mostly white or rose-colored flowers, chiefly in racemes, spikes, or panicles, both bracteate and bracteolate. Flowers nearly as in the preceding genus, but less rarely 4-merous, and ovules solitary in the cells, which become bony nutlets or combine into a few—several-celled stone; the drupes somewhat bitter or astringent, or in Californian species subacid and more or less edible. Leaves in the erect species almost always more or less vertical by a twisting of the petiole. Fl. spring. — Gray in Pacif. R. Rep. iv. 116; Benth. & Hook. Gen. ii. 581.

§ 1. *ARCTÓUS*. Flowers preceding the thin and deciduous leaves: fruit juicy.

A. alpina, Spreng. Depressed or prostrate and tufted, rising little above the ground, glabrate: leaves obovate with a tapering base, conspicuously rugose-reticulated, ciliate when young: flowers few in a fascicle from a terminal lax-scaly bud: drupe rather large, black, containing 4 or 5 stones. — Syst. ii. 287; DC. Prodr. vii. 584. *Arbutus alpina*, L.; Fl. Dan. t. 73; Engl. Bot. t. 2030. — Arctic America, south to Newfoundland and alpine summits in New England; also northern Rocky Mountains and Aleutian Islands. (Arctic-alpine round the Old World.)

§ 2. *UVA-ÚRSI*. Leaves coriaceous and evergreen, in erect species inclined to be vertical, and the bark mahogany-color: drupe smooth, mealy; its nutlets separate or separable, or irregularly coalescent: bracts persistent and usually becoming rigid. — *Xerobotrys*, Nutt. in Trans. Am. Phil. Soc. n. ser. viii. 267. *Daphnido-staphylis*, Klotzsch in Linn. xxiv. 80.

* Depressed-trailing or creeping, green, glabrous or minutely pubescent, no bristly hairs: flowers rather few in simple small clusters, 2 lines long: ovary and reddish fruit glabrous: nutlets 1-nerved on the back.

A. Uva-úrsi, Spreng. (BEARBERRY.) Leaves oblong-spatulate, retuse, an inch or less long, tapering into a petiole: fruit insipid. — *A. officinalis*, Wimmer, Koch. *Arbutus Uva-úrsi*, L. Fl. Lapp. t. 6; Bigel. Med. Bot. t. 6. *Daphnido-staphylis Fendleriana*, Klotzsch in Linn. xxiv. 81. — Rocky or sandy ground, Penn. to New Mexico, N. California, and north to the arctic circle. (Arctic-montane En. & Asia.)

A. Nevadénsis. Leaves obovate or oval to lanceolate-spatulate, cuspidate-mucronate, thicker, abruptly petioled: berries subacid. — *A. pungens*, var. (small Manzanita), Gray, Bot. Calif. i. 453. — Sierra Nevada, California, common at 8–10,000 feet. Rising only a few inches, or at most a foot above the surface of the ground, from rigid procumbent main stems: apparently there are no transitions into *A. pungens*, which is sometimes found at the same altitudes.

* * Erect low shrubs, with mostly clustered short racemes or spikes: flowers only a line or two long: leaves half inch or at most an inch long.

A. púmila, Nutt. A foot or less high, tomentulose: leaves pale, oblong-obovate, obtuse or retuse, sometimes obscurely mucronulate, entire, short-petioled: fruit unknown. — Trans. Am. Phil. Soc. n. ser. vii. 266; Gray, Bot. Calif. l. c. *Daphnidostaphylis pumila*, Klotzsch, l. c. — Monterey, California, *Nuttall, Rich.* Not yet met with by recent collectors.

A. Hoókeri, Don. A foot or two high, diffuse, puberulent or glabrate: leaves green, ovate or oval, cuspidately mucronate or acuminate, sometimes spinulose-denticulate, slender-petioled: fruit glabrous, 2 lines in diameter, reddish. — Syst. iii. 836. *Arbutus pungens*, Hook. & Arn. Bot. Beech. 144. *Andromeda? venulosa*, DC. Prodr. vii. 607. *Xerobotrys venulosus* & *Arctostaphylos acuta?* Nutt. in Trans. Amer. Phil. Soc. l. c. *A. pungens*, partly, Gray, Bot. Calif. i. 453, into which it may pass. But the smaller forms seem quite distinct, and the drupes are very small. — Monterey, &c., California.

A. nummulária, Gray. A foot or two high, nearly glabrous, excepting scattered setose bristles on the branches and short petioles, very leafy: leaves mostly broadly oval with both ends rounded or the base slightly cordate, usually entire, bright green: fruit unknown. — Proc. Am. Acad. vii. 366, & Bot. Calif. l. c. — Mendocino plains, California, *Bolander.*

* * * Erect shrubs or low trees, with short clustered racemes: flowers 3 or 4 lines long and drupes 4 or 5 lines in diameter, yellowish turning reddish: leaves 1 to 3 inches long.

A. Andersónii, Gray. Long and spreading bristles copious on the branchlets, &c. (along with fine pubescence): leaves thin, bright green, glabrous, lanceolate-oblong to ovate-lanceolate, with a sagittate or cordate base, sessile or very short-petioled, conspicuously spinulose-serrulate or rarely entire: drupes depressed, densely clothed with exceedingly viscid-tipped bristles. — Proc. Am. Acad. xi. 83, & Bot. Calif. l. c. — Santa Cruz, California, under Redwoods, *Anderson.*

A. tomentósa, Dougl. Tomentose or pubescent when young, and the branchlets, &c., usually bristly: leaves pale, coriaceous, oblong-lanceolate to ovate, entire or sparingly spinulose-serrulate, petioled; the base acutish, rounded or subcordate: ovary hirsute: drupes minutely puberulent or becoming glabrous. (Runs into endless forms, of which one has narrow-oblong and rather small leaves, acutish at base, apparently connecting with the next species.) — Lindl. Bot. Reg. t. 1791; Hook. Bot. Mag. t. 3220. *A. cordifolia*, Lindl. l. c. *Arbutus tomentosa*, Pursh, Fl. i. 282; Hook. Fl. ii. 36, t. 130. *Andromeda? bracteosa*, DC. Prodr. vii. 607. *Xerobotrys tomentosus*, *cordifolius*, & *argutus*, Nutt. in Trans. Am. Phil. Soc. n. ser. viii. 268. — Dry hills, from Puget Sound to San Diego Co., California, and Arizona. The berries are used in California in infusion for a subacid drink. Nutlets 8 to 10, either all separate or some united in pairs.

A. púngens, HBK. Glabrous or minutely tomentose-pubescent, 3 to 20 feet high: leaves thick and rigid, green or glaucescent, oblong-lanceolate to round-ovate, commonly mucronate-cuspidate, entire, obtuse or rounded at base, slender-petioled: pedicels glabrous: drupes smooth and glabrous: nutlets thick-walled, carinate or thickened on the back, sometimes firmly coalescent. — Nov. Gen. & Spec. iii. 278, t. 259; Hook. Bot. Mag. t. 2937; Lindl. Bot. Reg. xxx. t. 217; Torr. in Emory Rep. t. 7; Gray, Bot. Calif. i. 453, in part. *Daphnidostaphylis pungens*, Klotzsch, l. c. — Arizona and S. Utah to California. (Mex.)

Var. platyphýlla, the commoner MANZANITA in California, especially northward, reaching Oregon, Nevada, and Utah: leaves pale or glaucescent, oblong to orbicular, 1 to 2 inches long, commonly muticous. — *Arctostaphylos glauca*, Watson, Bot. King, 210, &c., not Lindl. *A. pungens*, Gray, l. c., partly.

§ 3. **XYLOCÓCCUS.** Leaves coriaceous and evergreen, entire: drupe not warty, ovoid-globose, with a thin pulp and a thick completely solid woody or bony 1-6-celled putamen. — *Xylococcus*, Nutt. l. c. vii. 258.

A. gláuca, Lindl. Erect, 8 to 24 feet high, wholly glabrous except the glandular-pubescent slender pedicels: leaves, &c., as of *A. pungens*, var. *platyphylla*, or paler: drupes half an inch or more in diameter, minutely glandular, sometimes viscid, with a thin flesh around the solid mucronate-apiculate stone: seeds and cells 4 to 6, or by abortion fewer, very small in proportion to the size of the putamen. — Bot. Reg., under 1791; Gray, Bot. Calif. i. 454 — California, commoner from Monterey southward. Except by the larger and solid drupe hardly distinguishable from the common glaucous variety of *A. pungens*.

A. bicolor, Gray. Shrub 3 or 4 feet high: leaves petioled, not vertical, oblong-oval, thin-coriaceous, pinnately-veined, 1 or 2 inches long, white-tomentose beneath, as are the ovate obtuse bracts and much imbricated sepals: pedicels very short: corolla rose-color, 3 or 4 lines long: filaments filiform: drupe 3 or 4 lines in diameter. — Proc. Am. Acad. vii. 366, & Bot. Calif. l. c. *Xylococcus bicolor*, Nutt. l. c. — San Diego Co., California, *Nuttall, Cooper, Cleveland, &c.* Fl. February.

A. Clevelandi. More pubescent: leaves sessile, narrower, acuminate, margins more revolute: inflorescence leafy: bracts and sepals acute: corolla 4 lines long, equalled by the pedicels: fruit unknown. (When the fruit becomes known, it may refer this recently discovered species to the following section.) — Potrero, San Diego Co., California, *Cleveland.* Fl. Sept.

§ 4. **COMAROSTAPHYLIS.** Leaves coriaceous, evergreen: drupe with granulate or warty surface and a solid few-celled putamen. — *Comarostaphylis*, Zucc.

A. polifolia, HBK. Shrub 5 to 8 feet high, glabrous: leaves linear-lanceolate, pale beneath: flowers in a loose terminal raceme or panicle: calyx-lobes triangular and acute: corolla reddish, ovoid: drupe dark purple, small. — Nov. Gen. & Spec. iii. 277, t. 258; Torr. Mex. Bound. 108. — California, on the southern boundary, and Mexico.

6. EPIGÆA, L. MAYFLOWER. (Formed of *ἐπί*, upon, *γῆ*, the earth, from the mode of growth.) — Prostrate or somewhat creeping; the short slender stems barely shrubby, rusty-bristly, leafy only toward the summit of the flowering shoots; the leaves petioled, alternate, thin-coriaceous, veiny, pale green, persistent, round-oval or elliptical, mostly cordate, entire. Flowers in earliest spring, almost sessile in a short and close terminal cluster, bracteate and 2-bracteolate; the somewhat scale-like persistent bracts equalling the calyx. Sepals ovate-lanceolate and acuminate, nearly scarious and often purplish. Lobes of the corolla oval, either quincuncially imbricated in the bud or imbricate-convolute. Capsule depressed-globose and somewhat 5-angled, bristly, thin-walled. Seeds numerous on the much-projecting placenta, round-oval, with a close and thin reticulated coat. The flowers are heteromorphous and inclined to be diœcious or diœcio-dimorphous. Those with fully polliniferous anthers seldom set fruit: their stigmas short, erect, slightly projecting beyond the margin of the 5-toothed ring (to the teeth of which they severally are adnate); the style sometimes longer than the stamens and projecting, sometimes shorter and included. Fully fertile flowers on other plants; their style (as in the former sort sometimes long and exserted, sometimes shorter and included) with stigmas elongated and much surpassing the ring, short-linear, glutinous, radiately divergent; their stamens either slightly polliniferous, or reduced to abortive filaments, or even wanting. — Gray, Man. ed. 5, 293, & Amer. Jour. Sci. ser. 3, xii. 74.

E. répens, L. (MAYFLOWER, TRAILING ARBUTUS, GROUND LAUREL.) Flowers mostly numerous or several in the cluster, spicy-fragrant: corolla rose-color to almost white, bearded inside; its tube more or less exceeding the calyx. — Lam. Ill. t. 367; Andr. Bot. Rep. t. 102; Bot. Reg. 3, t. 201; Brit. Fl. Gard. ser. 2, t. 384. — Gravelly or sandy woodlands in the shade of evergreens, Newfoundland westward to Saskatchewan, and south to Kentucky and Florida. (The other and very nearly related species is *E. Asiatica*, Maxim., of Japan.)

7. GAULTHÉRIA, Kalm, L. AROMATIC WINTERGREEN. (Dedicated by Kalm to "*Dr. Gaultier*" of Quebec, whose name, as appears from the records, was written *Gaultier*. The genus therefore should not be written *Gualtheria*, (Scop., &c.), nor *Gualteria*, *Gautiera*, &c., as by others. If changed at all, the right

orthography would be *Gaultheria*.) — Shrubs or almost herbaceous plants (Asiatic and American); with broad evergreen leaves, shining above, and usually spicy-aromatic in flavor, axillary white or rose-colored nodding flowers in early summer, succeeded by red or blackish “berries,” consisting of the at length baccate calyx enclosing the capsule. Cells of the anthers opening by a terminal pore, and commonly tipped with two points or awns. Stigma truncate or obtuse, entire. Disk 10-toothed or of 10 scales. Ovary and capsule depressed, umbilicate, commonly 5-lobed: placenta ascending, although often borne toward the summit of the short columella. Seeds very many, with a close shining coat. Pedicels or calyx bracteolate.

* Corolla short-campanulate, 5-lobed: filaments glabrous: apex of the anthers obscurely 4-pointed.

G. Myrsinites, Hook. Cespitose-procumbent or depressed, a few inches high: leaves orbicular or ovate, denticulate with minute bristle-tipped teeth (half inch to inch and a half long): pedicels solitary in the axils, very short, 3-5-bracteolate: fruit scarlet, with pine-apple flavor. — Fl. ii. 35, t. 129. *Vaccinium humifusum*, Graham in Edinb. Phil. Jour. 1831, 8. — Rocky Mountains from Colorado northward and in Utah, and northern borders of California, to Brit. Columbia. One form glabrous or nearly so, with small round leaves; another with rusty hirsute hairs on the stem and calyx, and larger ovate leaves.

* * Corolla ovate or urceolate, 5-toothed: filaments hairy: anthers 4-awned at the summit.

G. procumbens, L. (WINTERGREEN, CHEEKERBERRY, BOXBERRY.) Nearly glabrous and as if herbaceous: slender but ligneous stems extensively creeping, generally underground, sending up flowering shoots a span high: leaves crowded towards the top, obovate and oval, mucronate, more or less serrulate with bristly-tipped teeth: pedicels mostly solitary in the axils, 2-bracteolate close under the calyx: fruit red, this and the foliage aromatic-tasted, with flavor as of Sweet Birch, but warmer. — Lam. Ill. t. 367; Andr. Bot. Rep. t. 316; Bigelow, Med. Bot. ii. 27, t. 12; Bot. Mag. t. 1966. *Gaultheria procumbens*, Torr. Fl. N. Y. i. 433. — Low woods under evergreens, Newfoundland to L. Superior and sub-arctic Amer., and through the Atlantic States southward to upper Georgia.

G. Shallon, Pursh. (SALAL.) Shrubby, a foot or two high, with rather stout spreading stems: branches, pedicels, and even the corollas glandular-hairy or pubescent: leaves ovate or obscurely cordate, acuminate, strongly serrulate (2 to 4 inches long): racemes from large both terminal and axillary chartaceous-scaly buds, elongated, many-flowered, secund: scaly bracts persistent: pedicels 2-bracteolate below the middle: corolla large for the genus (3 or 4 lines long), viscid: fruit purple becoming black, eaten by Indians under the name of “*shallon*” (Lewis & Clark) or *salal*. — Fl. i. 284, t. 12; Hook. Bot. Mag. t. 2843, & Fl. ii. 35; Lindl. Bot. Reg. t. 1411. — Shady woods, Brit. Columbia along and near the coast to the mountains behind Santa Barbara, California.

8. ANDRÓMEDA, L. (Fancifully named in allusion to the fable of *Andromeda*. See the poetical account by Linnæus, under the original species, in Fl. Lapp. 126.) — Shrubs; with evergreen or deciduous and broad or rather narrow mostly petioled leaves, and umbellate-fascicled or paniculate racemose flowers, in spring or early summer; all of the northern hemisphere. Calyx naked at base, usually very early open in the bud, 5-parted or of nearly separate sepals, the edges of which do not overlap even at the base. Corolla white or rose-color. — Gray, Man. ed. 2, 253, & ed. 5, 295. *Andromeda*, *Zenobia* (Don), *Pieris* (Don), & *Lyonia* (Nutt.), Benth. & Hook. Gen. ii. 587.

§ 1. EUANDRÓMEDA. Corolla globose-urceolate: calyx small, deeply 5-parted, early open: filaments bearded and not appendaged: anthers short; each cell surmounted by a slender ascending awn: placenta attached next the summit of the columella: seeds turned in all directions, oval, with a smooth and shining crustaceous coat. — *Andromeda*, Don, DC., Benth. & Hook.

A. polifolia, L. Shrub a foot or so high, glabrous and glaucous: the firm-coriaceous and evergreen Rosemary-like leaves from linear to lanceolate-oblong, with strongly revolute margins, white beneath: flowers (early spring) in a small terminal umbel: pedicels from the axils of ovate persistent scaly bracts, naked. — Fl. Lapp. t. 1, f. 3; Fl. Dan. t. 54. *A. rosmarinifolia*, Pursh, Fl. i. 291. *A. glaucophylla*, Link, Enum. i. 394. — Wet bogs, &c., from New Jersey and Pennsylvania, and on the Pacific side from Norfolk Sound to the arctic coast. Capsule in the American specimens more or less depressed, in the European higher than broad. (Eu., N. Asia.)

§ 2. **ZENÓBIA.** Corolla open-campanulate, obtusely 5-lobed: calyx barely 5-parted, thickish, with the thin margins valvate in the early bud: filaments naked, abruptly dilated at base: anthers lanceolate; each cell surmounted by a pair of slender ascending awns: capsule depressed-globose, obtusely 5-lobed, and somewhat carinate at the dorsal sutures: placentæ on the middle of the very short columella: seeds oval, angled, with a rather soft minutely reticulated coat. — *Zenobia*, Don, &c.

A. speciosa, Michx. Shrub 2 to 4 feet high, glabrous, often glaucous: leaves coriaceous, but deciduous, oval or oblong (an inch or two long), commonly crenulate or sparsely serrulate, reticulate-veiny: flowers in umbel-like fascicles from axillary buds, mostly racemose on naked branches of the preceding year: pedicels naked, drooping: calyx-lobes triangular, short: corolla white (a third of an inch high and wide). Varies from bright green to chalky-white with a dense glaucous bloom. — Fl. i. 256; Pursh, Fl. i. 294; Lodd. Cab. t. 551. *A. nitida*, Sims, Bot. Mag. t. 970. *A. cassinefolia nuda*, Vent. Cels., 1. 60. *Zenobia speciosa*, Don, l. c. The following relate to the var. *pulverulenta*, Michx., i. e. the white glaucous form: *Andromeda pulverulenta*, Bartr. Trav. 476, with plate; Sims, Bot. Mag. t. 667. *A. cassinefolia pulverulenta*, Vent. Malm. t. 79. *A. dealbata*, Lindl. Bot. Reg. t. 1010, a state with corolla 5-parted. — Low pine-barrens, Florida to N. Carolina.

§ 3. **PORTÚNA.** Corolla ovate-urceolate, 5-toothed: calyx deeply 5-parted; the lobes firm-coriaceous and thick-edged, ovate-lanceolate, strictly valvate in the bud: filaments not appendaged: anthers oblong; the cells each with a slender deflexed awn on the back at the junction with the filament: capsule globose, not thickened at the sutures: placentæ borne on the summit of the columella: seeds mostly scobiform: flowers in axillary and terminal racemes, formed during the preceding summer, remaining naked until early the following spring, when the (white) blossoms unfold: pedicels minutely bracteate and 2-3-bracteolate: leaves coriaceous, evergreen. — *Portuna*, Nutt. l. c. *Pieris* § *Portuna* & § *Phillyreoides*, Benth. & Hook. l. c. (Here also belong *A. Cubensis*, Griseb., *A. Japonica*, Thunb., and *A. formosa*, Wall.)

A. floribunda, Pursh. Shrub 2 to 6 feet high, very leafy: young branchlets, &c., strigose with rusty or dark hairs: leaves thinish-coriaceous, lanceolate-oblong, acute or acuminate, minutely serrulate and bristly-ciliate, rounded at base, somewhat glandular-dotted beneath (2 inches long): racemes crowded in a terminal short panicle, densely flowered: corolla (3 lines long) strongly 5-angled and at base 5-saccate, twice the length of the calyx: seeds linear-oblong with a very loose cellular coat, large, all pendulous from the summit of the cell. — Fl. i. 293; Bot. Mag. t. 1506; Bot. Reg. t. 807. *A. (Leucothoe) montana*, Buckley in Amer. Jour. Sci. xlv. 172. *Leucothoe floribunda*, Don, l. c. *Zenobia floribunda*, DC. l. c. *Portuna floribunda*, Nutt. l. c. — Moist shaded hills, in the Alleghianies, Virginia to Georgia.

A. phillyreifolia, Hook. Shrub a foot or two high, nearly glabrous: branches slender, alternately leafy and scaly-bracteate: leaves firm-coriaceous, oblong or lanceolate-oblong, obtuse, more or less serrulate or few-toothed near the apex (an inch or two long): racemes solitary and axillary, loosely 4-12-flowered: bracts deciduous: corolla ovoid, not angled, twice the length of the calyx: seeds small and short, borne on all sides of the placentæ, which occupy the middle of the cells of the depressed-globular umbilicate capsule; the

minutely reticulated coat conformed to the nucleus. — Ic. Pl. t. 122; Lindl. Bot. Reg. xxx. t. 36; Chapm. Fl. 262. *Pieris phillyreifolia*, DC. Prodr. vii. 599. — Wet pine barrens, W. Florida, especially Apalachicola.

§ 4. **PIÉRIS.** Corolla from ovate-urceolate to cylindraceous, 5-toothed: calyx of 5 nearly distinct and early open sometimes herbaceous sepals: filaments narrow, usually pubescent or ciliate, 2-setose or 2-toothed at or below the apex (these teeth or awn-like appendages spreading or recurved, rarely obsolete): anthers oblong, awnless: dorsal sutures of the 5-angular capsule with more or less of a thickened ridge (sometimes separating in dehiscence): placenta usually borne about the middle of the columella and of the cells: seeds scobiform or oblong and with a loose thin coat. — *Pieris* § 1 & § 4, Benth. & Hook. l. c. — Original *Pieris*, Don, is Asiatic, with racemes chiefly terminating leafy branches; and the seeds pendulous. The two American, of subsection **MARIA** (*Pieris* § *Maria*, Benth. & Hook.), bear the flowers in axillary umbels or fascicles, the pedicels scarious-bracteate and bracteolate at base; and the placenta as low as the middle of the columella; the seeds therefore in all directions. All combine into one subgenus in structure of flower, capsule, and bisetose filaments.

* Leaves thick-coriaceous and evergreen: sepals thickish and rigid, purplish: flowers honey-scented, in early spring.

A. nitida, Bartr. (FETTER-BUSH.) Very glabrous, 2 to 6 feet high, and with acutely triangular branches: leaves Myrtle-like, rigid, bright green, very shining above, punctulate beneath, ovate to lanceolate-oblong, acuminate, entire, the minutely revolute edge bordered by an intramarginal nerve: flower-clusters in the axils of the persistent leaves of the preceding year: corolla ovoid-cylindraceous with contracted orifice (3 or 4 lines long, from white to rose-red): filaments nearly glabrous, bearing the setiform small appendages close to the summit: style abruptly fusiform-thickened above the middle: capsule ovoid-globose, little exceeding the calyx. — Bartram, Cat. & in Marsh. Arbust. (1785) 8; Walt. Car. 137; Michx. Fl. i. 252. *A. lucida*, Lam. Diet. i. 157 (1783), not Jacq. *A. coracea*, Ait. Kew. ed. 1 (1789), ii. 70; Sims, Bot. Mag. t. 1045. *A. Mariana*, Jacq. Ic. Rar. iii. t. 465, not L. *A. marginata*, Duham. Arb. ed. nov. i. 188, t. 40. *A. myrtifolia*, Salisb. *A. obovata*, Raf., a form with smaller and rhombic-obovate obtuse leaves. *Lyonia marginata*, Don. *Leucothoe coriacea*, DC., excl. syn. *A. rhomboidalis*? *L. marginata*, Spach. — Low pine barrens, N. Carolina to Florida and Louisiana. (Cuba: *A. lacustris*, C. Wright.)

* * Leaves almost membranaceous, deciduous: flowers (late spring or summer) consequently on leafless branches of the previous year, in the manner of *Zenobia*: sepals thinner, larger, and nearly foliaceous, deciduous with the leaves! (*Leucothoe* § *Maria*, DC.)

A. Mariana, L. (STAGGER-BUSH.) Glabrous or slightly pubescent, 2 to 4 feet high: leaves oblong or oval, obtuse or acute at both ends, entire, loosely veiny (1 to 3 inches long): fascicles of nodding flowers racemose on naked shoots: corolla cylindraceous-campanulate with slightly narrowed orifice, white or pale rose-color (almost half inch long): filaments hairy outside; their very small setose appendages below the summit, occasionally obsolete or wanting: capsule ovate-pyramidal, truncate at the contracted apex; the placenta low down. — Sims, Bot. Mag. t. 1579; Duham. l. c. t. 37; Gray, Man. ed. 5, 296. *A. pulchella*, Salisb. *Lyonia Mariana*, Don, l. c. *Leucothoe Mariana*, DC. l. c. — Low grounds, Rhode Island to Florida along the low country; also Arkansas and Tennessee. Foliage said to be poisonous to lambs and calves.

§ 5. **LYÓNIA.** Corolla from globular to urceolate, pubescent or glandular: calyx 5- (rarely 4-) cleft; the valvate lobes early open, short: filaments flat, pubescent; these and the short anthers both destitute of appendages or awns: capsule as in the preceding section, i. e. with ribs at the dorsal sutures which are more or less separable in dehiscence: placenta on the apex of the columella and at the top of the cells: seeds all pendulous, narrow, scobiform, having a loose

and thin cellular-reticulated testa : flowers (small and white) racemose or fascicled : bracts minute and deciduous. — *Lyonia*, Nutt. Gen. i. 266 ; Benth. & Hook. Gen. ii. 587.

* Lepidote-scurfy, not pubescent : flowers fascicled in the axils of persistent coriaceous leaves.

A. ferruginea, Walt. Low shrub, or taller and arborescent : leaves rigid, cuneate-obovate, rhombic-obovate, or cuneate-oblong, entire, with revolute margins (1 or 2 inches long), smooth and shining above, or obscurely lepidote when young, grayish or ferrugineous-lepidote beneath, much exceeding the flower-clusters : capsule oval-pentagonal, barely 2 lines long. — Car. 138 ; Michx. Fl. i. 252 ; Vent. Malm. t. 80. *A. ferruginea* & *A. rigida*, Pursh, Fl. i. 295 ; Lodd. Cab. t. 430. *Lyonia ferruginea* & *L. rigida*, Nutt. l. c. — Michaux's two forms are pretty well marked, viz. var. *arborescens*, with narrower less reticulated leaves, usually crowded ; and var. *fruticosa*, with sparser leaves conspicuously reticulated, mostly cuneate-obovate or rhomboidal. To this belongs *A. rhomboidalis*, "Veill." in Duham. Arb. ed. nov. i. 192, therefore *Leucothoe rhomboidalis*, Don, l. c. — Sandy pine barrens, S. Carolina to Florida. (W. Ind. & Mex. ?)

* * Somewhat pubescent, but not scurfy : leaves deciduous : flowers racemose-panicled.

A. ligustrina, Muhl. Shrub 3 to 10 feet high, much branched : pubescence minute : leaves from obovate or broadly ovate to lanceolate-oblong (1 or 2 inches long), thinnish, obscurely serrulate or entire : racemes few-leaved at base, or mainly from separate buds (in summer), crowded in naked or leafy panicles : pedicels either scattered or fascicled : corolla globose, barely 2 lines long : capsule globular : seeds oblong, obtuse at each end. — Ell. Sk. i. 490 ; Torr. Fl. 421 ; Gray, Man. l. c. *A. paniculata*, Ait. ; Michx. Fl. i. 254, partly, not L. (except as to syn. Pluk.). *A. racemosa*, Lam., not L. *Vaccinium ligustrinum*, L. Spec. i. 351. *Lyonia paniculata*, Nutt. l. c. *L. ligustrina*, DC. l. c. *L. paniculata*, *capreefolia*, *salicifolia*, & *multiflora*, Wats. Dendr. t. 37, 127, 128. — Wet grounds, Canada to Florida and Arkansas.

Var. pubescens. A form cinereous with dense and soft fine pubescence. — *A. frondosa*, Pursh, Fl. i. 295 (anthers not awned in specimen of herb. Enslin) ; Ell. l. c. *A. paniculata*, var. *foliosiflora*, Michx. l. c., in part. *Lyonia frondosa*, Nutt. l. c. — Virginia ? to Georgia.

9. OXYDENDRUM, DC. SORREL-TREE, SOUR-WOOD. (Composed of ὄξύς, sour, and δένδρον, tree, from the acid foliage. *Oxydendron*, Benth. & Hook., but DeCandolle's form follows the analogy of *Epidendrum*.) — A single species, with Peach-like foliage : fl. summer.

O. arboreum, DC. Tree 15 to 40 feet high : leaves membranaceous and deciduous, oblong or lanceolate (4 to 6 inches long), acuminate, serrulate, glabrous, or at first glaucous, veiny, slender-petioled : inflorescence a panicle of many-flowered racemes terminating the leafy shoots of the season, appearing in early summer : flowers tardily opening : corolla from cylindraceous- to ovate-conical (3 lines long), white, minutely pubescent. — Prodr. vii. 601. *Andromeda arborea*, L. (Catesb. Car. t. 71) ; Sims, Bot. Mag. t. 905 ; Michx. f. Sylv. iii. t. 7 ; Bart. Fl. Am. Sept. 1, t. 30. *Lyonia arborea*, Don, l. c. — Rich woods, Penn., Ohio, and along the Alleghany region to Florida.

10. LEUCÓTHOE, Don. (Mythological ; the name of one of the fifty daughters of Nereus.) North and South American and Japanese shrubs, of various habit ; with entire or serrulate leaves, and racemose chiefly white flowers. — Don in Edinb. Jour. xvii. 159 ; Gray, Man. l. c. *Leucothoe* & *Agarista* (at least mainly), Benth. & Hook. Gen. ii. 584, 586. (*Agarista* of Don is evidently founded on the Mauritius and Bourbon species, the section *Agauria*, DC., genus *Agauria*, Benth. & Hook., to which are added S. American species, all or chiefly belonging to *Leucothoe*.)

§ 1. EULEUCOTHOE. Calyx not bracteolate, 5-parted ; the divisions usually only early or slightly overlapping, herbaceous or membranaceous : anthers awn-

less : leaves coriaceous and evergreen : bractlets at or near the base of the pedicels ; these articulated with the flower.

- * (Nearest *Gaultheria*.) Racemes dense and spike-like, sessile in the axils of persistent leaves of the former season, developing in spring, at first resembling catkins ; the ovate concave scaly persistent bracts being imbricated, little shorter than the pedicels : filaments minutely scabrous, nearly straight : anther-cells obscurely or manifestly bimucronate : stigma large, depressed-capitate and 5-rayed. Glabrous shrubs with green erect and recurving branches, and serrulate leaves bright green and shining above and loosely pinnately veined.

L. axilláris, Don. Stems 2 to 4 feet high ; often minutely pubescent when young : leaves from oval to oblong-lanceolate (2 to 4 inches long), mostly with an abrupt acumination, serrulate mainly toward the apex with cartilaginous or somewhat spinulose teeth : petioles very short : sepals broadly ovate and obviously imbricated. — Gray, *Man.* l. c. ; *Chapm. Fl.* 261 ; also *DC. Prodr.* vii. 601, excl. var. & habitat. *Andromeda axillaris*, Lam. *Dict.* i. 157 ; *Ait. Kew. ed.* 1, ii. 69 ; *Duham. Arb. ed. nov.* i. t. 39. — Low grounds, Virginia to Florida and Alabama toward the coast ; not in the mountains.

L. Catesbæi, Gray. Shoots longer (3 to 6 feet) and more recurving, glabrous : leaves ovate-lanceolate to lanceolate and tapering into a long and slender acumination, serrulate throughout with appressed strongly ciliate-spinulose teeth (4 to 7 inches long), conspicuously petioled : sepals ovate-oblong, not overlapping in the flower : capsule chartaceous, depressed, strongly lobed : seeds oval, flat, with a loose cellular-reticulated coat much larger than the nucleus. — *Man. ed.* 2, 252, & *ed.* 5, 294. *Andromeda Catesbæi*, Walt. *Car.* 137 ; *Willd. Spec.* ii. 613 (excl. syn. *Catesb.*) ; *Sims, Bot. Mag. t.* 1955 ; *Lodd. Bot. Cab. t.* 1320. *A. Walteri*, Willd. *Enum.* 453, *A. lanceolata*, Desf. ? *A. axillaris*, Michx. *Fl. i.* 253, chiefly. *A. axillaris*, var. *longifolia*, Pursh, *Fl. i.* 293 ; *Hook. Bot. Mag. t.* 2357, hardly Lam. *A. spinulosa*, Pursh, l. c., excl. habitat. *Leucothoe spinulosa*, Don, l. c. ; *DC. l. c.*, excl. syn. *Duham. &c.* — Moist banks of streams, Virginia to Georgia, along and near the mountains. (Pursh characterized the two species, but transposed the habitats.) Flowers later than the other, and with the unpleasant odor of chestnut-blossoms.

- * * Racemes loose and few-flowered in the axils of the persistent reticulated leaves : bracts and bractlets minute : pedicels slender : filaments pubescent, sigmoid-curved toward the apex (in the manner of Brazilian species) : anthers nearly pointless : stigma small.

L. acumináta, Don. (PIPE-WOOD.) Shrub 3 to 12 feet high, with spreading hollow branches, glabrous, or puberulent when young : leaves ovate-lanceolate, gradually acuminate, with callous entire or obscurely serrulate margin, rounded at base, short-petioled ; the midrib only prominent ; the veins and veinlets all minute and finely reticulated : racemes shorter than the leaves : calyx very short and small at base of the cylindraceous (4 or 5 lines long) corolla : capsule coriaceous : seeds oblong, pendulous. — *Andromeda acuminata*, Ait. l. c. ; *Smith, Exot. Bot. t.* 89. *A. lucida*, Jacq. *Ic. Rar. i. t.* 79. *A. papulifolia*, Lam. *Dict. i.* 159. *A. reticulata*, Walt. *Car.* 137. *A. laurina*, Michx. *Fl. i.* 253. — Sandy swamps, coast of S. Carolina to E. Florida.

- * * * Racemes clustered in a terminal naked panicle : bracts and bractlets small and scarious or whitish : pedicels short : filaments glabrous, slender, straight : anther-cells 2-mucronate : stigma rather small, 5-rayed.

L. Davisæ, Torr. Shrub 3 to 5 feet high, very leafy, nearly glabrous : leaves oblong, obtuse at both ends, obscurely serrulate, bright green (1 to 3 inches long) : racemes nearly sessile, slender, many-flowered : flowers recurved-pendulous (3 lines long) : divisions of the deeply parted whitish calyx ovate-oblong, obtuse, not overlapping in the flower : seeds pendulous, oblong, flat, scobiform, the thin reticulated coat being much larger than the oval nucleus, and its margin densely fimbriate with clavate-oblong hair-like cells. — Gray, *Proc. Am. Acad.* vii. 400, & *Bot. Calif. i.* 455 ; *Hook. f. Bot. Mag. t.* 6247. — California, in the Sierra Nevada, Plumas and Nevada Counties, *Lobb, Miss N. J. Davis, &c.*

§ 2. **EUBÓTRYs.** Calyx bibracteolate ; the persistent bractlets and distinct sepals firm-chartaceous, ovate or ovate-lanceolate, acuminate, much imbricated, (whitish or reddish) : corolla cylindraceous : filaments glabrous, straight : anther-cells 1–2-awned from the apex : stigma merely truncate : placentæ short and porrect : leaves membranaceous and deciduous : flowers in second spike-like racemes, which mostly terminate the branchlets, formed early in summer, remaining naked

and undeveloped until late in the ensuing spring, when the flower-buds complete their growth and the blossoms expand: bracts foliaceous-subulate, deciduous at flowering: the short pedicels articulated with the rhachis. — Gray, Man. l. c. *Eubotrys*, Nutt. in Trans. Am. Phil. Soc. n. ser. viii. 269. (Between *Euleucothoe* and the genus *Cassandra*. The two Japanese species agree with this subgenus only in foliage.)

L. racemósa, Gray. Shrub 4 to 10 feet high: branches erect: leaves oblong or oval-lanceolate, acute, serrulate, somewhat pubescent when young and on the midrib beneath: racemes or spikes mostly solitary, erect or ascending: sepals lanceolate-ovate, very acute: anther-cells each 2-awned: capsule coriaceous, not lobed: seeds angled and wingless, the shining smooth coat conformed to the nucleus. — Man. ed. 2. 252, ed. 5, 294. *Andromeda racemosa* & *A. paniculata* (chiefly), L. Spec. 394. *A. spicata*, Wats. Dendr. t. 36. *Lyonia racemosa* & *Leucothoe spicata*, Don, l. c. *Zenobia racemosa*, DC. l. c. *Cassandra racemosa*, Spach, Hist. Veg. ix. 478. *Eubotrys racemosa*, Nutt. l. c. — Varies with awns of anthers very short. — Moist thickets (Canada, *Pursh*, but most doubtful), Massachusetts near the coast to Florida and Louisiana.

L. recurva, Gray, l. c. Lower than the foregoing, and with divaricate branches: leaves more acuminate: racemes spreading or recurved: sepals ovate: anther-cells 1-awned: capsule chartaceous, strongly depressed and 5-lobed: seeds flat, with a broadly winged loose cellular coat. — *Andromeda (Zenobia) recurva*, Buckley in Am. Jour. Sci. xlv. 172. — Dry hills in the Alleghany Mountains, Virginia to Alabama.

11. CASSÁNDRA, Don. LEATHER-LEAF. (Mythological: *Cassandra* was the daughter of Priam and Hecuba.) — A single good species.

C. calyculáta, Don. A low and much branched shrub, a foot or two high, with recurving branches: leaves coriaceous and persistent, very short-petioled, oblong, obtuse, obscurely serrulate, dull green and lepidote-scurfy, an inch or so in length: flowers on short recurved pedicels in the axils of the upper leaves, these becoming gradually smaller and bract-like: calyx and bractlets rusty-lepidote: flowers formed in summer and expanding early the next spring: corolla cylindraceous-oblong, 5-lobed, white, 2 or 3 lines long: capsules small. — *Andromeda calyculata*, L.; Pall. Fl. Ross. t. 71; Sims, Bot. Mag. t. 1286; Lodd. Cab. t. 530 & 862. *Chamedaphne calyculata*, Mönch. *Lyonia calyculata*, Reichenb. — Bogs, through the cooler parts of the Northern Atlantic States, and in the Alleghanies to Georgia; N. Illinois to Newfoundland; Kotzebue's Sound. (N. Eu. & N. Asia.)

Var. angustifolia is a remarkable form, unknown in an indigenous condition: leaves linear-lanceolate, and the somewhat revolute margins undulate or crisped: bractlets acute: sepals more pointed. — *Andromeda calyculata*, var. *angustifolia*, Ait. Kew. ed. 1, ii. 70. *A. angustifolia*, Pursh, Fl. i. 291. *A. crispa*, Desf. Cat.; Guimp., Otto, & Hayne, Holz. t. 51. — "North America and Siberia," Hort. Kew. "Carolina to Georgia," *Pursh*; but that is a random guess.

12. CASSÍOPE, Don. (*Cassiope* was the mother of *Andromeda*.) — Arctic-alpine fruticulose evergreens, resembling Heaths or *Lycopodium*; with small or minute and imbricated or crowded entire and veinless leaves, often opposite or whorled, and solitary flowers nodding on the apex of an erect naked peduncle. Sepals ovate, thickened at base. Corolla white or rose-color. Style thickened at base or conical. Placentæ many-seeded, pendulous from the summit of the short columella: seeds with a thin close coat. — DC. Prodr. vii. 610.

* Leaves loose or spreading, narrow, flattish: peduncle terminal: corolla deeply cleft: style conical.

C. Stelleriána, DC. Diffusely spreading, with the habit of *Empetrum*: leaves oblong-linear, obtuse, widely spreading, obscurely serrulate (less than 3 lines long): peduncle very short: corolla 4-5-parted. — *Andromeda Stelleriana*, Pall. Fl. Ross. 58, t. 74; Hook. Fl. ii. 37, t. 131. *Erica Stelleriana*, Willd. *Menziesia empetriformis*, Pursh, Fl. i. 265, not Smith. *Bryanthus Stelleri*, Don, Syst. iii. 833. — N. W. Coast, Sitka to Behring Straits.

C. hypnoides, Don. Cespitose, 2 to 4 inches high, with the habit of a moss or small *Lycopodium*: leaves somewhat erect, loosely imbricated, linear-acerose, a line long: peduncle slender: corolla deeply 5-cleft. — Edinb. Phil. Jour. xvii. 157. *Andromeda hypnoides*, L. Spec. 393, & Fl. Lapp. t. 1; Fl. Dan. t. 10; Pall. l. c. t. 73; Hook. Bot. Mag. t. 2936. — Alpine summits of the mountains of N. New England and New York, Labrador, &c. (Greenland, Lapland, Arct. Siberia.)

* * Leaves appressed-erect, closely imbricated in four ranks, thick, boat-shaped or triangular, ovate or oblong in outline: peduncles lateral: corolla 5-lobed: style slender, but slightly thickened downward.

C. lycopodioides, Don. Very low or creeping stems filiform: leaves barely a line long, roundish on the back, not ciliate: peduncles filiform. — Ledeb. Fl. Ross. ii. 912. *Andromeda lycopodioides*, Pall. l. c. t. 72; Hook. l. c. — Aleutian Islands to Oregon. *Cusick*.

C. Mertensiana, Don. Stout, with rigid ascending stems and fastigate branches, a foot or less in height, resembling the next: leaves $1\frac{1}{2}$ or 2 lines long, glabrous, carinate and not furrowed on the back: pedicels rather short. — DC. l. c.; Gray, Bot. Calif. ii. 456. *Andromeda Mertensiana*, Bong. Sitk. 152, t. 5. *A. cupressina*, Hook. Fl. ii. 38. — Sitka, &c., northern Rocky Mountains, and along the Cascade Mountains to the Sierra Nevada, California, as far south as Mount Dana.

C. tetragona, Don. Stems ascending, a span or two high, with fastigate branches: leaves $1\frac{1}{2}$ to 2 lines long, thick, and with a deep furrow on the back, often pubescent when young: parts of the flower sometimes in fours. — *Andromeda tetragona*, L.; Fl. Dan. t. 1030; Pall. l. c. t. 73, f. 4; Hook. l. c. & Bot. Mag. t. 3181. — Northern Rocky Mountains, and Cascade Mountains in Oregon, to the arctic regions. (Greenland round to Kamtschatka.)

13. CALLŪNA, Salisb. HEATHER, LING. (From *καλλύρω*, to brush or sweep, brooms being made of it.) — Grayish-evergreen undershrub, with no scaly buds, minute opposite leaves imbricated in four ranks on the branches, and very numerous small flowers in the upper axils, subtended by two or three pairs of bractlets, the inner scarious. — Single species.

C. vulgaris, Salisb. A foot or less high, in broad tufts, more or less whitish-tomentose or glabrate: branches 4-sided by the imbricated leaves: these minute, 3-sided, grooved on the back: flowers appearing in summer, crowded on the branchlets, as if spicate or racemose, commonly secund, rose-colored or sometimes white. — Linn. Trans. vi. 317; Reichenb. Ic. Germ. xvii. t. 1162; Gray, Man. ed. 5, 297. *C. Atlantica*, Seem. Jour. Bot. iv. 305, t. 53. *Erica vulgaris*, L.; Lam. Ill. t. 287; Engl. Bot. t. 1013. — Low grounds, Massachusetts, at Tewksbury (*T. Dewson*) and W. Andover (*James Mitchell*); Cape Elizabeth, Maine (*Pickard*); and less rare in Nova Scotia, Cape Breton, Newfoundland, &c. (Iceland, the Azores, N. Eu. to W. Asia.)

ERICA CINÉREA, a European Heath, has been found growing on rocks on Nantucket, Mass., but doubtless a waif.

14. BRYÁNTHUS, Steller, Gmelin. (*Βρύον*, moss, and *ἄρθος*, flower, because growing among mosses.) — Heath-like fruticulose evergreens (all arctic-alpine); with alternate much crowded linear-obtuse leaves (half an inch or less in length), articulated with the stem, grooved beneath or margins revolute-thickened. Flowers umbellate or racemose-crowded at the summit of the branches: the pedicels glandular and bibracteolate at base. Sepals 4 or 5, sometimes 6, imbricated, persistent. Anthers oblong, opening at top by oblique chinks. Seeds oval or oblong; the coat close and rather firm. Flowers in summer, from purple to ochroleucous. — Gray, Proc. Am. Acad. vii. 377, & Bot. Calif. i. 456. *Bryanthus* & *Phyllodoce*, Maxim. Rhod. As. Or. 4, 5; Benth. & Hook. Gen. ii. 595.

B. GMELINI, Don, the typical species, and the only one not yet found in America, may be expected on the American, as it belongs to the opposite, side of Behring Straits. It has the cluster of few flowers raised on a naked peduncle, and an open 4-parted corolla.

§ 1. **PARABRYANTHUS.** Corolla open-campanulate, 5-cleft or 5-lobed: calyx glabrous: flowers racemose-clustered: pedicels subtended by foliaceous and rigid bracts: leaves almost smooth, with strongly revolute thickened margins. — Gray, Bot. Calif. l. c. *Bryanthus*, in part, Hook. & Benth. Gen. l. c. *Phyllodoce*, in part, Maxim. l. c.

B. Bréweri, Gray. A span to a foot high, rigid: leaves 3 to 7 lines long: pedicels numerous, at first shorter than the flowers: corolla rose-purple, almost saucer-shaped, 5-cleft fully to the middle, large for the genus, the spreading lobes 2 lines long: stamens (7 to 10) and style soon much exserted. — Proc. Am. Acad. vii. 377. — Sierra Nevada at about 10,000 feet. Flowers comparatively large and showy.

B. empetrifórmis, Gray, l. c. A span or so high: leaves similar to those of the preceding, or rough at the margin: pedicels fewer and more umbellate: corolla rose-color, much smaller (between 2 and 3 lines long), campanulate, barely 5-lobed; the lobes much shorter than the tube: stamens included: style either included or exserted. — *Menziesia empetriformis*, Smith in Linn. Trans. x. 280; Pursh, Fl. i. 264; Graham in Edinb. Phil. Jour. & Bot. Mag. t. 3176; Hook. Fl. ii. 40. *M. Grahami*, Hook. l. c. *Phyllodoce empetriformis*, Don, Syst. iii. 783. — Rocky Mountains from lat. 50° to 42°, and Mount Shasta, California to Vancouver's Island.

Var. intermédius (*Menziesia intermedia*, Hook. l. c.), apparently a form with corolla approaching cylindraceous and sepals rather acute. — Northern Rocky Mountains, Drummond, Lyall.

§ 2. **PHYLLÓDOCE.** Corolla ovate, contracted at the orifice, 5-toothed: calyx glandular-pubescent: stamens and style included: pedicels umbellate; the bractlets scarious and bracts thinnish: leaves more scabrous-ciliolate or roughish. — *Phyllodoce*, Salisb. Parad. Lond. 36; DC. l. c., in part; Benth. & Hook. l. c.

* Flowers purple, rarely rose-color, 2 to 6 in the umbel, or sometimes solitary.

B. taxifólius, Gray, l. c. Barely a span high: leaves with acute scabrous-ciliolate edges: pedicels minutely glandular: sepals ovate-lanceolate, acuminate: corolla from urceolate-oblong to ovoid, glabrous, as are the filaments. — *Andromeda taxifolia*, Pall. Fl. Ross. ii. 54, t. 72; Fl. Dan. t. 57. *A. cærulea*, L. Fl. Lapp. t. 1, f. 5, but corolla not blue. *Menziesia cærulea*, Swartz in Linn. Trans. x. 377, t. 30. *Phyllodoce taxifolia*, Salisb. l. c.; DC. l. c. — Alpine mountain summits of New Hampshire and Maine; also Labrador. (Greenland, N. Eu. to Japan and Kamtschatka.)

* * Flowers from white or whitish to sulphur-color.

B. Aleúticus, Gray, l. c. A span or more high: leaves of the preceding: pedicels (7 to 15) and base of the acutish sepals very glandular: corolla almost globose, glabrous, whitish: filaments glabrous. — *Menziesia Aleutica*, Spreng. Syst. ii. 202; Cham. in Linn. i. 515; Hook. l. c.; not Bong. *Phyllodoce Pallasiana*, Don, & DC. l. c. (as to pl. Cham., *Andromeda cærulea*, var. *viridiflora*, Pall. herb. ?); Maxim. Rhod. As. Or. 6. — Unalashka and Alaska. (Kamtschatka to Japan.)

B. glandulifórus, Gray, l. c. A span or two high: leaves similar or thicker-edged: pedicels (3 to 8) and acuminate sepals glandular-hirsute: corolla turgid-ovate, glandular, sulphur-color: filaments puberulent. — *Menziesia glanduliflora*, Hook. Fl. ii. 40, t. 132. *M. Aleutica*, Bong. Sitk. 154, t. 3 (poor), not of Spreng. — Rocky Mountains, lat. 49° to 56°, and west to Sitka.

15. **KÁLMIA, L. AMERICAN LAUREL.** (*Peter Kalm*, a pupil of Linnæus, who travelled in Canada and N. States, and became professor at Abo.) — N. American shrubs and one W. Indian: with evergreen entire leaves, and umbellate clustered or rarely scattered showy flowers, either rose-colored, purple, or white: no scaly leaf-buds nor thin scaly-bracted flower buds; the bracts ovate to subulate, coriaceous or firm and persistent. Calyx 5-parted or of 5 sepals, imbricated in the bud. Limb of the corolla in the bud strongly 10-carinate from the pouches

upward, the salient keels running to the apex of the lobes and to the sinuses, the limb imbricated in the bud. Anthers free and on erect filaments in the early bud, in the full-grown bud received in the pouches of the corolla, and the filaments bent over as the corolla enlarges, and still more when it expands, straightening elastically and incurving when disengaged, thereby throwing out the pollen: anther-cells opening by a large pore, sometimes extending into a chink. Stigma depressed. Capsule globular, 5-celled: placenta pendulous or porrect from the upper part of a small columella. Seeds with a thin and mostly close coat.

§ 1. Flowers in simple or clustered umbels, fascicles, or corymbs: calyx persistent under the capsule: leaves and branches glabrous or nearly so.

* Inflorescence compound: branchlets terete: capsule depressed, tardily septicial: seeds oblong.

K. latifolia, L. (LAUREL, CALICO-BUSH, &c.) Widely branching shrub 3 to 10, or in S. Alleghanies even 30 feet high, with very hard wood: leaves alternate or occasionally somewhat in pairs or threes, oblong or elliptical-lanceolate, acute or acutish at both ends, petioled, bright green: inflorescence very viscid-pubescent: flowers produced in early summer; the corymbose fascicles numerous and crowded in compound terminal corymbs: corolla rose-color to white, viscid, three-fourths inch in diameter: capsules viscid-glandular; the almost closed valves or pieces generally carrying with them the placenta. — Sims, Bot. Mag. t. 175; Schk. Handb. t. 116; Michx. f. Sylv. ii. t. 63; Bigel. Med. Bot. i. 133, t. 13. (Catesb. Car. ii. t. 98; Trew, Ehret. t. 38.) — Rocky hills or northward in damp grounds, commonly where wooded, Canada, Maine to Ohio and Tennessee, and chiefly along the mountains to W. Florida.

K. angustifolia, L. (SHEEP LAUREL, LAMBKILL, WICKY.) Shrub 2 or 3 feet high, simple: leaves mostly in pairs or threes, oblong, obtuse, petioled, an inch or two long, light green above, dull or pale beneath: inflorescence lateral from the early growth of the terminal shoot, puberulent, slightly glandular: flowers in early summer, not half as large as in the foregoing, purple or crimson: capsules not glandular, on recurved pedicels. — Sims, Bot. Mag. t. 331. (Catesb. Car. iii. t. 17; Trew, Ehret. t. 18.) — Hillsides, Newfoundland and Hudson's Bay to the upper part of Georgia.

K. cuneata, Michx. Low shrub, somewhat pubescent: leaves oblong with cuneate base, almost sessile and chiefly alternate, mucronate (an inch long): inflorescence lateral, few-flowered, nearly glabrous: sepals ovate, obtuse: corolla white or whitish, one-third inch in diameter. — Fl. i. 257; Nutt. Gen. i. 263; Loud. Arb. fig. 1143. — Swamps, eastern part of N. & S. Carolina (not in the mountains, as said Pursh): little known.

* * Inflorescence a simple terminal umbel or corymb: branchlets 2-edged: capsule ovoid-globose, freely dehiscent from the summit; the valves 2-cleft at apex; placenta left on the summit of the columella: seeds linear, with a loose cellular coat.

K. glauca, Ait. Shrub a foot or two high, wholly glabrous, mostly glaucous: leaves all opposite or rarely in threes, almost sessile, oblong or linear-oblong, or appearing narrower by the usual strong revolution of the edges, glaucous-white beneath (an inch or less long): flowers in spring, lilac-purple, half to two-thirds inch in diameter: bracts large: sepals ovate, scarious-coriaceous, much imbricated. — Hort. Kew. ed. 1, ii. 64, t. 8; Sims, Bot. Mag. t. 177; Lodd. Cab. t. 1508. *K. polifolia*, Wang. Act. Nat. Ber. v. t. 5. Var. *rosmarinifolia*, Pursh, is merely a state with very revolute leaves: var. *microphylla*, Hook. Fl. a small alpine form, a span high, with leaves barely half inch long. — Bogs, Newfoundland and Hudson's Bay to Pennsylvania, and on the western coast at Sitka, &c., extending down the Rocky Mountains to Colorado, and down the Sierra Nevada to Mt. Dana, California, in the depauperate alpine form or variety.

§ 2. Flowers mostly scattered and solitary in the axils of ordinary leaves; these small and, with the branches and foliaceous sepals, hirsute: capsule shorter than the calyx: placenta remaining upon the columella: seeds oval or roundish, and with a close and firmer coat. (The Cuban *K. ericoides*, with rigid Heath-like leaves, has inflorescence approaching the first section, and sepals apparently persistent.)

K. hirsúta, Walt. About a foot high, branching freely: leaves nearly sessile, plane, oblong or lanceolate, a quarter to half inch long: flowers scattered and axillary, produced through the summer, on pedicels longer than the leaves: sepals ovate-lanceolate and leaf-like, as long as the rose-purple corolla (this barely half inch in diameter), at length deciduous, leaving the old capsules bare. — Bot. Mag. t. 138. *K. ciliata*, Bartram, Trav. — Low pine barrens, S. E. Virginia to Florida.

16. MENZIÉSIA, Smith. (*Archibald Menzies*, assistant surgeon in Vancouver's voyage, 1791–95, brought the original species from the N. W. coast.) — Deciduous-leaved shrubs, of N. Am. and Japan; with the foliage of the Azaleas, but with small and mostly dull-colored 4-merous flowers (the corolla barely lobed, in ours a quarter inch long, lurid-purplish), developed at the same time as the leaves, from separate strobilaceous buds, which terminate the branches of the preceding year; the pedicels nodding in flower, erect in fruit. Leaves alternate, membranaceous, glandular-mucronate. Capsule short: placenta attached to the whole length of the columella. Flowers in early summer. — Smith, Ic. Pl. 59; Salisb. Parad. Lond. 44; Maxim. Rhod. As. Or. 7.

* Seeds with tail or appendage at each end as long as the nucleus: capsule smooth and naked or nearly so, inclined to obovate: filaments more or less ciliate below.

M. glabélla. Strigose-chaffy scales wanting, or very few on young petioles and midrib beneath: leaves obovate, mostly obtuse, barely mucronate-tipped, glaucescent and glabrous or nearly so beneath (an inch or two long), sprinkled with some small appressed hairs above, the obscurely serrulate margins minutely ciliate: pedicels naked or somewhat glandular: corolla ovoid-campanulate. — *M. globularis*, Hook. Fl. ii. 41; Maxim. Rhod. As. Or. l. c., not Salisb. *M. ferruginea*, Gray in Proc. Am. Acad. viii. 393. — Rocky Mountains, lat. 49°–56° (*Drummond, Bourgeau*), thence to Washington Territory and Oregon, *Lyall, Tolmie, E. Hall*.

* * Seeds merely apiculate or very short-tailed: capsule ovate: filaments glabrous.

M. globuláris, Salisb. Straggling or loosely branched shrub 2 to 5 feet high (like the others), more or less chaffy: leaves obovate-oblong, usually obtuse, prominently glandular-mucronate, strigose-hirsute especially above, glaucescent beneath: pedicels glandular: corolla globular-ovate becoming ovate-campanulate: capsule beset with short gland-tipped bristles. — Pursh, l. c. *M. Smithii*, Michx. Fl. i. 235. *M. ferruginea*, var. (*globularis*), Sims, Bot. Mag. t. 1571; Gray, Man. ed. 2 & 3. *M. pilosa*, Juss. in Ann. Mus. i. 56. *Azalea pilosa*, Michx. in Lam. Jour. Nat. Hist. i. 410. — Woods, through the Alleghany Mountains, from Pennsylvania to Georgia. Most like the preceding, but the seeds very different; the small calyx commonly more distinctly 4-lobed. Leaves an inch or two long.

M. ferruginea, Smith. Strigose-chaff not rare on young parts: leaves oblong or lanceolate-obovate, acute or acutish at both ends, prominently glandular-mucronate, more ciliate with glandular bristles, rusty strigose-hirsute above, merely paler beneath (somewhat blackening in drying): pedicels bristly-glandular: corolla oblong-ovate and becoming cylindraceous. — Pursh, Fl. i. 264; Hook. l. c.; Maxim. l. c. — Woods, coast of Oregon to Alaska and Aleutian Islands. (*Kamtschatka*?)

17. RHODODÉNDRON, L. ROSE BAY, AZALEA, &c. (The ancient Greek name, meaning rose-tree.) — Shrubs or small trees, of diverse habit and character, with chiefly alternate entire leaves: the principal divisions have been received as genera, but they all run together. Only five are N. American out of the eight subgenera of Maximowicz, Rhod. As. Or. 13. (*Rhododendron* & *Azalea*, L.) — The first two subgenera are very anomalous.

§ 1. **THERORHÓDION**, Maxim. Flowers one or two terminating leafy shoots of the season; the thin bud-scales of the shoot deciduous only with the annual leaves: corolla rotate, divided to the base on the lower side: stamens 10.

R. Kamtschaticum, Pall. A span high: leaves thin and chartaceo-membranaceous, sessile, obovate, or the upper oval, very obtuse, nervose-veined and reticulated, bristly ciliate, shining: sepals large and foliaceous, deciduous: corolla rose-purple, deeply 5-cleft, nearly an inch long: capsule thin. — Fl. Ross. i. 48, t. 33; Hook. Fl. ii. 43. *Rhodothamnus Kamtschaticus*, Lindl. in Paxt. Fl. Gard. i. t. 22. — Alaska and Aleutian Islands to North Japan, &c.

§ 2. **AZALEASTRUM**, Planchon, Maxim. Inflorescence lateral; the flowers from the same bud as the leafy shoot or from separate 1–3-flowered lateral buds below: scales caducous: leaves deciduous: corolla rotate or approaching campanulate: stamens 5 to 10.

R. albiflorum, Hook. Shrub 2 or 3 feet high, with slender branches, pubescent with slender strigose or silky and some short glandular hairs when young, nearly glabrous in age: leaves membranaceous, oblong, pale green: flowers from separate small buds of the axils of the previous year, nodding on short pedicels: sepals membranaceo-foliaceous, oval or oblong, half the length of the white 5-cleft corolla, as long as the ovoid capsule: stamens 10, included: filaments bearded at the base: stigma peltate-5-lobed. — Fl. ii. 43, & Bot. Mag. t. 133. — Woods of the northern Rocky Mountains and Oregon to British Columbia. Corolla less than an inch long.

§ 3. **AZÁLEA**, Planchon, Maxim. Inflorescence terminal; with the umbellate flowers from a separate strobilaceous bud, terminating the growth of the previous year, surrounded at the base by lateral and smaller leaf-buds, developing in spring or early summer; the thin-scaly bud-scales and bracts caducous or early deciduous: leaves deciduous, glandular-mucronate: calyx small, sometimes minute: corolla chiefly funnelform, glandular-viscid outside: stamens and style more or less exserted and declined (5 to 10). — *Azalea*, L. chiefly, DC. &c. (with *Rhodora*, Duhamel).

* Strobilaceous flower-buds of numerous much imbricated scales: corolla with conspicuous funnel-form tube, slightly irregular limb, and acute oblong lobes: stamens (chiefly 5) and style long-exserted. TRUE AZALEAS.

† Pacific States species: flowers more or less later than the leaves.

R. occidentále, Gray. Shrub 2 to 6 feet high: branches not bristly: leaves obovate-oblong, nearly glabrous at maturity, but ciliate, thickish, bright green and shining above (1 to 3 inches long): lobes of the 5-parted calyx oblong or oval: corolla white or barely with a rosy tinge and a pale yellow band on the upper lobe, often 2½ inches long: capsule oblong, three-fourths inch long. — Bot. Calif. i. 458. *R. calendulaceum*, Hook. & Arn. Beech. 362. *Azalea occidentalis*, Torr. & Gray, Pacif. R. Rep. iv. 116. — California, western foothills of the Sierra Nevada through the length of the State, and in the coast ranges, along streams. Fragrance of blossoms sweet, but slightly unpleasant.

†† Atlantic States species (commonly called SWAMP HONEYSUCKLES), all from 3 to 10 feet high and the leaves from obovate to oblong-oblancoate. — Species of *Rhododendron*, Torr. Fl. N. & M. States (1824), 424.

‡ Flowers appearing later than the glabrous leaves, deliciously fragrant.

R. arborescens, Torr. No strigose or chaffy bristles: leaves (fragrant in drying) merely ciliate, slightly coriaceous when mature, bright green and shining above, glaucous beneath: corolla rose-color, fully 2 inches long: the tube and the conspicuous narrow-oblong calyx-lobes sparsely glandular-bristly. — Fl. N. & M. States, 425. *Azalea arborescens*, Pursh, Fl. i. 152; Gray, Man. ed. 1, 268. *A. fragrans*, Raf. Ann. Nat. 12. — Alleghany Mountains, Pennsylvania to North Carolina. Foliage exhales the odor of *Anthranthum* in drying.

R. viscosum, Torr. Branchlets and midrib of the leaves beneath more or less chaffy-bristly: leaves more ciliate, an inch or two long, dull or hardly shining above, pale beneath: calyx very small: corolla white, or with a rosy tinge, sometimes varying to reddish, the outside very glandular-viscid. — Fl. N. & M. States, l. c., & Fl. N. Y. i. 439, t. 66. *Azalea viscosa*, L. (Catesb. Car. i. t. 57); Michx. Fl. i. 150; Emerson, Mass. Rep. ed. 2,

t. 24.—Swamps, Canada and Maine to Florida and Arkansas. Runs into manifold varieties; the following being those most marked:—

Var. glaucum. Leaves glaucous-whitened beneath, dull and sometimes glaucous above also.—*Azalea viscosa*, var. *glauca*, Michx. l. c. *A. glauca*, Lam. Ill. t. 110. *R. glaucum*, Don, l. c. Form more strigose-hispid ls *A. hispida*, Pursh, l. c. (*R. hispidum*, Torr. l. c.) *A. scabra*, Loddiges, &c.—New England to Virginia.

Var. nitidum. Leaves oblanceolate, brighter green both sides: stems a foot to a yard high.—*R. nitidum*, Torr. l. c. *Azalea nitida*, Pursh, l. c.; Lindl. Bot. Reg. t. 414.—Mountains, New York to Virginia.

++ ++ Flowers earlier and less fragrant, preceding or accompanying the leaves; these soft-pubescent beneath and more membranaceous, 1 to 3 inches long; the midrib and the branchlets either slightly or not at all chaffy-strigose or hispid: calyx usually very small.

R. nudiflorum, Torr. l. c. Corolla from light rose-color or flesh-color to rose-purple; the viscid tube as long as or rather longer than the limb.—*Azalea nudiflora*, L. Spec. ed. 2, 214; Sims, Bot. Mag. t. 180; Emerson, l. c. t. 24. *A. lutea*, L. Spec. ed. 1. *A. periclymenoides* & *A. canescens*, Michx. l. c. *A. bicolor*, Pursh, l. c. *Rhododendron canescens*, *bicolor*, &c., Don, l. c.—Swamps, low grounds, or shaded hillsides, Canada to Florida and Texas. Varying much in color, &c., at the south sometimes passing into yellow. Many hybrid forms are in cultivation.

R. calendulaceum, Torr. l. c. Corolla from orange-yellow to flame-red; the tube mostly hirsute-glandular, shorter than the ample limb: mature leaves more tomentose beneath.—*Azalea calendulacea*, Michx. Fl. i. 151; Pursh, l. c.; Bot. Mag. t. 1721, 2143.—Woods in the Alleghany Mountains, from Pennsylvania to Georgia, extending southward into the middle country.

* * Strobilaceous flower-buds of fewer and early caducous scales: corolla irregular, with a short or hardly any tube, anteriorly divided to the base; the limb equalling the 10 stamens and style.—*Rhodora*, Duhamel, in Linn. Gen.

R. Rhodora, Don. A foot or two high, the young parts sparingly strigose-hairy: flowers somewhat preceding the leaves, short-pedicelled: calyx very small: corolla less than an inch long, purplish-rose-color, bilabiate parted or divided; the posterior lip 3-lobed; the anterior of two oblong-linear and recurving nearly or quite distinct petals: leaves oblong, pale, glaucescent, more or less pubescent.—Syst. iii. 848; Maxim. l. c. *Rhodora Canadensis*, L.; L'Her. Stirp. i. 161, t. 68; Lam. Ill. t. 364; Bot. Mag. t. 474; Duham. Arb. ed. nov. iii. 53; Emerson, l. c. t. 25. *Rhodora congesta*, Mönch. *Rhododendron pulchellum*, Salisb.—Cool bogs, New England to mountains of Pennsylvania and northward to Newfoundland: fl. May. Mature leaves 1 to 2½ inches long, glandular-mucronulate. Flowers rarely white, sometimes variably or variously cleft or divided, or the lower petals more united to the upper lip.

§ 4. EURHODODÉNDRON. Inflorescence terminal; the umbellate or somewhat corymbose flowers from a separate strobilaceous bud (of mostly numerous and well-imbricated caducous scales), terminating the growth of the previous year; the leaf-buds lateral and below: leaves coriaceous and persistent: calyx various, usually small or minute: corolla mostly 5-lobed and little irregular: stamens (commonly 10) and style rarely exserted, somewhat declined, or sometimes equally spreading: flowers mostly large and showy, in early summer.—*Eurhododendron* & *Osmothamnus* (DC.), Maxim. l. c.

* Not lepidote, glabrous or soon becoming so; the pubescence of young parts (if any) scurfy-tomentose and deciduous: leaves ample and thick-coriaceous: stems and branches stout and erect: flowers many in the cluster, mostly developing earlier than the leaf-buds: seeds scobiform or scarious-appendaged at one or both ends.

+ Pacific species: pedicels wholly glabrous: calyx lobes very short and rounded.

R. Californicum, Hook. Shrub 3 to 8 feet high, glabrous: leaves broadly oblong, 3 to 6 inches long, obtuse with a mucronate or short-acuminate point, acute or acutish at base: corolla rose-purple, broadly campanulate (over an inch long); the broad lobes undulate: ovary rusty-hirsute.—Bot. Mag. t. 4863; Gray, Bot. Calif. i. 458.—Woods, California from Mendocino Co. extending into Oregon (*E. Hall*). Corolla much resembling that of *R. Catawbiense*.

R. macrophyllum, Don. Shrub 10 to 15 feet high: leaves oblong, acute at both ends, 5 to 8 inches in length, thinnish: corolla white, less than an inch long; its lobes oblong: ovary bristly hirsute. — Syst. iii. 843; Torr. Bot. Wilkes Exp. 382. *R. maximum*, Hook. Fl. ii. 43, excl. syn. &c. — Woods, Puget Sound to Washington Territory. A little known species.

+ + Atlantic States species: pedicels glandular or pubescent.

R. máximum, L. (GREAT LAUREL or ROSE BAY.) Shrub or small tree 6 to 35 feet high: leaves elongated- or lanceolate-oblong, acute or short-pointed, narrowed toward the mostly acute base, 4 to 10 inches long, commonly whitish beneath: pedicels viscid: calyx-lobes oval, equalling the glandular ovary: corolla pale rose-color or nearly white, greenish in the throat on upper side and with some yellowish or reddish spots, campanulate, an inch long, rather deeply 5-cleft into oval lobes: capsule short. — Catesb. Car. iii. t. 17; Lam. Ill. t. 364; Bot. Mag. t. 951; Michx. f. Sylv. i. t. 67; Bigel. Med. Bot. iii. t. 51. *R. purpureum* & *R. Purshii*, Don, l. c. (varying in color of flower, &c.). — Damp woods, rare in Nova Scotia, New England and bordering part of Canada, common through the Alleghanies on steep banks of streams, &c., New York to Georgia. Flowering toward mid-summer, simultaneously with the growth of the leafy shoots.

R. Catawbiense, Michx. Shrub 3 to 6 (rarely 20) feet high: leaves oval or broadly oblong, mostly obtuse or rounded at both ends, 3 to 5 inches long: pedicels rusty-pubescent when young, glabrous in age: calyx and its lobes very short: ovary oblong, rusty-pubescent: corolla lilac-purple, broadly campanulate, an inch and a half high, with broad roundish lobes: capsule narrowly oblong. — Fl. i. 258; Bot. Mag. t. 1671. Higher mountains, Virginia to Georgia: fl. at beginning of summer. Largely hybridized with other species, and varied in cultivation.

* * Lepidote-dotted or scurfy with scattered peltate scales: stems mostly spreading or diffuse: flowers fewer or few in the umbel: seeds (in ours and in most species) with a close coat, barely apiculate at either end!

+ Southern species: stems 3 to 6 feet high, with slender and often recurving branches: even the outside of the short-funnelform corolla sprinkled with the resinous globules or dots: stamens 10: flower-buds ovate or oblong and well imbricated.

R. punctátum, Andr. Diffuse, the slender branches recurved or spreading: leaves lighter green and thinner-coriaceous, oblong or oval-lanceolate, acute or somewhat acuminate at both ends, 2 to 5 inches long: flowers developed later than or with the leaves of the season (in early summer), copious: corolla rose-color, an inch long, short-funnelform with an ample widely expanded limb and rounded-obovate slightly undulate lobes, exceeding the stamens and style: capsule resinous-dotted: seeds oval. — Bot. Rep. t. 36; Vent. Cels. t. 15; Bot. Reg. t. 37. *R. minus*, Michx. Fl. i. 258. — Eastern portion of the Alleghany Mountains from N. Carolina to Georgia, and extending to the eastern frontier of the latter State on the Savannah River at Augusta. Corolla often darker-spotted and greenish in the throat.

R. Chapmánii. More erect and rigid: leaves firm-coriaceous, oval or oblong, obtuse, seldom an inch and a half long, duller, more crowded, short-petioled: flowers developed earlier than the leafy shoots of the season: corolla rose-color, spotted within, more narrowly funnelform; the tube longer than the limb; lobes somewhat ovate, shorter than the stamens and style: seeds narrowly oblong. — *R. punctatum*, var., Chapm. Fl. 266. — Sandy pine barrens, W. Florida, Chapman.

+ + Arctic-alpine species, small and depressed: corolla rotate-campanulate, deeply 5-cleft, not lepidote or resinous-dotted: stamens 5 to 10: flower-buds globular and less imbricated.

R. Lappónicum, Wahl. Divergently branched from the base, prostrate or a span or two high: leaves a quarter to half an inch long, firm-coriaceous, oval or oblong, obtuse: umbels 3-6-flowered: corolla purple, with darker spots within, half inch long: stamens 5 to 8, rarely 10. — Fl. Succ. 249; DC. Prodr. vii. 724; Hook. Bot. Mag. t. 3106. *Azalea Laponica*, L.; Fl. Dan. t. 906. — Alpine region of the mountains of N. New York and New England, Labrador to the northern Rocky Mountains and arctic coast, west to Norton Sound and Unalashka (*Eschscholtz*). (Greenland to Arct. Asia.) *R. parvifolium*, Adams (*Azalea Laponica*, Pall.), or at least the N. W. American form referred to it by Maximowicz, seems hardly different; and all the American and Greenland specimens have the filaments bearded or pubescent at base.

18. **LÉDUM**, L. LABRADOR TEA. (*Λίδον*, ancient name of the *Cistus*.)

— Low shrubs, with alternate persistent leaves entire and more or less resinous dotted, slightly fragrant when bruised. Flowers white, developed in early summer from separate and mostly terminal buds, their scales and bracts well imbricated, thin and caducous. Stamens and the (persistent) style fully as long as the petals. Stigma obscurely annulate. Pedicels slender, recurved in fruit. — We have all the species.

* Leaves densely tomentose beneath, the wool soon ferrugineous, and the margins strongly revolute: inflorescence all terminal.

L. palustre, L. A span (in the arctic form) to 2 feet high: leaves linear (half to inch and a half long): stamens 10: capsule short oval. — Fl. Dan. t. 1031; Lodd. Cab. t. 560. — Bogs, Newfoundland, Labrador, and through the arctic regions to Alaska and Aleutian Islands. (N. Eu. & Asia.)

Var. dilatatum, Wahl.: approaching the next, having broader leaves and sometimes long-oval capsules. — N. W. Coast, Sitka, &c.

L. latifolium, Ait. A foot to a yard high, erect: leaves oblong or linear-oblong (an inch or two long), commonly half inch wide, very obtuse: stamens 5 to 7: capsule oblong, acutish. — Lam. Ill. t. 363; Jacq. Ic. Rar. t. 464. *L. Greenlandicum*, Retz. Scand. *L. palustre*, var. *latifolium*, Michx., &c. *L. Canadense*, Lodd. Cab. t. 1049. — Newfoundland and Labrador (Greenland), through the wooded regions to Puget Sound, and south in the Atlantic States to Wisconsin and Pennsylvania.

* * Leaves glabrous both sides: inflorescence sometimes also lateral. — *Ledodendron*, Nutt.

L. glandulosum, Nutt. Shrub 2 to 6 feet high, stout: leaves oblong or oval, or approaching lanceolate (one or two inches long), pale or whitish and minutely resinous-atomiferous beneath: inflorescence often compound and crowded: calyx 5-parted: capsules oval, retuse. — Trans. Am. Phil. Soc. n. ser. viii. 270; Gray, Bot. Calif. i. 459. — Woods and swamps, coast of California from Mendocino Co. northward, and through the Sierra Nevada; thence north and east to Br. Columbia and northern Rocky Mountains.

19. **BEJÁRIA**, Mutis. (Written *Befaria* by the younger Linnæus, &c., but originally "*Bejaria*, Mutis, ex Zea, Annal." iii. 151. Zea was a pupil of Mutis, and he declares that the name was given in honor of *Bejar*, professor of Botany at Cadiz, and an intimate friend of Mutis.) — All but the following species tropical American.

B. racemosa, Vent. Shrub 3 or 4 feet high, evergreen: branches sparsely hispid: leaves alternate, sessile, oblong, coriaceous, glabrous, pale: flowers in pedunculate and sometimes paniculate naked racemes terminating leafy branches: bracts and bractlets subulate, deciduous: calyx obtusely 7-lobed: petals spatulate, white tinged with red, an inch long. — Hort. Cels. t. 51; Ell. Sk. i. 533. *Befaria paniculata*, Michx. Fl. i. 280, t. 26. Pine barrens, Florida and Georgia near the coast: fl. summer.

20. **LEIOPHYLLUM**, Pers. SAND MYRTLE. (*Λείον*, smooth, *γύλλον*, leaf, from the smooth and shining foliage.) — A single species, varying considerably: flowering late in spring; the coriaceous scales or bracts resembling reduced leaves.

L. buxifolium, Ell. Shrub resembling Dwarf Box in miniature, a span or two high, very glabrous, much branched, thickly leafy: leaves alternate or opposite, oblong or oval, veinless, a fourth to half inch long, slightly petioled: flowers profuse, in terminal umbelliform corymbs: corolla white or rose-color (3 or 4 lines broad): anthers brown or purple. — *L. buxifolium* & *L. serpyllifolium*, DC. Prodr. vii. 730. *L. thymifolium*, Don, Syst. iii. 851. *Ledum buxifolium*, Berg. in Act. Ups. 1777, t. 3, f. 1; Michx. Fl. i. 260; Lodd. Cab. t. 52. *L. thymifolium*, Lam. Ill. t. 363. *Dendrium buxifolium*, Desv. Jour. Bot. iii. 36. *Ammyrsine buxifolia*, Pursh; Lindl. Bot. Reg. t. 531. *Fischera buxifolia*, Swartz in Act. Mose. v. 16. — Sandy pine barrens, New Jersey to Florida, and the mountains of Carolina. The state

(*L. serpyllifolium*, DC.) with "capsules sparsely puberulent" or often granulate-roughish is chiefly southern, and on the mountains passes into

Var. prostrátum. Depressed-tufted, with the habit of *Loiseleuria*: leaves mostly oval and deeper green: capsules from smooth and nearly even to sparsely muricate with soft projecting points or processes. — (Gray, in Amer. Jour. Sci. xlii. 36.) *L. prostratum*, Loud. Arb. 1155; DC. l. c. — Summit of Roan Mountain, and of other high mountains of Carolina.

21. LOISELEÚRIA, Desv. (*Loiseur-Delongchamps*, a French botanist.)

— A single, arctic-alpine species, which was included by Linnæus in *Azalea*, but is most unlike.

L. procumbens, Desv. Fruticulose and cespitose, depressed, glabrous, evergreen: leaves nearly all opposite, rather crowded on the branches, distinctly petioled, oval or oblong, thick-coriaceous, veinless, 2 to 4 lines long, with thick midrib beneath and revolute margins: umbel 2-5-flowered from a terminal coriaceous-foliateous bud; the scales or bracts persistent: pedicels short: corolla rose-color or white (2 lines high), barely twice the length of the purplish sepals. — Jour. Bot. iii. 35; DC. l. c. *Azalea procumbens*, L. Spec. & Fl. Lapp. t. 6, f. 2; Fl. Dan. t. 9; Pall. Fl. Ross. t. 70, f. 2; Pursh, Fl. i. 154 (excl. pl. Grandfather Mt., which is *Leiophyllum*); Lodd. Cab. t. 762. *Chameledon procumbens*, Link, Enum. i. 211. — Alpine region of White Mountains, New Hampshire; also Labrador, Arctic America to high N. W. coast and islands. (Greenland, Eu., N. Asia.)

22. ELLIÓTTIA, Muhl. (Dedicated to *Stephen Elliott*, author of Sketch of the Botany of S. Carolina and Georgia.) — Identified with a Japanese genus, *Tripetaleia*, Sieb. & Zucc., forming a rather polymorphous but marked genus of three species and as many sections, as arranged in Benth. & Hook. Gen. ii. 598.

E. racemósa, Muhl. Shrub 4 to 10 feet high, glabrous, with slender branches: leaves short-petioled, oblong, mostly acute at both ends, about 2 inches long, mucronate with a gland, thinnish, pale beneath, lightly veiny: raceme or racemose panicle loosely many-flowered, a span to a foot long: bracts and bractlets minute, scarious, very caducous: calyx very short, 4-lobed: corolla white, half inch long; the petals 4, spatulate-linear, valvate or nearly so at base and imbricated at summit in the bud, in blossom recurved-spreading: stamens 8: anthers somewhat sagittate, erect; the cells callous-mucronate: style little declined, incurved at apex: ovary not stipitate. (Parts of the flower rarely in fives?) — Muhl. in Ell. Sk. i. 448; Chapm. Fl. 273; Baill. Adans. i. 205. — Wet sandy woods, on or near the Savannah River, at Waynesboro' (*Elliott*), and near Augusta (*Wray*, and recently *Berckmans*) in Georgia; and on the S. Carolina side of the river near Hamburg, on David L. Adams' place (*Olney*, 1853): rare and local: fl. early summer. Fruit still unknown.

23. CLADOTHÁMNUS, Bong. (*Κλάδος*, branch, and *θάμνος*, bush.) — Bong. Veg. Sitk. 37, t. 1; Benth. & Hook. Gen. ii. 598. *Tolmiea*, Hook. Fl. ii. 44. — A single species.

C. pyrolæfiórus, Bong. Tall shrub with many virgate branches, glabrous, leafy: leaves obovate-lanceolate, glandular-mucronulate, almost sessile, thin, an inch or so long, pale: flower nodding on a short pedicel: petals reddish, hardly half inch long. — DC. Prodr. vii. 722. *Tolmiea occidentalis*, Hook. l. c. — Low woods, Washington Territory to Alaska.

24. CLÉTHRA, Gronov. WHITE ALDER. (*Κλήθρα*, ancient Greek name of the Alder, which the original species somewhat resembles in foliage.) — Shrubs or small trees; with alternate leaves, in ours serrate and deciduous, and white flowers in simple or paniced chiefly terminal racemes; these usually canescent with a stellate pubescence. Bracts subulate, deciduous: bractlets none or caducous. Leaf-buds of few scales or naked. Capsule in ours nearly enclosed in

the calyx. Petals imbricated (or sometimes nearly convolute) in the bud. Filaments usually subulate: anthers fixed near the middle, in the bud extrorse, after expansion becoming introrse. Stigmas over the cells according to Baillon, Adans. i. 201. Fl. summer.

C. alnifolia, L. (SWEET PEPPERRUSH.) Shrub 3 to 10 feet high: leaves cuneate-obovate or oblong, sharply serrate, entire toward the base, prominently straight-veined, short-petioled: racemes erect, mostly panicle: filaments glabrous: flowers spicy-fragrant. — Lam. Ill. t. 369; Schk. Handb. t. 118; Michx. Fl. i. 260. (*Alnifolia Americana*, &c., Pluk. Alm. t. 115, f. 1; Catesb. Car. 1, t. 66.) *C. dentata*, Ait. Kew. ed. 1, ii. 73, with strongly serrate leaves. *C. paniculata*, Ait. l. c., with less toothed cuneate-lanceolate leaves green and glabrous both sides. *C. scabra*, Pers. Syn. i. 482, with leaves somewhat scabrous above and more or less pubescent beneath, as is common. — Wet woods and swamps, Maine to Florida, at the north only along the coast.

Var. tomentosa, Michx., l. c. More or less hoary: leaves tomentose-canescant beneath. — *C. tomentosa*, Lam. Dict. ii. 46; Hook. Bot. Mag. t. 3743. *C. incana*, Pers. l. c. *C. pubescens*, Willd. Enum. 455. — S. Atlantic States, passing into the other forms.

C. acuminata, Michx. Tall shrub or small tree: leaves ample (3 to 7 inches long), oval or oblong, acuminate, closely and sharply serrate almost to the base, with somewhat curved veins and rather long petioles, almost glabrous: racemes mostly solitary, nodding: caducous bracts longer than the flowers: filaments hirsute, usually also the base of the petals within the capsule hirsute. — Bart. Fl. Am. Sept. iii. t. 71; Lodd. Cab. t. 1427. *C. montana*, Bartram; Duham. Arb. ed. nov. v. 130. — Woods of the Alleghanies, Virginia to Georgia.

25. CHIMAPHILA, Pursh. PIPISSEWA, &c. (Composed of *χειμα*, winter, and *φιλέω*, to love, being a sort of “Wintergreen.”) — Low, with running lignescant stolons, thick and shining toothed leaves either scattered or often imperfectly opposite or verticillate on the short ascending stems, narrowish: a few flesh-colored or white fragrant waxy-looking flowers on a terminal naked peduncle, produced in early summer. Petioles short. Calyx 5-parted. Cells of the anther oblong, with a short narrow neck under the orifice, imperfectly 2-locellate, at least when young. Stigma very broad, obscurely 5-radiate. Bracts scaly. — We have all the species, except one in Japan, near *C. Menziesii*.

C. umbellata, Nutt. (PIPISSEWA, PRINCE'S PINE.) A span or two high, very leafy in irregular clusters or whorls, often branched: leaves cuneate-lanceolate, with tapering base, sharply serrate, not spotted, shining: peduncle 4-7-flowered: bracts narrow, deciduous: filaments hairy on the margins only. — Bart. Mat. Med. i. t. 1; Hook. Fl. i. 49. *C. corymbosa*, Pursh, Fl. i. 300. *Pyrola umbellata*, L.; Lam. Ill. t. 367; Fl. Dan. t. 1336; Bot. Mag. t. 897; Bigel. Med. Bot. t. 21. *P. corymbosa*, Bertol. Misc. iii. 12, t. 3. — Dry and especially coniferous woods, Canada to Georgia, west to the Pacific from Br. Columbia to California. (Mex., Eu., Japan.)

C. Menziesii, Spreng. A span high, sparingly branched from the base: leaves from ovate to oblong-lanceolate, acute at both ends, small (6 to 18 lines long), sharply serrulate, the upper surface often mottled with white: peduncle 1-3-flowered: bracts ovate or roundish: filaments slender, with a round dilated portion in the middle villous: flowers smaller, about half inch in diameter. — Syst. ii. 317; Hook. l. c. t. 138; Gray, Bot. Calif. i. 459. *Pyrola Menziesii*, R. Br.; Don in Vern. Trans. v. 245. — Coniferous woods, British Columbia to California.

C. maculata, Pursh, l. c. (SPOTTED WINTERGREEN.) A span or more in height, more simple: leaves oblong or ovate-lanceolate, obtuse at base (an inch or two long), sparsely and very sharply serrate; the upper surface variegated with white: peduncle 2-5-flowered: bracts linear-subulate: filaments villous in the middle: flower comparatively large, three-fourths inch in diameter. — Bart. Fl. Am. Sept. i. 40, t. 11; Radius, Diss. Pyr. t. 5, f. 2; Torr. Fl. N. Y. 1, t. 70. *Pyrola maculata*, L.; Bot. Mag. t. 897. — Dry woods, Canada to Georgia and Mississippi.

26. **MONÉSES**, Salisb. (Formed of *μός*, single, and *ἡσις*, delight, from the solitary handsome flower.) — Cells of the anther oblong, abruptly constricted under the orifice into a conspicuous short-tubular neck, in the bud completely bilocellate, so that the anther appears equally 4-lobed. Capsule not depressed, opening from above downward. — A single species.

M. uniflora, Gray. Herb with 1-flowered scape 2 to 4 inches high, a cluster of roundish and serrulate thin leaves at base, on a short stem or the ascending summit of a filiform rootstock: corolla white or tinged rose-color, about two thirds inch in diameter (in early summer). — Gray, Man. ed. 1, 273; Alefeld in Linn. xxviii. 72. *M. grandiflora*, Salisb., Don, l. c. *Pyrola uniflora*, L.; Fl. Dan. t. 8; Engl. Bot. t. 146; Reichenb. Ic. Germ. xvii. t. 1156. *M. reticulata*, Nutt. in Trans. Am. Phil. Soc. n. ser. viii. 271. — Deep moist woods, Labrador to Oregon, south to Pennsylvania, &c., and along the mountains to Colorado, Utah, &c., north to the arctic regions. (Eu. to N. E. Asia.)

27. **PÝROLA**, Tourne. WINTERGREEN, SHIN-LEAF. (Name said to be a diminutive of *Pyrus*, Pear-tree.) — Acaulescent herbaceous evergreens; with a cluster of round or roundish leaves, and some scarious scales on the ascending summit of slender subterranean rootstocks (one species leafless): scape more or less scaly-bracted, bearing a raceme of white, greenish, or purplish nodding flowers, in summer. (Almost all N. American). — *Pyrola* (*Actinocyclus*, Klotzsch), *Amelia*, & *Thelaia*, Alefeld in Linn. xxviii. 8.

§ 1. **AMÉLIA**, Benth. & Hook. Style straight and short: stigma peltate, large, obscurely 5-lobed: stamens equally connivent around the pistil: anthers not narrowed below the openings: hypogynous disk none: petals orbicular, naked at the base, globose-connivent. — *Amelia*, Alefeld, l. c. (*P. media*, of the Old World, connects with § *Thelaia*.)

P. minor, L. Leaves orbicular, thinnish, obscurely serrulate or crenulate, an inch or less long: scape a span high, 7-15-flowered: pedicels short, rather crowded: style much shorter than the ovary, included in the globose white or flesh-colored corolla. — Fl. Dan. t. 55; Radius, Diss. Pyrol. 15, t. 1; Reichenb. Ic. Germ. xvii. t. 1155. *P. rosea*, Smith, Engl. Bot. t. 2543; Radius, l. c. t. 2. *Amelia minor*, Alefeld, l. c. — Cold woods, Labrador, White Mountains of New Hampshire, Lake Superior, Rocky Mountains from New Mexico, Oregon, and northward to the arctic regions. (Greenland to Kamtschatka.)

§ 2. **EUPÝROLA**. Style straight and long: stigma peltate-5-lobed, large; the lobes at length radiately much projecting beyond the ring or border: stamens and oblong petals equally connivent around the pistil: a pair of tubercles on the base of each petal: anthers as in the preceding: hypogynous disk 10-lobed. — *Pyrola*, Alefeld. *Actinocyclus*, Klotzsch.

P. secúnda, L. Inclined to be caulescent from a branching base: leaves thin, ovate, serrulate or crenate, an inch or two long: scape a span long: flowers numerous in a second spike-like raceme: pedicels at first merely spreading, in fruit recurved: petals greenish-white, campanulate-connivent. — Fl. Dan. t. 402; Engl. Bot. t. 517. — Rich woods, Northern Atlantic States to Labrador, and the mountains of Colorado and California, thence far northward. (Mex., N. Eu. to Japan.)

Var. púmila, a smaller form, with rounded leaves half inch or little more in diameter, and 3-8-flowered scape. — J. A. Paine, Cat. Pl. Oneida Co., N. Y.; Gray, Man. ed. 5, 302. — Peat bogs of elevated regions in Central New York; also Labrador, Alaska, &c. (Greenland.)

§ 3. **THELÁIA**, Benth. & Hook. Style strongly declined or decurved and toward the apex more or less curved upward, longer (or becoming longer) than the concave somewhat campanulate-connivent or partly spreading petals: stigma

much narrower than the truncate and usually excavated apex of the style, which forms a ring or collar; its 5 lobes at first very short and even included, in age commonly protruding, connivent or more or less concreted: stamens declined-ascending: anthers more or less contracted under the terminal orifices, so as usually to form a neck or short prolongation, the other extremity with either a prominent or often an obsolete mucro: hypogynous disk none. — *Thelaia*, Alefeld, l. c.

* Anomalous, perhaps monstrous: petals and leaves acute: flowers ascending.

P. oxypétala, C. F. Austin. Leaves ovate, coriaceous, an inch or less in length and shorter than the petiole: scape 7 or 8 inches high, naked, 7-9-flowered: calyx-lobes triangular-ovate, acute, short: petals greenish, lanceolate-oblong, acuminate (nearly 3 lines long), campanulate-connivent: stamens slightly declined: anthers remaining extrorse, obscurely produced at the openings, the other end conspicuously 1-mucronate: style slightly curved; lobes of the stigma not projecting. — Gray, Man. ed. 5, 302. — Delaware Co., New York, on a wooded hill near Deposit, C. F. Austin, 1860. Not since found.

* * Leaves orbicular, oval, or oblong: petals from orbicular to oblong, very obtuse.

+ Calyx-lobes very short and obtuse or rounded, appressed to the greenish-white corolla.

P. chlorántha, Swartz. Leaves small (half to an inch in diameter), orbicular or nearly so, coriaceous, not shining, shorter than the petiole: scape 4 to 8 inches high, 3-10-flowered: anther-cells with distinctly beaked tips. — Act. Holm. 1810, 190, t. 5; Nutt. Gen. i. 273; Lodd. Bot. Cab. t. 1542; Hook. Fl. ii. 46, t. 134. *P. asarifolia*, Radius, Diss. 23, t. 4; Torr. Fl. N. & M. St. i. 433, not Michx. — Rather dry woods, Labrador to Pennsylvania, Rocky Mountains in Colorado, California? to Br. Columbia, and north to subarctic regions. (Eu., N. Asia?) The E. Asian species allied to this is *P. renifolia*, Maxim.

Var. occidentális. Leaves thinner and inclined to ovate. — *P. occidentalis*, R. Br. in herb. Banks; Don in Wern. Trans. v. 232. *Thelaia occidentalis*, Alefeld, l. c. 36, t. 1, f. 6 (excl. stamens, which apparently belong to *P. secunda*, var. *minor*?). — Alaska to Kotzebue's Sound, Nelson, &c. Rocky Mountains, Bourgeau.

+ + Calyx-lobes ovate and acute, short: leaves membranaceous, longer than their petioles.

P. elliptica, Nutt. Leaves oval or broadly oblong, $1\frac{1}{2}$ to $2\frac{1}{2}$ inches long, acute or merely roundish at base, plicately serrulate: scape a span or more high, loosely several-many-flowered: corolla greenish white: anther-tips hardly at all beaked. — Gen. i. 273; Radius, l. c. t. 5, f. 1; Hook. l. c. 47, t. 135. *P. rotundifolia*, Michx. in part. *Thelaia elliptica*, Alefeld, l. c. 47, t. 1, f. 5. — Rich woods, Canada to Br. Columbia, and through the N. Atlantic States to the mountains of New Mexico. (Japan.)

+ + + Calyx-lobes from ovate and acute to lanceolate: leaves coriaceous.

P. rotundifolia, L. Leaves generally orbicular or broadly oval, $1\frac{1}{2}$ to 2 inches long, obscurely crenulate or entire, shining above, mostly shorter than the slender petioles: scape a span to a foot high, several-many-flowered, scaly-bracteate: bracts lanceolate or ovate-lanceolate: calyx-lobes lanceolate to ovate-lanceolate, lax or with spreading tips, usually half or one third the length of the white or sometimes flesh-colored petals: anthers with oblong cells contracted into a very short neck under the orifice: the mucro at base either short and distinct or obsolete. — Lam. Ill. t. 367, f. 1; Engl. Bot. t. 213; Schk. Handb. t. 119; Gray, Man. ed. 2, 259, ed. 5, 301. *Thelaia rotundifolia*, *asarifolia*, *bracteosa*, *intermedia*, & *grandiflora*, Alefeld, l. c. — Sandy or dry woods, from upper Georgia, New Mexico, and California to the arctic regions. (Eu. to Kamtschatka.) With the following varieties or forms, all but the last of which pass into each other freely.

Var. incarnáta, DC. A rather small form: flowers from flesh-color to rose-purple: calyx-lobes triangular-lanceolate. — Coldwoods and bogs, Northern New England to the Aleutian Islands.

Var. asarifolia, Hook. Leaves round-reniform, orbicular-subcordate, or inclined to oboate-orbicular: scape slender: calyx-lobes from ovate-lanceolate to ovate, one third to one fourth the length of the flesh-colored or rose-colored or rarely white petals. — Fl. ii. 46. *P. asarifolia*, Michx. Fl. i. 251, in part; DC. Prodr. vii. 773 (excl. syn. Bigel., Torr., Nutt., & Muhl.); Gray, Man. ed. 1, 272. — Not uncommon northward and westward to the Rocky Mountains.

Var. uliginósa, Gray. Calyx-lobes shorter, usually broadly ovate, sometimes obtuse: leaves from subcordate to obovate, generally dull: flowers rose-colored or purple. — *Man. ed.* 2, 259. *P. uliginosa*, Torr. Fl. N. Y. i. 452, t. 69. *P. obovata*, Bertol. Misc. iii. 11, t. 2. — Cold bogs, northward nearly across the continent: distinguished from the preceding with reddish flowers only by shorter and broader calyx, and leaves seldom with a sinus at base.

Var. bracteáta, Gray. Like the preceding forms, but larger: leaves commonly 2 or 3 inches long and thinnish, sometimes variegated with whitish bands: scape often a foot or more high; the scaly bracts large and conspicuous: anthers (as in all these forms, but especially in this) distinctly mucronate at base: calyx-lobes triangular-lanceolate, acute or acuminate, commonly half the length of the rose-colored or purplish petals. — *Bot. Calif.* i. 460. *P. bracteata*, Hook. l. c. *P. elata* & *bracteata*, Nutt. l. c. 270. — Coniferous woods of California to Br. Columbia; the prevailing or exclusive form.

Var. púmila, Hook. l. c. A remarkable low variety: leaves firm-coriaceous, an inch or much less in diameter: scape 3 or 4 inches high, 5–10-flowered: flowers proportionally large, white: calyx-lobes oblong-lanceolate or linear-oblong. — *P. Grœnlandica*, Hornem. Fl. Dan. t. 1817. *P. grandiflora*, Radius, l. c. 27, t. 3; Alefeld, l. c. t. 2, f. 12. *P. rotundifolia*, var. *grandiflora*, DC. l. c. — Labrador to Mackenzie River along the arctic coast. (Greenland.)

P. picta, Smith. Leaves firm-coriaceous, dull, commonly veined or blotched with white above, pale or sometimes purplish beneath (1 to 2½ inches long), from broadly ovate to spatulate or narrowly oblong, all longer than the petiole; the margins quite entire, or rarely remotely denticulate: rootstocks rigid and often branched or clustered: scapes a span or more high, 7–15-flowered: bracts few and short: calyx-lobes ovate, not half the length of the greenish-white petals: cells of the anther with a distinct neck or beak below the orifice. — *Rees Cycl.*; Don, l. c.; Hook. Fl. ii. 47; Gray, *Bot. Calif.* i. 460. *P. dentata*, Smith, l. c.; Hook. l. c. t. 136; a common form with narrow and erect leaves, remotely but seldom strongly denticulate. *Thelasia spathulata*, Alefeld, l. c. — Nootka Sound to California, and east to Wyoming and S. Utah. In the drier regions often very small-leaved.

* * * Leafless, from deep scaly-toothed branching rootstocks, doubtless parasitic.

P. aphýlla, Smith. Scapes a span to a foot high, subulate-bracteate, reddish or lurid: raceme several-many-flowered: calyx-lobes ovate, acute, very much shorter than the obovate white petals: anthers tubular-beaked under the orifice of the cells: deflexed style almost straight. — Hook. Fl. ii. 48, t. 137; Gray, *Bot. Calif.* i. 461. — *Thelasia aphylla*, Alefeld, l. c. — Coniferous woods, California to Puget Sound. According to Nuttall, there are sometimes, "on infertile shoots, a few small, ovate or lanceolate, greenish leaves." These not since seen; but there is such a form of the preceding species.

28. **ALLÓTROPÆA**, Torr. & Gray. (*Ἀλλότροπος*, in another manner, the flowers not turned to one side as in *Monotropa*.) — A single species, connecting the *Pyroleæ* with the *Monotropeæ*.

A. virgáta, Torr. & Gray. Herb reddish or whitish, rather fleshy, a span or two high: simple erect stem thicker at base, there densely and above more sparsely scaly: lower scales ovate; upper lanceolate, passing into linear bracts of the virgate many-flowered spike: flowers 2-bracteolate. — Gray in *Pacif. R. Rep.* vi. 81, *Proc. Am. Acad.* vii. 368, & *Bot. Calif.* i. 461; Torr. *Bot. Wilkes Exp.* 385. — Under oaks, &c., Cascade Mountains, Washington Terr., to the Sierra Nevada, California.

29. **PTERÓSPORA**, Nutt. PINE-DROPS. (From *πτερόν*, wing, and *σπορά*, seed, alluding to the remarkable wing of the seed.) — Capsule becoming nearly naked in age; the thin valves persistent after dehiscence, being fixed by the partitions to the columella, in the manner of *Pyrola*, &c. Seeds innumerable (as in the tribe), on the pendulous placentæ; the nucleus ovoid, with a nearly close thin coat, apiculate at both ends, the upper apiculation bearing a broad and hyaline rounded or reniform and reticulated wing, which is many times larger than the body of the seed. — A single species.

P. andromedæa, Nutt. A chestnut-colored or purplish herb, glandular and clammy-pubescent: simple stem 1 to 3 feet high, bearing small and scattered lanceolate scales: raceme long and many-flowered: pedicels slender, spreading, soon recurved: corolla white, a quarter inch long, somewhat viscid. — Gen. i. 386; Lindl. Coll. t. 5. — Under pines and oaks, N. W. New England, Canada, and Pennsylvania to Br. Columbia and California: fl. summer.

30. SARCÓDES, Torr. SNOW-PLANT. (*Σαρκοειδής*, flesh-like or fleshy, from the appearance of this singular plant.) — Torr. Pl. Frem. in Smithson. Contrib. iii. 17, t. 10. — A single species.

S. sanguinea, Torr. Stout fleshy herb, a span to a foot high, of flesh-red color, somewhat glandular-pubescent, thickly clothed and when young imbricated with the firm fleshy scales: lower scales ovate; upper narrower, more scattered, and above passing into linear bracts of the thick spike or raceme which subtend and mostly exceed the reddish flowers: pedicels erect, the upper ones very short: corolla glabrous, half inch long. — Pl. Frem. l. c.; Chatin, Anat. t. 55; Benth. & Hook. Gen. ii. 607; Gray, Bot. Calif. i. 462. — California, in coniferous woods of the Sierra Nevada, 4-9,000 feet, shooting up and flowering soon after the snow melts away.

31. SCHWEINÍTZIA, Ell. SWEET PINE-SAP. (Named in honor of the late *Louis David von Schweinitz*.) — Flowers exhaling the odor of violets, produced in spring. Anthers in the young flower-bud turned at right angles to the filament, so that apex and base are directed right and left; in anthesis becoming vertical. — A single species.

S. odorata, Ell. Plant light brown, in tufts, 2 to 4 inches high, glabrous, beset with thinnish ovate or oblong scales, and similar bracts, spicately several-flowered: spike nodding in flower, erect in fruit: corolla flesh-color, a quarter inch long. — Ell. in Nutt. Gen. addend. & Sk. i. 478; Gray, Chloris, 15, t. 2. *S. Caroliniana*, Don, Syst. iii. 867. *Monotropis odorata*, Schweinitz in Ell. l. c. — Moist woods, Maryland (near Baltimore) to North Carolina in and near the mountains, parasitic on the roots of herbs or on decaying vegetable matter.

32. MONÓTROPÁ, L. INDIAN PIPE, PINE-SAP. (*Μόρος*, one, and *τόπος*, turn, the summit of the stem in flower turned to one side or drooping.) — White, tawny, or reddish scaly and fleshy herbs, a span or two high; the clustered stems rising (in summer) from a thick and matted mass of fibrous rootlets, one-several-flowered; the summit of the stem straightening in fruit. — Comprises two very distinct subgenera, in Benth. & Hook. Gen. ii. 607 restored as genera.

§ 1. **EUMONÓTROPÁ.** (INDIAN PIPE.) Plant inodorous, 1-flowered: scales passing into an imperfect or irregular calyx of 2 to 4 loose sepals or perhaps bracts; the lower ones rather distant from the flower: anthers opening at first by 2 transverse chinks, at length 2-valved; the valves almost equal and equally spreading: style short and thick: edge of the stigma naked.

M. uniflora, L. Smooth plant a span or so high, waxy-white (blackish in drying), rarely flesh-color: nodding flower two-thirds inch long: petals 5, rarely 6. — Lam. Ill. t. 352; Bart. Fl. Am. Sept. iii. t. 86, f. 1; Hook. Exot. Fl. t. 85; Torr. Fl. N. Y. t. 71; Chatin, Anat. t. 50. *M. uniflora* & *M. Morisoniana*, Michx. Fl. i. 263. *M. Morisoni*, Pers. (Moris. Hist. iii. 502 (12), t. 16, f. 5; Pluk. Alm. t. 209, f. 2.) — Damp woods, nearly throughout the U. S., Brit. Amer., &c. (Mex., Japan to India.)

§ 2. **HYPÓPITYS.** (PINE-SAP.) Plant often violet-scented, commonly pubescent, at least above, racemously 3-several-flowered: terminal flower earliest and usually 5-merous and the lateral 3-4-merous: sepals less bract-like, as many as

the petals: the latter saccate at base: anthers more reniform; the cells completely confluent into one, which opens by very unequal valves, the larger broad and spreading, the other remaining erect and contracted: style longer: stigma glandular or hairy on the margin. — *Hypopitys*, Dill., Scop., &c.

M. Hypópitys, L. A span or at length a foot high, tawny or flesh-colored: scales and bracts entire or slightly crose: flowers less than half inch long; the lateral 4-petalous and 8-androus. — Lam. Ill. t. 362; Fl. Dan. t. 232; Schk. Handb. t. 316; Reichenb. Ic. Germ. t. 1152. *M. lanuginosa*, Michx.; Torr. Fl. N. Y. i. 457, t. 72. *Hypopitys latea*, Dill. *H. multiflora*, Scop. *H. Europea* & *H. lanuginosa*, Nutt. Gen. i. 271. — Under amentaceous and coniferous trees, Canada to Florida and Louisiana, west to Oregon and Br. Columbia. (Mex., Japan to Eu.)

M. fimbriáta, Gray. Near a foot in height: obovate-cuneate upper scales and bracts and spatulate sepals laciniately or crosely fimbriate: lateral flowers commonly 3-petalous and 6-androus. — Proc. Am. Acad. viii. 629, & Bot. Calif. i. 463. — Cascade Mountains in Oregon, *E. Hall*. (Mistaken for *Pleuricospora fimbriolata* in Proc. Am. Acad. viii. 394.)

33. PLEURICÓSPORA, Gray. (*Πλευρίζός*, at the side, and *σπορά*, seed, alluding to the parietal placentation.) — A single known species.

P. fimbrioláta, Gray. Light brown or whitish plant, with the aspect of *Monotropa Hypopitys*, but stouter, a span high, glabrous or nearly so, clothed with imbricated scales: lowest scales ovate, firm, entire; upper passing into the narrower and lanceolate scarious-margined and lacerate-fringed bracts of the dense and erect cylindraceous spike: corolla white or whitish, not exceeding the bracts, barely half inch long. — Proc. Am. Acad. vii. 369, & Bot. Calif. i. 463 (not of Proc. Am. Acad. viii. 394, which is *Monotropa fimbriata*). — California, in the Mariposa grove of *Sequoia gigantea*, *Bolander*.

34. NEWBÉRYA, Torr. (Dedicated to the discoverer, *Professor J. S. Newberry*, a geologist and naturalist, much devoted to fossil botany.) — Benth. & Hook. Gen. ii. 606. A single species.

N. congésta, Torr. Plant brownish, glabrous, a span high: scales crowded or loosely imbricated, oval or oblong, thinish, with obscurely crose margins; the upper forming similar bracts of the somewhat depressed head of numerous flowers: corolla hardly half inch long; its lobes within and the style hairy. — Ann. Lyc. N. Y. vii. 55; Gray, Bot. Calif. i. 464. *Hemitomes congestum*, Gray, Pacif. R. Rep. vi. 81, t. 12; char. and figure incorrect as to the anthers, and the name inapplicable. — Cascade Mountains, in Des Chutes Valley, S. Oregon, *Newberry*. Washington Territory, station unknown, *George Gibbs*.

ORDER LXXVIII. LENNOACEÆ.

Root-parasitic leafless herbs. scaly and fleshy, with much the aspect of *Monotropeæ*, but with stamens inserted in or near the throat of the tubular corolla, and the polymorous ovary peculiar, the cells being at least double the number of the other parts of the 5–10-merous regular and perfect flower, and uniovulate; the fruit drupaceo-polycoccous. Sepals 5 to 10, linear or filiform. Corolla hypogynous, tubular or slightly funnellform, marcescent, 5–8-lobed, the lobes plicate-imbricated in the bud. Stamens as many as the corolla-lobes and alternate with them: filaments very short: anthers 2-celled, introrse; the cells opening longitudinally: pollen simple, 3-sulcate. Disk none. Ovary depressed-globose, 12–28-celled (doubtless of half as many 2-locellate carpels, surrounding a thick axis): style slender: stigma crenulate or somewhat lobed. Ovule horizontal, anatropous or somewhat amphitropous; the orifice superior. Fruit depressed-globular, with

a thin fleshy at length dry epicarp which ruptures transversely, as if circumscissile, liberating the ring of numerous seed-like nutlets: these are crustaceous, lenticular, and separable. Seed with a very thin proper coat: albumen farinaceous and oily: embryo (according to Solms) minute, globular and undivided, i. e. as in *Mnотropeæ*. — Torr. in Ann. Lyc. N. Y. viii. 56; Solms-Laubach, Abhand. Nat. Halle, xi. 1-60; Benth. & Hook. Gen. ii. 621.

Lennoa (*Corallophyllum*, HBK.), the remaining genus of this small and very singular natural order, is Mexican, with coralloid branching stems, and the stamens in two sets; the cells of the anther divergent.

1. **PHOLISMA**. Flowers sessile and densely spicate. Sepals 6, rarely 5, linear, naked, shorter than the corolla; the short lobes of the latter mostly 6, undulate-plicate, spreading. Stamens 6 or sometimes 5, in a single row: anthers oblong, the cells parallel. Fruit 18-24-celled.

2. **AMMOBROMA**. Flowers short-pedicelled, thickly covering the expanded and hollowed receptacle. Sepals mostly 10, filiform, plumose-hairy, pappus-like, equalling the corolla; the mostly 6 lobes of which are erect, retuse, hardly plicate. Stamens 6 to 10 in a single row. Anthers, pistils, &c., as in *Pholisma*.

1. **PHOLÍSMА**, Nutt. (From *φολίς*, a scale, referring to the scaly stem.) — Single species.

P. arenárium, Nutt. Herb brownish or reddish, with simple stems, in clumps, a span or more high, somewhat glandular-puberulent, stout, beset with short and narrow scattered scales: spike dense, oblong or cylindraceous (an inch or two long): flowers purplish (4 lines long), rather longer than the linear bracts. — Hook. Ic. t. 626; Gray, Bot. Calif. i. 464. — Sandy soil, Monterey to San Diego, California, *Nuttall*, &c. Parasitic on the roots of *Eriodictyon tomentosum*, according to *D. Cleveland*, also apparently upon those of some *Clematis*. Flowers produced in spring. Nutlets half a line long, oval. Albumen of the seed oily. Embryo not seen.

2. **AMMOBRÓMA**, Torr. (Formed of *ἄμμος*, sand, and *βρῶμα*, food.) — Single species.

A. Sonóræ, Torr. Root of tortuous fibres: stems simple, 2 to 4 feet long (but mainly buried in sand), three fourths to an inch and a half in diameter, fleshy, gradually tapering upward, but at summit dilated into an obconical dilated receptacle of 2 inches in diameter, funnelform inside and lined with the flowers: scales lanceolate, acute, appressed, or on the receptacle reflexed: corolla purple, 4 lines long: ovary about 20-celled. — Mem. Am. Acad. v. 327, & Ann. Lyc. Nat. Hist. N. Y. viii. 51, t. 1; Gray, Bot. Calif. i. 464; Solms-Laubach, l. c. t. 1. — Desert sand-hills, Adair Bay, near the head of the Gulf of California, beyond the limits of the United States, *Col. A. B. Gray*. Arizona, between Pilot Knob and Cook's Wells, *Schuchard*. The plant upon the roots of which it is parasitic is unknown. The roasted stems are edible and even luscious; they are said to be an important article of food of the Papigos Indians.

ORDER LXXIX. DIAPENSIACEÆ.

Low perennial herbs or suffruticulose tufted plants, wholly glabrous or nearly so, with alternate simple leaves, no stipules, regular and symmetrical 5-merous flowers, except the pistil which is 3-merous and the ovary 3-celled, stamens adnate to the corolla or connate with each other, those opposite its lobes when present reduced to sterile appendages (staminodia), anthers mostly transversely or obliquely dehiscent, pollen simple, and capsule and seeds of *Ericaceæ*. Flowers perfect, solitary or racemose. Calyx and corolla imbricated in the bud, hypogynous, or with slight adnation to base of ovary; the former persistent, the latter deciduous.

Filaments commonly dilated. Style one: stigma 3-lobed, not indusiate. Ovules indefinite, on projecting axile placentæ, anatropous or nearly amphitropous. Capsule coriaceous, loculicidally 3-valved, with or without a persistent columella. Embryo small and terete in fleshy albumen; the cotyledons very short. — Gray, Proc. Am. Acad. viii. 246; Maxim. Mém. Biol. ix. 18; Benth. & Hook. Gen. ii. 618. *Diapensiaceæ*, Lindl., as to our Tribe I., with *Galacineæ*, Don, as to *Galax*.

TRIBE I. DIAPENSIEÆ. Suffrutescent depressed evergreens, crowded with small entire and nerveless coriaceous leaves. Sterile filaments or staminodia none: fertile filaments adnate to the campanulate corolla up to the sinuses: anthers 2-celled. Capsule with persistent columella bearing the placentæ. Calyx conspicuously bracteolate, strongly imbricated. Flowers solitary.

1. **PYXIDANTHERA**. Flowers sessile on short leafy branchlets. Sepals thin-chartaceous. Anther-cells transversely 2-valved, the lower valve cuspidate-pointed. Seeds globular, amphitropous, with a close pitted coat.
2. **DIAPENSIA**. Flower (or at least fruit) on a scape-like peduncle. Sepals broad and coriaceous. Anther-cells muticous, divergent, obliquely 2-valved. Seeds oval or by pressure cubical, anatropous, with a nearly close and reticulated coat.

TRIBE II. GALACINEÆ. Acaulescent, with creeping rootstocks sending up long-petioled round-cordate or oblong evergreen leaves, and a scape bearing racemose or clustered or rarely solitary flowers. Stamminodia opposite the lobes of the corolla. (Besides the following genera are *Schizocodon* of Japan, near to *Shortia*, and *Berneuxia* of Thibet, between the latter and *Diapensia*.)

3. **SHORTIA**. Calyx strongly imbricated and scaly-bracteolate; the sepals many-striate. Corolla open campanulate, 5-lobed; the lobes undulate-crenate. Stamens distinct: anthers 2-celled; the cells obliquely dehiscent: staminodia small and scale-like, adnate to base of corolla, incurved over the ovary. Style filiform: stigma obscurely 3-lobed. Capsule globular: partitions borne on the valves and separating from the persistent columella, which bears the placentæ. Seeds globular or ovoid with a close granulate coat.
4. **GALAX**. Calyx rather strongly imbricated, minutely 2-bracteolate, 5-parted; the oblong divisions nerveless. Corolla of 5 entire oblong petals, distinct, except that their bases are adnate to the base of the monadelphous stamen-tube, which is ovate-cylindraceous, 10-lobed above; the lobes alternate with the petals very short and antheriferous; those opposite the petals (i. e. the staminodia) longer, linear-spatulate, petaloid: anthers subsessile, thickened, rounded and granulate on the back; the polliniferous part introrse and small, somewhat beak-like, one-celled, transversely 2-valved. Style very short: stigma obscurely 3-lobed. Capsule ovate; the placentiferous columella at length more or less 3-parted. Seeds angular, with a loose coat tapering upward.

1. **PYXIDANTHÉRA**, Michx. **FLOWERING MOSS**. (*Πυξίς*, a small box, and *ἀνθήρα*, anther, the latter opening as by a lid.) — Fl. i. 152, t. 17; Gray. Bot. Text Book, ed. 2, 436, fig. 785–790; Lindl. Veg. Kingd. 606, fig. 410; Hook. Bot. Mag. t. 4592. — Single species.

P. barbuláta, Michx. A small prostrate and creeping evergreen, leafy throughout, loosely branching: leaves lanceolate or somewhat narrowed below, subulate-acuminate, when young pubescent at base, much crowded, a quarter inch long: flowers abundant (in early spring), closely sessile: corolla white or tinged with rose, open-campanulate; its lobes (2 lines long) cuneate-obovate, retuse and obscurely erose: filaments ligulate. — *Diapensia cuneifolia*, Salisb. Parad. Lond. 105; Pursh, Fl. i. 148. *D. barbulata*, Ell. Sk. i. 229. — Pine barrens, mostly in sand, New Jersey and N. Carolina.

2. **DIAPÉNSIA**, L. (Said to be an ancient Greek name of Sanicle, somewhat altered, applied in a wholly meaningless way to the present genus.) — Arctic-alpine, containing a Himalayan species (Hook. f. Kew. Jour. Bot. ix. t. 12), and the following.

D. Lappónica, L. Plant forming very dense cushion-like tufts, glabrous: leaves imbricated on the short shoots, cartilaginous, spatulate (3 to 5 lines long), with mostly revolute margins: peduncle at length an inch or two long: sepals and 2 or 3 bractlets oval, rigid: corolla white, open campanulate; the tube (2 lines long) not longer than the calyx, nearly equalled by the rounded lobes: filaments linear. — Fl. Lapp. t. 1; Wahl. Fl. Lapp. t. 9; Fl. Dan. t. 47; Bot. Mag. t. 1108. — Labrador, Alpine summits of White Mountains, New Hampshire, Mount Mansfield, Vermont, and N. W. arctic coast. (Greenland eastward to Japan.)

3. SHÓRTIA, Torr. & Gray. (Dedicated to the late *Dr. Charles W. Short*, of Kentucky.) — Gray in Amer. Jour. Sci. xlii. 48, ser. 2. xlv. 402, & Proc. Am. Acad. viii. 246; Maxim. Mém. Biol. ix. 19; Benth. & Hook. Gen. ii. 620. — Two species, one Japanese, from which the character of the corolla, stamens, &c., were drawn by Maximowicz.

S. galacifolia, Torr. & Gray. Rootstocks slender and apparently stoloniferous: leaves (2 inches wide) orbicular, moderately cordate and retuse, repand-serrate and the teeth mucronate: peduncles in fruit a span high, not surpassing the long petioled leaves, scaly bracteate towards the summit: style elongated, persistent. — High mountains of N. Carolina, *Michaux*. In fruit only.

4. GÁLAX, L., Sims. (If from *γάλα*, milk, an unmeaning name.) — Linn. Gen. ed. 5, 93, excluding all the character and the synonymy; these wholly of *Viticella*, Mitchell, which is *Hydrophyllum appendiculatum*. *Anonymos* s. *Belvedere*, Clayt. Virg. ed. 1, 25, with good character, which is wholly omitted by Gronovius himself, in Fl. Virg. ed. 2, because quite incongruous with the generic character of *Galax* by Linnaeus. — Single species.

G. aphylla, L. Glabrous herb, with reddish creeping and matted rootstocks, sending up leaves and scape: leaves round-cordate, thickly crenate-dentate, veiny, thin but persistent over winter, rather shining, $1\frac{1}{2}$ to 3 inches broad, long-petioled: scape a foot or two high, slender and very naked, almost bractless: raceme virgate and spike-like: bractlets minute, deciduous: flowers numerous, small: corolla 2 lines long, white. — Spec. i. 200 (excl. syn. Mitch.); Sims, Bot. Mag. t. 754 (where the true char. gen. first appears with the name); DC. Prodr. vii. 776. *Erythrorhiza rotundifolia*, Michx. Fl. ii. 36. *Blanfordia cordata*, Andr. Bot. Rep. t. 343. *Solenandria cordifolia*, P. de Beauv. ex Vent. Malm. t. 69. — Wooded hillsides and in mountains, Virginia to Georgia; fl. early summer.

ORDER LXXX. PLUMBAGINACEÆ.

Herbs, occasionally somewhat woody, agreeing with *Primulaceæ* in having the stamens isomerous with the petals or divisions of the corolla and opposite them; the filaments adnate only to their base or completely hypogynous; the free ovary one-celled, with a solitary anatropous ovule pendulous on a slender funiculus which rises from the base of the cell; styles 5 and distinct or united; the single seed with a large and straight embryo surrounded by (or sometimes destitute of) a sparing mealy albumen. Chiefly affecting saline soil. Leaves alternate, mostly rosulate. Flowers regular and symmetrical, 5-merous, perfect. Calyx gamosepalous, costate, plaited at the sinuses, persistent. Corolla with claws to the nearly distinct petals, or these united into a tube, convolute or rarely imbricated in the bud. Anthers 2-celled, opening longitudinally. Disk none. Fruit dry, utricular or akene-like, sometimes dehiscent by a lid or by valves. — Innocent, with astringent roots or rootstocks.

TRIBE I. STATICEÆ. Calyx with open limb scarious, colored, strongly plicate. Petals (long-unguiculate) and filiform styles distinct or united only below.

1. **STATICE.** Flowers cymose-spicate, secund. Styles wholly separate. Leaves flat.
2. **ARMERIA.** Flowers capitate-glomerate. Styles mostly united at the very base, stigmatose down the inner side. Leaves usually slender, with no distinction of blade and petiole.

TRIBE II. PLUMBAGINEÆ. Calyx with erect teeth or lobes, and merely scarious sinuses. Claws of the petals completely united into a tube. Style filiform, 5-cleft at the apex; the slender lobes stigmatic within.

3. **PLUMBAGO.** Calyx tubular, beset with glands. Corolla salver-form with a long tube. Stamens free from the corolla. Leafy-stemmed.

1. **STATICE**, Tourn. **SEA-LAVENDER**, **MARSH-ROSEMARY**. (The ancient Greek name, referring to the use as an astringent.) — Large genus in the Old World, very sparingly represented in the New, in N. America only by the section *Limonium*, in which the styles are stigmatose down the inside; the 1-3-flowered spikelets about 3-bracteate, i. e. 1-bracteate and 2-3-bracteolate; leaves all radical and 1-ribbed. Fl. late summer.

S. Limonium, L. Root thick and woody, reddish; leaves thickish and rather fleshy, oblong, spatulate or obovate-lanceolate, tapering into a long or rather long petiole, obtuse or retuse, and usually mucronate-tipped; scapes a foot or two high, loosely paniculate; the branches spreading or rather erect; spikelets either crowded or soon rather scattered; exterior or true bract ovate, herbaceous with scarious margin, much shorter and smaller than the obtuse or retuse broadly scarious innermost bractlet; flowers lavender-color; calyx hirsute on the angles below; the lobes ovate-triangular and acute, and usually a tooth in each sinus. — In various forms widely distributed over the world, mainly in salt marshes of the coast. Ours are

Var. Californica. Leaves thinnish, retuse or obtuse and mucous: scape 2 feet or more high; branches of the ample panicle densely floriferous at the summit, the spikelets almost imbricated in short cymose spikes; innermost bract only twice the length of the outermost. — Bot. Calif. i. 466. *S. Californica*, Boiss. in DC. Prodr. xii. 463. — S. W. Texas (C. Wright) to California. Resembles dense-flowered European *S. Limonium*.

Var. Caroliniána, Gray (Man. 313). Inflorescence more paniculate than corymbose; the 1-3-flowered spikelets soon separate or rather distant on the branching slender spikes; bracts more unequal; calyx-lobes usually very acute or acuminate. — *S. Caroliniana*, Walt. Car. 118; Bigel. Med. Bot. ii. 51, t. 25; Boiss. l. c. *S. Limonium*, Torr. Fl. i. 329, & Fl. N. Y. ii. 17. — Labrador to Texas. The Southern plant thinner-leaved, with mucro often obsolete, branches of the spike filiform, and scattered spikelets small, slender, and only 1-2-flowered; the northern forms with more fleshy veinless leaves, the mucro conspicuous, flowers and 2-3-flowered spikelets larger, in closer less spreading spikes; the smaller state nearly approaching the European var. *Bahusiensis* (*S. Bahusiensis*, Fries).

S. Brasiliensis, Boiss. Leaves oblong, rounded or retuse at the apex, thinnish; scape (a foot or two high) and spreading branches of the panicle slender; spikelets 1-3-flowered, slender, more or less remote in the spreading spikes; bractlets very unequal; flowers white or whitish; calyx perfectly glabrous; the lobes ovate and acutish. — DC. l. c. — Coast of N. Carolina to Florida. (Mex.? Brazil to Patagonia.)

Var. angustata. Leaves linear or nearly so, tipped with an awn-like mucro, fleshy; spikelets sparse. — Pine Key, Florida, in a salt marsh, *Blodgett*. Leaves 2 or 3 inches long besides the petiole, 2 or 3 lines wide.

2. **ARMERIA**, Willd. **THRIFT**, **SEA PINK**. (The monkish Latin *Flos Armeriæ*, applied to a Pink, and transferred to Thrift). — Low and stemless herbs. of the Old World, with one variable species widely dispersed in the New and familiar in cultivation; the narrow leaves much crowded on the crown or

short tufted stems, 1-5-nerved, persistent; scapes simple and naked, terminated by a compact glomerule of rose-colored or white short-pedicelled flowers, surrounded and subtended by scarious bractlets and bracts; the lower of the latter empty and forming an involucre, the two lowest extended downward at base into appendages forming a reverse sheath to the apex of the scape. Calyx more dry and scarious than in *Statice*, at base oblique or decurrent on the pedicel. Dilated bases of the filaments adnate to the slightly united bases of the petals. Styles hairy below. Fl. early summer.

A. vulgaris, Willd. (COMMON THRIFT.) Leaves narrowly linear, flat or flattish, more or less 1-nerved; scapes a span to a foot high; bracts very obtuse; calyx at base simply decurrent on the pedicel; the tube 10-nerved, hairy at least on the stronger nerves or angles; the lobes blunt or cuspidate. — *Statice Armeria*, L. *Armeria vulgaris*, *maritima* & *alpina*, Willd. Enum. 133. *A. Labradorica*, *arctica* & *sanguinolenta*, Wallr. Armer.; Boiss. in DC. *A. andina*, Poepp., & var. *Californica*, Boiss. l. c. — Through Arctic America to Labrador on the Atlantic and to California on the Pacific coast; in various forms, the Californian tall form recurring in Chili and Patagonia. (Eu., N. Asia.)

3. PLUMBÁGO, Tourn. LEADWORT. (Latin name, from the lead-colored flowers of some species.) — Herbs, or rather woody plants, some of them sarmentose, and cult. in conservatories for the handsome Phlox-like blossoms, leafy; leaves with the sessile base or that of petiole commonly auriculate-clasping; the flowers in a terminal spike. Calyx valvate and corolla convolute in the bud. Glands of the calyx stipitate. — Species mainly tropical.

P. scandens, L. Suffrutescent, decumbent or climbing, much branched; branches sulcate-striate; leaves ovate-lanceolate, not auricled at base; calyx with 5 hooked teeth; corolla white. — Boiss. in DC. Prodr. xii. 692. *P. Floridana*, Nutt. in Am. Jour. Sci. v. 290. — S. Florida: perhaps introduced from W. Ind. (Trop. Amer.)

ORDER LXXXI. PRIMULACEÆ.

Herbs, with simple leaves, regular and symmetrical perfect flowers, remarkable for having the stamens of the same number as the lobes of the corolla and opposite them (inserted on the tube or base), and a 1-celled ovary surmounted by an undivided style and stigma, and containing few or numerous (mostly amphitropous) ovules, sessile on a free central placenta. Calyx and corolla hypogynous, except in *Samolus*, in which they cohere below with the base of the ovary. But *Glaur*, with a partly colored calyx, is apetalous and the stamens perigynous; *Coris* (which belongs to the Old World) has irregular calyx and corolla; and rudiments of a second series of stamens (staminodia) appear in *Samolus* and *Steironema*. Submersed leaves pinnately divided, and the ovules anatropous in *Hottonia*. Flowers 4-8-merous, commonly 5-merous. Calyx usually persistent, and the lobes imbricated in the bud. Anthers introrse. Fruit capsular. Seeds with copious fleshy albumen and a small straight embryo.

TRIBE I. HOTTONIÆ. Ovary wholly free: ovules fixed by the base, anatropous. Aquatic: immersed leaves pectinate.

1. **HOTTONIA**. Corolla short-salverform; limb 5-parted, the lobes imbricated in the bud. Capsule globular, more or less 5-valved, many-seeded. Flowers verticillate and racemose.

TRIBE II. PRIMULÆ. (*Primulæ* & *Lysimachieæ*, Benth. & Hook.) Ovary wholly free: ovules fixed by the middle, amphitropous or half-anatropous.

* Scapigerous or tufted: flowers chiefly 5-merous, umbellate or solitary: capsule dehiscent (at least at the apex) by valves: lobes of the corolla imbricated (or sometimes partly convolute) in the bud.

+ Stamens exserted, connivent in a cone, monadelphous.

2. **DODECATHEON.** Corolla 5-parted with very short tube, and dilated thickened throat; the long and narrow divisions (with the calyx-lobes in flower) reflexed. Stamens inserted on the throat of the corolla: filaments short and flat, monadelphous (but separable above in age): anthers lanceolate or linear. Style filiform, exserted: stigma small. Placenta columnar, many-seeded.

+ + Stamens included, distinct, with short filaments and short and blunt anthers: corolla salverform or funnelform.

3. **PRIMULA.** Corolla with tube surpassing or at least equalling the calyx, and spreading mostly obo cordate or emarginate lobes. Style filiform. Capsule many-seeded. Leaves all radical.

4. **DOUGLASIA.** Corolla with tube equalling or surpassing the calyx, somewhat inflated above; the throat more or less contracted and 5-fornicate beneath the sinuses; lobes entire. Style filiform. Ovary 5-ovuled. Capsule turbinate, 1-2-seeded. Leaves imbricated or crowded on tufted stems.

5. **ANDROSACE.** Corolla short; its tube shorter than the calyx; the throat constricted. Style mostly short. Ovules and seeds numerous or few. Flowers small.

** Leafy-stemmed: corolla rotate or somewhat so, and the divisions convolute or sometimes involute in the bud, in *Glaux* none: leaves entire.

+ Capsule dehiscent vertically by valves or irregularly, mostly globose.

6. **TRIENTALIS.** Flowers 7-merous (rarely 5-6- or 8-merous. Corolla completely rotate, without a tube, deeply parted; the divisions convolute in the bud, ovate to lanceolate and pointed. Filaments long and filiform, united at their insertion into a very short ring: anthers linear, recurving when old. Style filiform. Leaves clustered at the summit of the simple stem.

7. **STEIRONEMA.** Flowers 5-merous. Corolla rotate, with no proper tube, deeply parted, and the sinuses rounded; the divisions ovate, cuspidate-pointed, erose-denticulate above, each separately involute or convolute around its stamen! Filaments distinct or nearly so on the ring at the base of the corolla: anthers linear and arcuate in age, nearly as in *Trientalis*: sterile filaments (staminodia) 5, interposed between the fertile ones, subulate. Capsule 10-20-seeded. Flowers nodding on the slender peduncles. Leaves opposite, destitute of dots. Calyx valvate in the bud.

8. **LYSIMACHIA.** Flowers 5-merous (or casually 6-7-merous). Corolla rotate (or short funnelform in some foreign species); the divisions entire, convolute in the bud. Filaments more commonly monadelphous at base: anthers oblong or oval. No staminodia or vestige of sterile stamens. Capsule few-several-seeded. Herbage commonly glandular-dotted. Stems leafy throughout. Calyx lightly imbricated or valvate in the bud.

9. **GLAUX.** Flowers 5-merous. Corolla none. Calyx with 5 petaloid lobes, which are imbricated in the bud and equal the campanulate tube. Stamens on the base of calyx, alternate with its lobes: filaments slender: anthers cordate-ovate. Style filiform: stigma capitate. Capsule 5-valved at apex, few-seeded. Leafy throughout: leaves mainly opposite: nearly sessile flowers solitary in the axils.

+ + Globose capsule circumscissile, the top falling off as a lid: seeds numerous.

10. **ANAGALLIS.** Corolla completely rotate, 5-parted; the rounded lobes convolute in the bud, exceeding the 5-parted calyx. Stamens on the base of the corolla: filaments bearded or pubescent: anthers broadly oblong.

11. **CENTUNCULUS.** Corolla with a globular tube and a 4-5-lobed limb, shorter than the calyx; lobes acute. Stamens on the tube of the corolla: filaments short and subulate, beardless: anthers ovate or cordate.

TRIBE III. SAMOLEÆ. Ovary connate at base with the base of the calyx: ovules as in the preceding tribe.

12. **SAMOLUS.** Flowers 5-merous. Corolla perigynous, nearly campanulate; the rounded lobes imbricated in the bud. Fertile stamens 5, on the tube of the corolla, with short filaments and cordate anthers. Staminodia or sterile filaments 5 in the sinuses of the corolla, or in one species wanting. Style short or slender: stigma obtuse or capitate. Capsule ovate or globular, 5-valved at the apex, many-seeded. Caulicent, alternate-leaved, with racemose flowers.

1. **HOTTÓNIA**, L. FEATHERFOIL. (In memory of *Prof. Peter Hotton* of Leyden.) — Rooting, often floating, glabrous, branching, with air-bearing fistulous stems and peduncles. Sepals linear. Corolla white. Filaments short. Stigma capitate. Capsule membranaceous. Flowers dimorphous in the manner of *Primula* in the European species, the earlier cleistogamous in the following.

H. infláta, Ell. Leafy stems and especially the internodes of the emersed flowering ones or peduncles much inflated (the latter often as thick as fingers) : proper leaves dissected into long and numerous filiform divisions ; whorled bracts linear or spatulate, entire, a quarter inch long, mostly exceeding the pedicels : corolla only a line or two long, with short lobes as well as tube, not equalling the calyx ; the throat open : style short. — Sk. i. 231 ; Nutt. Gen. i. 120. *H. palustris*, Pursh, &c., not L. — Shallow water, Massachusetts to Louisiana : fl. summer.

2. **DODECÁTHEON**, L. SHOOTING STAR, AMER. COWSLIP. (Fanciful name, from δώδεκα and θεοί, twelve gods ; the specific name of the original and, as we suppose, the only species commemorates *Dr. Richard Mead*, and was given as generic by Catesby.) — Flowers few or numerous in an umbel, terminating a naked scape, in late spring or summer, handsome, resembling the solitary flower of *Cyclamen* : corolla from pink-purple to white. Calyx erect in fruit, enclosing the lower part of the ovoid or fusiform crustaceous capsule.

D. Meádia, L. Perennial herb, with fibrous roots : leaves crowded on a thickish crown, generally spatulate-oblong or oblanceolate and entire or nearly so, sometimes repand, obtuse, below tapering into more or less of a margined petiole, in the typical or Atlantic form 3 to 9 inches long ; while the scape is from a span to 2 feet high ; and the flowers from few to many in the umbel : bracts of the involucre linear or subulate, small : pedicels slender and nodding with the flowers, erect in fruit. (Flower rarely 4-merous.) — *Meadia*, Catesb. Car. iii. t. 1 ; Ehret, Pl. Sel. t. 12. *D. Meadia* & *D. integrifolium*, Michx. Fl. i. 123. *D. integrifolium*, Hook. Bot. Mag. t. 3622. *Dianthus Carolinianus*, Walt. Car. 140. — The Atlantic plant, in moist and shaded grounds, Michigan and Penn., and through the upper country to Georgia, thence to Arkansas and Texas. Westward the species extends to California and Behring Straits, under very various forms and varieties, which may be generally classified as follows (after Bot. Calif. i. 467) ; the Pacific forms generally having shorter or blunter anthers than the Atlantic or typical *D. Meadia*, L.

Var. brevifólium. Leaves from obovate or ovate to broadly spatulate, half inch to an inch and a half long, abruptly contracted into a petiole ; scape 3 to 12 inches high, few-many-flowered : capsule seldom exceeding the minutely glandular calyx. — *D. ellipticum*, Nutt. ex Durand, Pl. Pratt. in Jour. Acad. Philad. n. ser. ii. 95. *D. integrifolium*, Benth. Pl. Hartw. 322. — Common in W. California. Forms nearly answering to this, or larger-leaved, occur in Arkansas, Kentucky, and Pennsylvania.

Var. lancifólium. Leaves oblanceolate or elongated-spatulate, 3 to 10 inches long, the short margined petiole included, quite entire, mucronate : pedicels and calyx commonly minutely glandular ; lobes of the latter lanceolate or triangular-lanceolate, nearly equalling the short-ovoid capsule. — *D. Jaffroyi* of the English gardens. — Wet mountain meadows of California, especially in the Sierra Nevada.

Var. alpinum. Like diminutive forms of the preceding, with shorter as well as smaller leaves (half inch to an inch and a half long) : scape 2 to 10 inches long, 1-4-flowered : pedicels and calyx glabrous. — High Sierra Nevada to the Rocky Mountains.

Var. macrocárpum. A large and stout form, emulating the common Atlantic plant : leaves thickish (rarely laciniate-toothed), tapering gradually into a rather short petiole : capsule oblong or even fusiform, 6 to 9 lines long, about double the length of the narrow calyx-lobes. — W. California to Alaska.

Var. frigidum. Leaves from obovate to oblong, very obtuse, mostly entire, an inch or two in length, with short or long and slender petiole : scape a span or two high, few-several-flowered : lobes of the calyx longer than the tube, from broadly lanceolate to almost ovate, shorter than the oblong capsule. — Hook. Bot. Mag. t. 5371 ; Wats. Bot.

King, 214. *D. frigidum*, Cham. & Schlecht. in Linn. i. 217; Seem. Bot. Herald, 38, t. 9. — Behring Straits (both sides and islands) to the Rocky Mountains and high Sierras.

Var. latilobum. Leaves thin, ovate or oval, repand or undulate-toothed, long-petioled: scape a span to a foot high, 1-several-flowered: calyx-lobes ovate or triangular-ovate, not longer than the tube, about half the length of the oblong capsule. — Var. *frigidum*, Watson, l. c., in part. *D. dentatum*, Hook. Fl. ii. 119? — Cascade Mountains, British Columbia or Washington Terr. to Wahsatch Mountains, Utah.

3. PRÍMULA, L. PRIMROSE. (Late Latin, from *primula veris*, the first in spring, i. e. to blossom.) — Flowers in some species, but not in others, dimorphous, i. e. in different individuals either with elongated style and low-inserted stamens, or with short included style and stamens inserted high in the throat, so that the tips of the anthers show in the orifice of the corolla. Few N. American species of this large Old World genus, and none of the True Primrose or Cowslip set, with thin rugose-veiny leaves. All perennials, chiefly with fibrous roots from a short crown: ours glabrous or nearly so.

* Flowers small; the tube of the salverform corolla not over 2 or 3 lines long and little surpassing the calyx; lobes obovate; throat with more or less of a callous ring or processes. Species passing into each other, probably reducible to two.

P. farinósa, L. More or less white mealy on the leaves, calyx, &c., at least when young: leaves from cuneate-lanceolate to obovate-oblong or spatulate, denticulate, an inch or less long, tapering into a short margined petiole: scape 3 to 9 inches high: umbel few-several-flowered, close: pedicels seldom equalling the flower, sometimes very short: corolla from flesh-color to lilac, with yellowish eye; the lobes cuneate-obcordate, rather distant at base, 2 or 3 lines long. Varies with mealiness sparing or deciduous. — Fl. Dan. t. 125; Curt. Lond. ii. 21; Engl. Bot. t. 6. *P. Scotica*, Hook. in Curt. Lond. iv. t. 133; Engl. Bot. t. 2608, form with almost capitate umbel. — Labrador, Nova Scotia and Mairé, Lake Superior, Rocky Mountains from Colorado northward, through Arctic America. (Antarctic Amer., Eu., N. Asia.)

P. Mistassínica, Michx. Green, without mealiness or with mere traces of it, small and slender: leaves half inch long, with or without a short petiole, spatulate or obovate, repand or toothed: scape 2 to 5 inches high, 1-8-flowered: lobes of the flesh-colored corolla from broadly to narrowly obovate, $1\frac{1}{2}$ or 2 lines long. — Fl. i. 124; Pursh, Fl. i. 137; Lehm. Prim. 63, t. 7; Hook. Bot. Mag. t. 2973; Gray, Man. 314. *P. stricta*, Hornem. Fl. Dan. t. 1385. *P. Hornemanniana*, Lehm. l. c. 55. *P. pusilla*, Hook. in Edinb. Phil. Jour. vi. 322, t. 11, Exot. Fl. t. 68, & Bot. Mag. t. 3030; Sweet, Br. Fl. Gard. ser. 2, t. 5. — Wet banks and shores, N. New England and New York to Lake Superior and N. Rocky Mountains to the Arctic Sea. (Greenland, N. Eu.)

P. boreális, Duby. Between the preceding and the next: very slender: leaves nearly of the latter, but only 3 to 5 lines long: scape 1-5-flowered: lobes of the purple corolla oblong, barely 2 lines long, deeply notched. — DC. Prodr. viii. 43; Herder in Radde, iv. 114. — Alaska and Islands to Kotzebue's Sound, &c. (Greenland, being apparently *P. Egelikensis*, Hornem. Fl. Dan. t. 1511.)

P. Sibírica, Jacq. Green, not at all mealy: leaves round-ovate, oval, or obovate, entire or nearly so, a quarter to a full inch long, slender-petioled: scape a span high, few-flowered: bracts of the involucre almost spur-like at base: lobes of the lilac-colored corolla broadly and usually deeply obovate, 3 to 5 lines long; the throat broadened. — Misc. i. 161; Lehm. Prim. t. 5; Hook. Fl. ii. 121, & Bot. Mag. t. 3167, 3445; Trautv. Imag. Fl. Ross. t. 30, mainly. *P. integrifolia*, Gunner, ex Oed. Fl. Dan. t. 188, not L. — *P. Finmarkica*, Jacq. l. c.; Fries, Sum. Scand. 198. — Arctic Amer. (*Richardson*) to the high N.W. coast and islands. (Greenland to Kamtschatka.)

** Flowers larger: tube of the corolla from 3 to 6 lines long, the throat open and unappendaged.

† Leaves entire or merely denticulate, clustered on the short erect subterranean crown.

P. angustifólia, Torr. Small: scape 1-flowered, one or two inches high, equalling the lanceolate-spatulate obtuse entire short-petioled leaves: involucre of one or two minute bracts: lobes of the lilac-purple corolla obovate, emarginate (3 or 4 lines long); the tube

hardly exceeding the narrow teeth of the oblong calyx. — Ann. Lyc. N. Y. i. 34, t. 3, & ii. 235. — Alpine region of the Rocky Mountains in Colorado and New Mexico, *James*, &c.

P. Párryi, Gray. Large, sometimes obscurely puberulent: leaves rather succulent, spatulate-oblong or oblanceolate, 4 to 12 inches long, often denticulate: scape a span to a foot high, 5-12-flowered: bracts of the involucre subulate, much shorter than most of the pedicels: calyx ovoid-campanulate, glandular, commonly reddish; the lanceolate-subulate lobes as long as the tube, rather longer than the ovoid capsule: corolla crimson-purple with yellow eye; the round-obovate lobes (about 5 lines long) emarginate or obcordate; the tube not exceeding the calyx. — Amer. Jour. Sci. ser. 2, xxxiv. 257; Watson, Bot. King, 213; Hook. f. Bot. Mag. t. 6185. — Margins of alpine brooks, through the higher Rocky Mountains of Colorado (*Parry*, &c.), to those of Nevada and Arizona. The most showy species.

P. nivális, Pall. Resembles the preceding, but runs into much smaller forms: leaves from one to 6 inches long, thickish, either entire or closely denticulate: umbel 2-10-flowered: bracts of the involucre ovate-subulate: pedicels usually short: calyx-lobes oblong or broadly lanceolate, shorter than the oblong capsule: corolla lilac-purple; the lobes oblong or oval, entire (3 or 4 lines long); the tube funnelform and surpassing the calyx. — "It. appx. t. G, f. 2," ex Ledeb. Fl. Ross. iii. 10; Cham. & Schlecht. in Linn. i. 215; Hook. & Arn. Bot. Beech. 129. — Unalaschka to Behring Straits and St. Paul's Island; chiefly the small form, var. *pumila*, Ledeb. l. c. (N. Asia.)

+ + Leaves more or less cuneate, coarsely toothed around the apex or sometimes lacinate, of firm and thickish texture: bracts of the involucre subulate: pedicels and deeply cleft calyx obscurely glandular.

P. cuneifolia, Ledeb. Leaves all rosulate-clustered on the thick short crown, obovate-cuneate, coarsely lacinate-toothed (3 to 12 lines long), mostly narrowed at base into a long and slender petiole: scape 2 to 4 inches high, 1-several-flowered: corolla purple; the lobes deeply 2-cleft (3 to 5 or even 6 lines long), as long as the funnelform tube. — Mem. Acad. Petersb. (1814) v. 522, & Fl. Ross. l. c. *P. saxifragaefolia*, Lehm. Prim. 89, t. 9; Cham. & Schlecht. l. c. — Aleutian Islands to Behring Straits. (N. E. Asia.)

P. suffrutescens, Gray. Leaves thickly crowded on ligneous-fleshy and tufted creeping stems or rootstocks (of a span or so in length), thick, cuneate-spatulate, 5-7-toothed at summit, long-attenuate below into a margined petiole: scape 2 to 4 inches long, several-flowered: corolla red-purple; the lobes (three lines long) obovate and emarginate or slightly obcordate, about equalling the tube. — Proc. Am. Acad. vii. 370, & Bot. Calif. i. 468. — Crevices of rocks, alpine region of the Sierra Nevada, California.

4. DOUGLÁSIA, Lindl. (Named for *David Douglas*, of Scotland, an indefatigable explorer of N. W. Amer. Botany) — Depressed and tufted little herbs; the stems branching or proliferous, suffrutescent, or at least persistent; the leaves small, linear, imbricated or rosulate on the branches, or some of them scattered and alternate. Flowers solitary or somewhat umbellate, small. — Lindl. in Brande Jour. Sci. 1827 (not 1828 as generally cited), 383, & Bot. Reg. t. 1886; Gray, Proc. Am. Acad. vii. 371; Benth. & Hook. Gen. ii. 632. *Aretia*, Gaud., Koch, &c., not L. *Gregoria*, Duby, Bot. Gall. 1828, 583, & DC. Prodr. viii. 45, as to No. 1, namely the *D. Vitaliana*, of Europe, which has yellow flowers: in ours they are rose-purple.

* Flowers umbellate-clustered from the uppermost rosulate tuft of leaves: tube of the corolla longer than the calyx.

D. nivális, Lindl. Canescent with fine close pubescence, 3 or 4 inches high, repeatedly 3-4-chotomous: leaves nearly all in proliferous rosulate tufts, not ciliate, rather obtuse, 3 to 6 lines long: lobes of the corolla oval, shorter than the tube, 2 lines long. — Bot. Reg. t. 1886. *Androsace linearis*, Graham in Edinb. Phil. Jour. July, 1829. — Rocky Mountains, in lat. 52°, &c., at 12,000 feet, *Douglas*.

D. ártctica, Hook. Glabrous: leaves ciliate with short and simple hairs. — Fl. ii. 120. *D. nivális*, var. *glabra*, Duby, in DC. l. c. 47. — Arctic seashore between the Mackenzie and the Coppermine, *Richardson*.

- * * Flowers solitary terminating the leafy shoots: tube of the corolla barely equalling the calyx: leaves more or less imbricated in the manner of *D. Vitaliana*.

D. montána, Gray. Pulvinate-cespitose, an inch or two high, nearly glabrous: leaves subulate, minutely somewhat ciliate, 2 lines long, somewhat interruptedly imbricate-clustered: pedicel not longer than the flower, 1-2-bracteolate near the calyx: corolla-lobes cuneate-obovate, 2 lines long. — Proc. Am. Acad. vii. 371. — Rocky Mountains around Helena City, Montana, *M. A. Brown*. Owl Creek Mts., Wyoming, *J. D. Putnam*.

5. ANDRÓSACE, Tourn. (Ancient Greek name of some sea-plant or zoöphyte, curiously transferred to these little plants of the mountains.) — Small annuals or perennials, of various habit, numerous in species in the Old World, few in the colder regions of the New: fl. summer.

- * Perennials, proliferously branched at base and cespitose: leaves rosulate-imbricated at the base of the many-flowered scapes: capsule usually few-seeded: umbel several-flowered.

A. Chamæjásme, Host. Leaves in more or less open rosulate tufts, from lanceolate to oblong-spatulate or ovate, carinate-1-nerved (3 to 6 lines long), at least their margins with the scape (1 to 3 inches high) and somewhat capitate umbel villous with many-jointed hairs: corolla white with yellowish eye (3 or 4 lines in diameter). — Koch, Syn. ed. 2, 671; Hook. Fl. ii. 119. *A. carinata*, Torr. in Ann. Lyc. N. Y. i. 30, t. 1; Sweet, Brit. Fl. Gard. ser. 2, t. 106. *A. villosa*, var. *latifolia*, Ledeb. Fl. Alt.; Herder, Bot. Radde, iii. 118. Indeed it may pass into *A. villosa*, L. — Alpine region of the Rocky Mountains from Colorado northward to the arctic coast, Behring Straits and islands. (N. E. Asia to En.)

- * * Annuals, acaulescent, with slender root, an open rosulate circle of leaves, and naked scapes, bearing an involucre few-many-flowered umbel: capsule many-seeded: corolla white, small.

+ Calyx-tube obpyramidal in fruit, whitish with conspicuous green teeth, which mostly surpass the capsule.

A. occidentális, Pursh. Minutely pubescent, not over 3 inches high: radical leaves and those of the conspicuous involucre oblong-ovate or spatulate, entire, sessile: scapes diffuse: bracts of the involucre ovate or oblong: lobes of the calyx triangular-lanceolate: oblong or deltoid, as long as the tube, still longer in fruit, foliaceous: lobes of the corolla oblong, shorter than the calyx. — Fl. i. 137; Nutt. Gen. i. 118. — Banks of the Missouri from the mountains down to St. Louis, and extending down the Mississippi, and into Illinois: also Utah, Colorado, and New Mexico.

A. septentrionalis, L. Almost glabrous: leaves lanceolate or oblong-lanceolate, narrowed at base (often into a sort of winged petiole), from irregularly denticulate to lacinate-toothed: scapes erect, usually numerous, 2 to 10 inches high: bracts of the small involucre subulate: umbel several-many-flowered: pedicels filiform, mostly long: lobes of the calyx mostly shorter than the tube, rather shorter than the obovate lobes of the corolla, from triangular to subulate-lanceolate, acute. — Lam. Ill. t. 98, f. 2; Fl. Dan. t. 7; Bot. Mag. t. 2021. *A. elongata*, Richards., not L. *A. linearis*, Graham in Edinb. Phil. Jour. 1829? — Rocky Mountains, both high alpine (and small), and at much lower elevations, New Mexico and Nevada to the arctic sea coast: also N. W. coast. (Kamtschatka to En.)

Var. subulifera. Lobes of the calyx slender-subulate, as long as the tube, surpassing the corolla. — Rocky Mountains near Boulder City, Colorado, *H. G. French*. San Bernardino, California, *Parry & Lemmon*.

+ + Calyx-tube hemispherical in fruit; the short teeth barely greenish and rather shorter than the globular capsule.

A. filifórmis, Retz. Glabrous: leaves, scapes (1 to 4 inches high), and pedicels nearly as in the preceding or more capillary: flowers less than a line and globose capsule only a line long: calyx-teeth broadly triangular, shorter than the very small corolla. — Obs. ii. 10; DC. Prodr. viii. 53; Reichenb. Ic. Germ. xvii. t. 69; Gray, in Proc. Acad. Philad. 1863, 70. — Rocky Mountains, from Colorado and Utah to Wyoming. (N. Asia.)

6. TRIENTÁLIS, L. STAR-FLOWER. CHICKWEED-WINTERGREEN. (Latin, for the third of a foot high.) — Low and glabrous perennials; the simple stem, from filiform rootstock somewhat tuberous-thickened at apex, bearing scat-

tered small scales or small leaves below, and a cluster or apparent whorl of larger leaves at summit; these veiny, entire or obscurely serrulate, nearly sessile. Peduncles filiform in some of the upper axils, one-flowered, in spring. Sepals slender, linear-lanceolate, united only at base. Corolla white or pinkish. Capsule with about 5 revolute valves. Seeds few, rather large, covered with a white cellular-reticulated pellicle, remaining for some time fast on the placenta in a globular mass. — The following are all the known species.

T. Americana, Pursh. Stem very naked below, unequally 5–9-leaved at summit, a span high: leaves lanceolate, acuminate at both ends: divisions of the white corolla finely acuminate. — Bart. Fl. Am. Sept. ii. t. 47. *T. Europæa*, Michx. *T. Europæa*, var. *Americana*, Pers., & var. *angustifolia*, Torr. Fl. I. 333. — Damp woods, from Labrador to the Saskatchewan and the mountains of Virginia.

T. Europæa, L. Stem either naked or with a few scattered leaves below the cluster of obovate or lanceolate-oblong obtuse or abruptly somewhat pointed leaves: divisions of the white or pink corolla abruptly acuminate or mucronate. — Alaska, &c. (Eu. to N. E. Asia.)

Var. ártica, Ledeb. Very like small specimens of the Old World plant, 2 to 4 inches high, with obtuse or retuse leaves, the larger barely an inch long, and gradually decreasing ones down the upper part of the stem: corolla white. — *T. arctica*, Fischer in Hook. Fl. ii. 121. *T. Europæa*, Cham. & Schlecht. — Mountains of Oregon to Aleutian Islands and Behring Straits.

Var. latifolia, Torr. Stem naked below in the manner of *T. Americana*; the whorl or cluster of 4 to 7 oblong-obovate or oval mostly acute leaves ($1\frac{1}{2}$ to 4 inches long), rarely proliferous: corolla from white to rose-red. — Pacif. R. Exp. iv. 118; Gray, Bot. Calif. i. 469. *T. latifolia*, Hook. l.c. — Woods, W. California to Vancouver's Island.

7. STEIRONÉMA, Raf. (From *στεῖρος*, sterile, and *ῥῆμα*, thread, referring to the presence of staminodia alternating with the fertile stamens.) — Leafy-stemmed perennials, glabrous except the ciliate petioles, destitute of glands or dots; the leaves all opposite, but mostly in seeming whorls (in the manner of *Trientalis*) on the flowering branches; the slender peduncles as in *Trientalis*; so also the corolla except that it is yellow. Filaments and bottom of the corolla granulose-glandular. Fl. summer. — Raf. in Ann. Gen. Phys. Bruxelles, vii. (1820) 192; Baudo in Ann. Sci. Nat. ser. 2, xx. 346; Gray in Proc. Am. Acad. xii. 62. *Lysimachia* § *Seleucia*, Bigel. Bost. ed. 2, 74. *Lysimachia* § *Steironema*, Gray, Man. ed. 1, 283.

* Leaves membranaceous, pinnately veined even when linear, at least the lower ones petioled: corolla sulphur-yellow.

S. ciliátum, Raf. Stem erect, 2 to 4 feet high, mostly simple: leaves ovate-lanceolate or oblong-ovate, gradually acuminate (5 to 2 inches long), and mostly with rounded or subcordate base, minutely ciliate; the long petioles hirsutely ciliate: corolla exceeding the calyx, about three quarters inch in diameter. — Gray, Proc. Am. Acad. l.c. *Lysimachia ciliata*, L.; Engl. Bot. t. 2922, & ed. Synce, t. 1543; Reichenb. Ic. Germ. xvii. t. 1086. *L. quadrifolia*, var., L. Syst. & Mant. — Low grounds and thickets, Nova Scotia to Georgia, and west to Br. Columbia and New Mexico. (Sparingly nat. in Eu.)

S. radicans, Gray. Stem slender and branching, soon reclined, the weak long branches often rooting in the mud: leaves smaller than in the foregoing, especially on the branches, not at all cordate, not ciliate, the margined petioles slightly so: calyx-lobes broader (ovate-lanceolate) and equalling the corolla, which is only a third of an inch in diameter. — *Lysimachia radicans*, Hook. Comp. Bot. Mag. i. 177. — Swamps, W. Virginia to Arkansas and Louisiana.

S. lanceolátum, Gray. Stems erect, a foot or two high, simple or paniculately branched, somewhat angled: leaves lanceolate or linear, an inch or two long, tapering into a short and margined ciliate petiole or attenuated base; the radical and sometimes lowest cauline from oblong to orbicular, small: corolla about two thirds inch in diameter; its divisions

conspicuously erose and cuspidate-acuminate, slightly exceeding the lanceolate calyx-lobes. — Proc. Am. Acad. l. c. *S. heterophylla*, Raf. l. c. *S. florida*, Baudo, l. c., chiefly. *Anagallis lutea*, &c., Pluk. Alm. t. 333, f. 1. *Lysimachia lanceolata*, Walt. Car. 92. *L. hybrida* & *heterophylla*, Michx. Fl. i. 126. *L. ciliata*, var., Chapm. Fl. 280. *L. decipiens*, Bertoloni, Amer. — Low grounds and thickets, western parts of Canada to Florida, and Nebraska to Louisiana. Polymorphous; the extremes in the following varieties, the first of which verges to the two preceding species.

Var. hybridum. Cauline leaves mostly petioled, from oblong to broadly linear. — *Lysimachia lanceolata*, var. *hybrida*, Gray, l. c. *L. hybrida*, Michx. l. c. *L. heterophylla*, Ell., Nutt., &c. — Commoner northward and westward.

Var. angustifolium. Stems more branched, a span to 2 feet high: cauline leaves linear, acute at both ends, more sessile, a line or two broad. — *L. angustifolia*, Lam. III. i. 440, not Michx. *L. heterophylla*, Michx. l. c. *L. quadriflora*, Ell., hardly of Bot. Mag. — The more marked form mainly southward.

* * Leaves of firmer texture and nearly veinless, mainly sessile: corolla deeper yellow.

S. longifolium, Gray, l. c. Glabrous: stems simple or very sparingly branched, slender, quadrangular, a foot or more high: cauline leaves all narrowly linear and sessile, mostly obtuse (2 to 4 inches long, $1\frac{1}{2}$ to $2\frac{1}{2}$ lines wide), lucid, the midrib prominent beneath, the margins narrowly revolute: corolla three fourths inch wide; the divisions somewhat obovate, longer than the calyx. — *S. longifolia*? & *S. revoluta*, Raf. l. c. *Lysimachia quadriflora*, Sims, Bot. Mag. t. 660, inappropriate name. *L. longifolia*, Pursh, Fl. i. 135 (at least chiefly); Duby in DC. l. c. (excl. habitat Carol.); Gray, Man. ed. 2, 273; Torr. Fl. N. Y. ii. 10. *L. revoluta*, Nutt. Gen. l. c. *L. angustifolia*, Gray, Man. ed. 1, not Lam. — Banks of streams, Lake Winnipeg to Niagara, and Wisconsin to W. Virginia; apparently not farther south.

8. LYSIMÁCHIA, Tourn. LOOSESTRIFE. (In honor of King *Lysimachus*, or from λύσις, release from, μάχη, strife.) — A genus of wide distribution, but very few species in America, and these rather polymorphous. Ours are perennials; fl. summer.

§ 1. **LYSIMACHIA** proper. Corolla yellow, strictly rotate, and deeply parted, with hardly any tube, and no teeth between the lobes: stamens more or less monadelphous at base, often unequal in length: leaves opposite or verticillate, or some abnormally alternate.

* Flowers (middle-sized) in a terminal and naked thyrsoid panicle: corolla destitute of dots and colored streaks: ovules rather numerous.

L. Fraseri, Duby. Almost glabrous: stem 3 to 5 feet high, sulcate-angled: leaves in whorls of 3 or 4, ovate to oblong-lanceolate, acutely acuminate (3 to 5 inches long), more or less reddish-dotted, mostly acute at base, very short-petioled; the upper smaller and commonly only opposite: panicle many-flowered, minutely glandular: bracts small and subulate: divisions of the calyx linear-lanceolate, valvate in the bud, margined by a narrow reddish line, moderately shorter than the obovate obtuse divisions of the corolla: glandular filaments somewhat unequal, united into a cup at base: anthers narrowly oblong, arcuate in age. — DC. Prodr. vii. 65. *L. lanceolata*, Pursh, Fl. ii. 729, ex char., not Walt. — S. Carolina (*Catesby* in herb. Sherard, and *Fraser* in herb. DC.); Columbus, Georgia, *Boykin*; Lookout Mountain, Tennessee, *Dr. Allen*. A striking and rare species, of the *L. vulgaris* section, most related to *L. Dahurica* of N. E. Asia.

* * Flowers (small) in a virgate terminal raceme or in the upper axils: stem erect: leaves punctate with pellucid and at length dark-colored dots: corolla dark-dotted or streaked; the divisions longer than the narrow lanceolate sepals: filaments conspicuously monadelphous at base and glandular, unequal: anthers barely oblong: capsule 1-5-seeded, sometimes 10-15-ovuled. — *Tridymia*, Raf. l. c. *L. § Cassandra*, Bigel. l. c.

L. quadrifolia, L. Stem a foot or two high, simple, leafy throughout, somewhat pubescent: leaves in whorls of 4, sometimes of 3, 5, or 6, rarely only in pairs or partly scattered, oblong-lanceolate or the lower ovate, more or less acuminate (1 to 3 inches long), equal, and with flowers on filiform pedicels from most of the upper axils, or sometimes the upper reduced to foliaceous bracts and the flowers loosely racemose: divisions of the corolla

ovate-oblong (2 lines long): ovules 10 to 18. — *L. Spec.* i. 147 (not of *Syst. Veg.*, where it is confounded with *L. ciliata*, L.); *Lam.* III. t. 101, f. 2. *L. lutea*, &c., *Pluk. Amalth.* t. 48, f. 3. *L. punctata*, Walt. *L. hirsuta*, Michx. — Sandy or gravelly soil, New Brunswick and Canada to Wisconsin and Georgia.

L. asperulæfólia, Poir. A foot or more high, mostly glabrous: leaves in whorls of 3 or 4, or some opposite, ovate-lanceolate from a broad closely sessile base, 3-5-ribbed, glaucous beneath, an inch or so in length; the upper reduced to bracts of a small leafy-bracted raceme: pedicels not longer than the flowers: divisions of the corolla lanceolate, 3 or 4 lines long. — *Dict. Suppl.* iii. 477 (wrongly said to come from Egypt); *Duby in DC.* l. c. *L. Herbesmonti*, Ell. *Sk.* i. 232; *Chapm. l. c.* — Pine woods, N. Carolina to Georgia.

L. stricta, Ait. A foot or two high, glabrous, soon branched, very leafy; the axils bearing fascicles of small leaves or sometimes torose bulblets: leaves opposite and occasionally alternate, lanceolate, acute at both ends, nearly veinless; the upper mostly abruptly reduced to linear or subulate bracts of a long and closely many-flowered virgate raceme: pedicels filiform, longer than the flowers: divisions of the corolla lanceolate or oblong, 3 lines long. — *Hort. Kew.* ed. 1, i. 199. *L. vulgaris*, Walt. *Car.* 92. *L. racemosa*, *Lam.*; *Michx. Fl.* i. 128. *L. bulbifera*, *Curt. Bot. Mag.* t. 104. *Viscum terrestre*, *L. Spec.* ii. 1023, bulbiferous and flowerless. — Wet ground, Newfoundland to Saskatchewan and Upper Georgia.

Var. producta, Gray, with a long and loose foliaceous-bracted raceme, gradually passing into ordinary leaves subtending filiform pedicels: flowers rather larger. — *L. racemosa*, *Michx. l. c.* (herb.), in part. — New York and Michigan.

Var. angustifolia, Chapm. Leaves all narrowly lanceolate and linear, a line or two broad: raceme rather few flowered. — *L. angustifolia*, *Michx. l. c.* *L. Loomisii*, *Torr. in Croom, Cat. Pl. Newbern*, 46. — Low country, N. Carolina to Georgia.

* * * Flowers (rather large), solitary in the axils of ordinary leaves: corolla not dark-dotted nor streaked: filaments slightly monadelphous at base.

L. NUMMULÁRIA, L. (MONEYWORT.) Glabrous: stems prostrate and creeping: leaves orbicular, short-petioled: sepals cordate-ovate, valvate and reduplicate in the bud, nearly equalling the corolla. Sparingly naturalized, escaped from gardens into moist grounds in N. Atlantic States. (Eu.)

§ 2. NAUMBÚRGIA. Corolla with hardly any tube deeply 5- (or even 6-7-) parted into linear divisions (light yellow and somewhat purplish-dotted), and with a small tooth interposed in each sinus: filaments distinct, slender, equal: leaves opposite, those at the base of the stem reduced to scales. — *Naumburgia*, *Mench. Thyrseanthus*, *Schrank*.

L. thyrsoíflóra, L. Glabrous or becoming so: stem a foot or two high from a slender rootstock, naked below: leaves lanceolate, sessile: peduncles only from 2 or 3 pairs of lower axils, much shorter than the leaf, bearing several or numerous small flowers in a dense head or oblong spike: capsule glandular-dotted, few-seeded. — *Engl. Bot.* t. 176; *Fl. Dan.* t. 517. *L. capitata*, *Pursh, Fl.* i. 135. — Wet bogs, Pennsylvania to Canada and northward, thence west to Oregon and Alaska. (Eu. to Japan.)

9. GLAUX, Tourn. SEA-MILKWORT. (From *γλαυρός*, sea-green.) — Single species. Flowers dimorphous as to reciprocal length of filaments and style.

G. marítima, L. A somewhat succulent little herb, glabrous and glaucous or pale, perennial by slender running rootstocks: stems a span or less high, erect or spreading, very leafy: leaves from oval to oblong-linear, a quarter to half inch long, entire, sessile: calyx-lobes oval, purplish or white. — Salt marshes along both sea-coasts, from New England and from California northward; also in the interior west of the Mississippi, in subsaline soil: fl. summer. (Eu., Asia.)

10. ANAGÁLLIS, Tourn. PIMPERNELL. (Ancient Greek name, probably from *ἀνά*, again, and *αἰνῶ*, to delight in.) — Low herbs, mainly annuals and of the Old World, one indigenous to Chili, one widely naturalized round the

world: flowers on slender pedicels from the axils of the entire leaves, middle-sized or small, in summer.

A. ARVÉNSIS, L. Annual, glabrous: stems spreading: leaves ovate, sessile (half to a full inch long, mostly shorter than the pedicels), opposite, in threes, or sometimes the uppermost alternate: calyx-lobes narrow, nearly equalling the red, purple, or blue (rarely white) corolla; the divisions of which are minutely denticulate or glandular-ciliate. — Waste grounds, especially in sandy soil, naturalized both on the Atlantic and Pacific coast. (Eu., Asia, Afr.)

11. CENTÚNCULUS, Dill. CHAFFWEED. (The meaning obscure.) — Very small glabrous annuals, with mainly alternate leaves, and solitary inconspicuous flowers in their axils, in summer.

C. mínimus, L. Stems ascending, 2 to 6 inches long, slender: leaves ovate, obovate, or in ours often spatulate-oblong, contracted or tapering at base (2 or 3 lines long), all but the lowest sessile: flowers nearly or quite sessile in the axils, 4-merous, sometimes 5-merous: calyx-lobes lanceolate-subulate, fully equalling the capsule. — Fl. Dan. t. 177; Reichenb. Ic. Germ. xvii. 1082; Fl. Bras. Prim. t. 23. *C. lanceolatus*, Michx. Fl. i. 93. — Low grounds, Illinois to Florida and Texas (wanting in N. E. States), and west to Oregon. (Eu., S. Amer.)

12. SÁMOLUS, Tourne. BROOKWEED, WATER-PIMPERNEL. (Celtic name, according to Pliny, the meaning unexplained.) — Low and glabrous herbs; with alternate entire leaves, and small white flowers in simple or panicle racemes; in summer. One species cosmopolite; most of the others in the southern hemisphere. Ours either annual or perennial, with fibrous roots.

S. Valerándi, L. Stems erect or ascending, branching from the base, leafy up to the raceme: leaves obovate, thinish; the lower tapering into a petiole: pedicels ascending, bracteate, 1-bracteolate near the middle: calyx adherent to the middle of the ovary and capsule; the lobes ovate, half the length of the short-campanulate corolla; this only a line long, the sinuses bearing inflexed sterile filaments. — Engl. Bot. t. 703. — Near Philadelphia, &c.; introduced in ballast. (Eu., Afr., Asia.)

Var. AmericánuS, Gray. More branched with age, becoming slender and diffuse, with elongating and loose paniculate racemes of mostly smaller flowers on more filiform and spreading pedicels: capsules sometimes one-half smaller. — Man. ed. 2, 274, &c. *S. floribundus*, HBK.; Gray, Man. ed. 1, &c. — Wet places, especially along brooks, N. Canada to Florida, Texas, Oregon, and California. (Mex., S. Amer.)

S. ebracteátus, HBK. Leafy stems short: leaves fleshy, obovate, spatulate, or oblong-oblanccolate, the lower tapering into a winged petiole and decurrent: racemes long-peduncled or as if on a scape (a span or two high): pedicels without bract or bractlet: calyx almost 5-parted, adherent only to the base of the ovary and capsule: corolla oblong-campanulate (about 2 lines long), with tube longer than the lobes: sterile filaments none. — Nov. Gen. & Spec. ii. 223, t. 129; Torr. Ann. Lye. N. Y. ii. 236; Chapm. Fl. 282. *S. longipes*, Hook. ex Shuttleworth in Bot. Zeit. 1845, 222. *Samodia ebracteata*, Baudo in Ann. Sci. Nat. ser. 2, xx. 350. — Saline and brackish soil, Florida to Texas and Upper Arkansas. (Mex., W. Ind.)

ORDER LXXXII. MYRSINACEÆ.

Shrubs or trees, with the floral characters of *Primulaceæ*, i. e. stamens of the number of the petals or corolla-lobes and opposite them, undivided style and stigma, and a one-celled ovary with a free central placenta, bearing few or numerous peltate amphitropous ovules. These are generally immersed in the placenta, and only one usually matures into a seed. This is globose, with a thin

coat, and a copious cartilaginous albumen. The fruit is pea-shaped, usually dry-drupaceous, never capsular. Leaves simple, mostly alternate, without stipules, commonly marked with some immersed dots or short lines, containing at first pellucid but at length dark resinous matter; these also appearing in the flower, especially in the corolla. (There are similar dots or lines in *Lysimachia*, of the preceding order.) No milky juice. Flowers small and the corolla short, rotate or campanulate. — A tropical order, sparingly reaching the southern borders of the United States.

TRIBE I. MYRSINÆ. Calyx perfectly free. No staminodia. Ovules usually immersed in the fleshy placenta, only one maturing into a seed which fills the cavity of the fruit.

1. MYRSINE. Flowers mostly polygamo-diceous, in axillary or lateral fascicles. Corolla 4-5-parted, imbricated in the bud. Anthers short and usually blunt.
2. ARDISIA. Flowers in panicles, either terminal or from the upper axils. Corolla rotate, 5- (rarely 4-6-) parted; the lobes convolute in the bud, or sometimes one wholly exterior. Anthers lanceolate-sagittate, pointed; the cells dehiscent from the apex downward.

TRIBE II. THEOPHRASTEÆ. Calyx perfectly free. Staminodia or sterile stamens in the throat at the sinuses of the corolla. Ovules numerous, not immersed in the placenta, maturing few or numerous seeds.

3. JACQUINIA. Calyx 5-cleft, with lobes rounded and much imbricated. Corolla short-salverform or campanulate; lobes rounded, imbricated in the bud: a rounded petaloid appendage (representing a sterile stamen of the outer series) in each sinus. Stamens 5, inserted low down on the tube of the corolla: filaments subulate: anthers oblong or ovate, extrorsely dehiscent. Fruit ovoid or globose, leathery, pointed with the base of the style. Seeds few, imbedded in the mucilage of the placenta. Embryo with ovate cotyledons and slender radicle.

1. MYRSÍNE, L. (An ancient Greek name of Myrtle.) — Shrubs or trees; with glabrous coriaceous leaves, small whitish flowers, and small dry berry-like fruits.

M. Rapánea, Roem. & Schult. Shrub or small tree: leaves thickish (2 inches or more long), oblong-obovate, obtuse or retuse, entire, narrowed at base into a short petiole: flowers sessile or nearly so in numerous small sessile clusters; the cluster in age raised on a short scaly-imbricated axis or spur: flowers 5-merous: drupe 2 lines in diameter, obscurely pedicelled. — Syst. iv. 509 (following indication of R. Br. Prodr.); A.DC. Prodr. viii. 97; Miq. in Fl. Bras. ix. 307, t. 50-52. *M. floribunda*, Griseb. Fl. W. Ind. 393. *M. floridana*, A.DC. l.c.; Chapm. Fl. 277. *Rapanea Guyanensis*, Aubl. Guian. i. 121, t. 46; the large and tropical form. *Samara floribunda*, Willd. Sp. i. 665. — Florida Keys, *Blodgett, Hassler*. (W. Ind. to S. Brazil.)

2. ARDÍSIA, Swartz. (From *ἄρδις*, the point of a thing, referring to the pointed anthers, which are often connivent around the acute style, forming a prominent cusp in the centre of the flower.) — A large and wide-spread tropical genus, with white or rose-colored corolla, and white, red, or blue berry-like fruits. Our only species differs from the most of the genus in having the corolla-lobes sinistrorsely overlapping, instead of the contrary direction, or occasionally with one lobe wholly outside and one inside, as often happens in this æstivation.

A. Pickeringia, Torr. & Gray. Shrub 5 to 9 feet high, glabrous: leaves from obovate to lanceolate-oblong, glaucescent, entire (2 to 4 inches long), contracted at base into a petiole: panicle broad, many-flowered: lobes of the corolla oval, soon reflexed, commonly dark-lined, 2 lines long: style filiform: fruit as large as peas. — A.DC. l.c. 124; Chapm. Fl. 277. *Cyrilla paniculata*, Nutt. in Amer. Jour. Sci. v. 290. *Pickeringia paniculata*, Nutt. in Jour. Acad. Philad. vii. 1. — E. Florida. (Mex. & W. Ind.)

3. JACQUÍNIA, L. (In honor of *Nicolas Joseph Jacquin*.)—Tropical American trees or shrubs; with thick coriaceous entire leaves, and white or yellow flowers in terminal or axillary racemes, corymbs or fascicles.

J. armilláris, L. Glabrous; leaves cuneate-spatulate or obovate-oblong, obtuse or retuse, sometimes mucronulate, nearly veinless, the margins somewhat revolute: flowers racemose or rather corymbose, white. — Jacq. Amer. 53, t. 39; Miq. in Fl. Bras. ix. t. 27. — E. Florida and Key West on the coast: perhaps introduced. (W. Ind., S. Amer.)

J. púngens, Gray. Shrub 8 to 12 feet high, glabrous, or the branchlets puberulent: leaves crowded, very rigid, some imperfectly verticillate, linear-lanceolate, veinless, minutely punctate beneath, with revolute margins, and tipped with a long pungent cusp: flowers few or solitary at the end of the branchlets, short-pedicelled: corolla orange: fruit globose, half to three fourths inch in diameter. — Pl. Thurb. in Mem. Am. Acad. v. 325. — Mountains near Ures (*Thurber*), and elsewhere in Sonora, N. W. Mexico (*Palmer*); probably reaching the borders of Arizona, but not received from within our limits. Related to *J. ruscifolia*.

ORDER LXXXIII. SAPOTACEÆ.

Shrubs or trees, with perfect flowers, agreeing with the foregoing order in having fertile stamens of the same number as the (proper) lobes of the corolla and opposite them, and inserted on its tube, in the short corolla, undivided style and stigma; differing in the few-several-celled ovary with solitary anatropous or amphitropous ovules, and a comparatively large seed with a crustaceous or bony testa (containing a large straight embryo with or without albumen), with broad and flat or sometimes fleshy-thickened cotyledons; and the juice in most is milky. Flowers regular and small, in axillary clusters. Calyx free, of 4 to 7 distinct sepals, which are strongly imbricated. Corolla hypogynous, 4-7-cleft, and the lobes imbricated in the bud, often with as many or twice as many accessory internal lobes or appendages borne on the throat. Staminodia (answering to series of stamens) commonly present, alternate with the true corolla-lobes and sometimes in the form of sterile filaments, or squamiform, or petaloid. Filaments of fertile stamens subulate or filiform, generally short: anthers oftener extrorse; the cell opening longitudinally. Fruit baccate, commonly by abortion 1-celled and 1-seeded; when several-seeded, the bony seeds are laterally flattened and disposed in a ring around a thickened axis. Leaves alternate, simple and entire, pinnately veined, mostly coriaceous: stipules small and caducous or none. Pubescence when present silky or tomentose, composed of malpighiaceous or stellate hairs. — Tropical or subtropical, except our species of *Bumelia*. Fleshy fruit of some edible. Juice of certain trees of the order yields gutta-percha. Seed albuminous in all ours excepting *Bumelia*.

* Calyx simple, i. e. of mostly 5 sepals in a single series, but strongly imbricated.

+ No internal appendages to the corolla and no staminodia.

1. **CHRYSOPHYLLUM.** Corolla bearing 5 stamens, otherwise naked within. Ovary 5-10-celled. Seeds 1 to 10, attached by an elongated hilum.

+ + Staminodia one in each sinus of the corolla, but no other internal appendages or divisions.

2. **SIDEROXYLON.** Staminodia more or less unlike and smaller than the lobes of the corolla. Ovary 2-5-celled. Berry drupe-like, usually 1-seeded.

+ + + Both staminodia and appendages or accessory lobes of the corolla present and petaloid; the latter one to each side of the proper corolla-lobes (or these 3-parted), therefore geminate in the sinuses outside of the staminodia: flowers white: anthers

extrorse, versatile: fruit cherry-like, with thin pulp, containing a mostly solitary erect seed (from a 5-ovuled ovary); the scar small and basilar or nearly so.

3. **DIPHOLIS**. Petaloid staminodia mostly erosely or fimbriately toothed. Seed with copious albumen; the embryo in its axis with flat cotyledons.

4. **BUMELIA**. Petaloid staminodia entire or denticulate. Seed destitute of albumen; the cotyledons very thick and fleshy, commonly consolidated.

* * Calyx double, of 6 or 8 sepals in two series; the outer almost valvate and enclosing the inner and thinner.

5. **MIMUSOPS**. Corolla of 6 or more exterior proper lobes, and twice as many similar appendages, a pair in each sinus outside of a thin scale-like or petaloid staminodium. Anthers sagittate, extrorse. Ovary 6-8-celled. Fruit baccate, maturing one or few seeds.

1. **CHRYSOPHYLLUM**, L. **STAR-APPLE**. (Formed of χρυσός, gold, and φύλλον, leaf, from the golden sheen of the lower face of the leaves.) — Handsome trees of tropical regions; with the leaves in the commoner species green and glabrous above, and beneath resplendent with a golden or copper-colored silky pubescence, traversed by fine and close parallel transverse veins: flowers small in axillary fascicles: fruit fleshy and commonly edible.

C. CAINITO, L., the common Star-apple of the W. Indies, if spontaneous in Florida, is doubtless an introduced tree. It has an 8-10-crenate stigma and an 8-10-celled large and globose edible fruit, as large as an apple; the foliage undistinguishable from the following.

C. **olivifórmē**, Lam. Small tree: leaves oval; the lower face (also young shoots, pedicels, and calyx) silky-tomentose and shining with the copper-colored or golden pubescence: corolla white; its tube seldom exceeding the calyx; stigma 5-crenate: fruit ovoid-oblong, 1-seeded, blackish when ripe, insipid. — Dict. i. 552; Descourt. Fl. Ant. ii. t. 71; Griseb. Fl. W. Ind. 398. *C. monopyrenum*, Swartz; Hook. Bot. Mag. t. 3303; Miq. in Fl. Bras. vii. 94. — S. Florida and Key West, *Blodgett, Chapman*. (W. Ind.)

2. **SIDERÓXYLON**, L. (Composed of σίδηρος, iron, and ξύλον, wood, from the hardness of the latter.) — A wide-spread tropical genus, of which a single W. Indian species has reached Florida.

S. **mastichodéndron**, Jacq. (**MASTIC-TREE**.) Rather large tree, glabrous: leaves thinnish, oval, with undulate margins, rounded or bluntish at apex, acutish at base, shining above (2 to 4 inches long), on slender (inch long) petioles: flowers crowded in lateral or axillary fascicles much shorter than the petioles: calyx barely puberulent, half the length of the 5-parted yellow corolla: staminodia lanceolate, with a subulate tip, nearly entire: ovary glabrous, 5-celled: fruit plum-like, 1-seeded, "yellow." — Coll. ii. t. 17, f. 5 (Catesb. Car. ii. t. 75); Gærtn. f. Carp. Suppl. 125, t. 202; A.DC. Prodr. viii. 181. *S. pallidum*, Spreng.; A.DC. l. c.; Chapm. Fl. 274. *Bumelia pallida*, Swartz. *B. fetidissima*, Nutt. Sylv. iii. 39, t. 94. — Key West (*Blodgett*) and Charlotte Harbor, Florida. (W. Ind.)

3. **DÍPHOLIS**, A. DC. (Formed of δίς, double, and φολίς, scale, from the pair of appendages in the sinuses of the corolla.) — Three W. Indian species, with the aspect and seeds of *Sideroxylon*, one of them extending to Southern Florida.

D. **salicifolia**, A. DC. Tree 60 feet high: leaves oblong-lanceolate, acuminate, glabrous, tapering into a petiole: flowers in axillary fascicles: short pedicels and calyx rusty silky-pubescent: staminodia oval, erose-toothed, as long as the linear or subulate exterior appendages: anthers oblong: fruit the size of a pea. — Prodr. l. c. 188, & Deless. Ic. v. 40 (corolla-lobes and appendages too much fringe-toothed); Griseb. Fl. W. Ind. 401; Miq. in Fl. Bras. vii. t. 18. *Achras salicifolia*, L. *Bumelia salicifolia*, Swartz. — Keys of S. Florida, *Blodgett*. (W. Ind.)

4. **BUMÉLIA**, Swartz. (Ancient Greek name of a kind of Ash, unmeaningly transferred to this genus.) — Shrubs or small trees (of Atlantic U. S. and

tropical America) ; with very hard wood, small white flowers fascicled in the axils of the leaves, in summer, and a black cherry-like fruit. Axils often spiny : therefore in S. States popularly called BUCKTHORN. Leaves in ours mostly deciduous, and staminodia nearly as large as the proper corolla-lobes.

* Pedicels, calyx, and lower face of the leaves clothed with silky or somewhat tomentose pubescence ; the upper face of the leaves finely venulose-reticulated : pedicels longer than the short petioles : fruit 4 or 5 lines long, oval.

B. ténax, Willd. Shrub or small tree, 12 to 30 feet high, with divergent branches : pubescence silky and close-pressed, yellowish or at first whitish, shining : leaves from oblanceolate or spatulate to cuneate-obovate, obtuse ($1\frac{1}{2}$ to $2\frac{1}{2}$ inches long) : fascicles very many-flowered : staminodia ovate. — Willd. Spec. i. 1085 ; Nutt. Sylv. iii. 39, t. 92. *B. chrysophylloides*, Pursh, Fl. i. 155. *B. reclinata*, Chapm. Fl. 275 ? *Sideroxylon tenax*, L. Mant. 48. *S. sericeum*, Walt. Car. 100. *S. chrysophylloides*, Michx. Fl. i. 123. *Chrysophyllum Carolinense*, Jacq. Obs. iii. t. 54. — Sandy soil, coast of N. Carolina to Georgia.

B. lanuginósa, Pers. Shrub or tree, sometimes even 40 feet high, less spiny ; the pubescence looser, more tomentose, and not shining : leaves from oblong-obovate to cuneate-obovate : fascicles 6–18-flowered : staminodia obscurely denticulate : otherwise in the most eastern forms very like the foregoing ; in the western with paler or sparser down to the leaves, or this partially deciduous in age so as to approach the next. — Syn. i. 237 ; Pursh, l. c. *B. tomentosa*, *lanuginosa*, & *oblongifolia* (Nutt. Gen.), A. DC. l. c. *B. oblongifolia* & *B. ferruginea*, Nutt. Sylv. l. c. 33. *B. Texana*, Buckley in Proc. Acad. Philad. 1862. *Sideroxylon tenax* ? Walt. l. c. *S. lanuginosum*, Michx. Fl. i. 122. — Woods, Georgia and Florida to Texas, S. W. Illinois, and Missouri ; the western form being *B. oblongifolia*, Nuttall.

Var. macrocarpa. Low and depressed : leaves less than an inch long, glabrate with age : “fruit edible, as large as a small date.” — *B. macrocarpa*, Nutt. Sylv. l. c. — Sand hills of the Altamaha, Georgia, Nuttall. To be rediscovered.

* * Pedicels and calyx glabrous, and leaves nearly or quite so throughout.

++ Leaves finely venulose-reticulated, rather thin.

B. lycioides, Gært. Shrub or low tree : leaves from oblanceolate to obovate-oblong and on vigorous shoots ovate-lanceolate ($1\frac{1}{2}$ to 5 inches long), reticulated ; the primary veins numerous, prominent, and obliquely transverse ; the lower face not rarely whitish-pubescent when young : fascicles very many-flowered, about the length of the petioles : staminodia ovate, obscurely denticulate : fruit short-ovoid, 3 to 5 lines long. — Gært. f. Carp. Suppl. 3. 127, t. 120 ; Loud. Arb. t. 1016 ; Nutt. Sylv. l. c. t. 91. *Sideroxylon lycioides*, L. (excl. hab.) ; Michx. l. c. *S. decandrum*, L. Mant. 48 ? *S. leve*, Walt. l. c. — Thickets, in low grounds, coast of Virginia and Illinois to Florida and Texas. Staminodia (as large as proper lobes of the corolla) sometimes with a pair of minute scales at their base. — Smaller-leaved forms in Florida and Louisiana pass into

Var. reclináta. Spreading or depressed shrub : leaves half inch to an inch or more in length, oblong with more or less cuneate base : branches very spiny. — *B. reclinata*, Vent. Choix. t. 22. *Sideroxylon reclinatum*, Michx. Fl. i. 122. — St. Mary’s River, S. E. Georgia (*Michaux*), and E. Florida, *Garber*, &c.

++ Leaves thicker, coriaceous, less veiny ; veinlets obscurely if at all reticulated.

B. cuneáta, Swartz. Shrub or small tree, glabrous : leaves from spatulate or linear-oblanceolate to broadly obovate-cuneate, very obtuse (half to an inch and a half long), rather fleshy ; the veins inconspicuous and strongly ascending : fascicles few-many-flowered : lanceolate appendages to the corolla and the ovate-lanceolate staminodia nearly equalling the proper lobes, acute, denticulate : fruit oblong-oval, edible, 6 to 9 lines long ; the seed oblong. — Fl. Ind. Occ. i. 496 ; Griseb. Fl. W. Ind. 401 (but “berry obovoid-globose”). *B. myrsinifolia*, A. DC. l. c. 192. *B. parvifolia*, (A. DC. l. c. ?) Chapm. Fl. 275. *B. angustifolia*, Nutt. Sylv. iii. 38. t. 93. *B. reclinata*, Torr. Mex. Bound. 109. — S. Florida from Key West to Tampa Bay ; lower part of the Rio Grande, Texas. (W. Ind., Mex.)

5. MÍMUSOPS, L. (Formed of *μῦς*, an ape, and *ὄψις*, appearance, but the likeness is not apparent.) — Trees of the tropics ; with coriaceous leaves, having slender and inconspicuous transverse veins and minutely reticulated vein-

lets, pedicels in axillary fascicles, corolla immersed or nearly so in the double calyx, and a plum-like edible fruit.

M. Sieberi, A.DC. Tree 30 feet high: leaves elliptical-oblong or inclining to obovate, retuse, glabrous and green both sides (2 to 4 inches long), slender-petioled; midrib stout: fascicles several-flowered: corolla whitish, 6-parted; its slender appendages 12: staminodia short, triangular, nearly entire: fruit the size of a pigeon's egg, brownish or yellowish when ripe, pleasant. — Prodr. viii. 204; Chapm. Fl. 275. *M. dissecta*, Griseb. l. c., as to W. Ind. pl. *Achras mammosa*, Sieber, Coll., not L. *A. Zapotilla*, var. *parviflora*, Nutt. Sylv. iii. 28, t. 90. — Key West, Florida, *Blodgett, Palmer*. Said to be common; probably indigenous. (W. Ind.)

ACHRAS SAPOTA, L., the SAPPADILLA or NASEBERRY of the West Indies and Central America (for a variety of which Nuttall mistook the above tree), appears not to have reached Florida.

ORDER LXXXIV. EBENACEÆ.

Trees or shrubs, with limpid juice, alternate entire leaves, and diœcious or polygamous (rarely completely hermaphrodite) regular flowers: the staminate with at least twice or thrice as many stamens as there are lobes to the short gamopetalous hypogynous corolla (usually convolute in the bud), and inserted on its tube or base, their anthers introrse; the pistillate flowers mostly with some imperfect stamens; the several-celled ovary with one or two anatropous ovules suspended from the summit of each cell: the fruit a berry, maturing one or more large and bony-coated seeds. These have a cartilaginous albumen, and a rather small straight embryo, with foliaceous cotyledons and a mostly slender radicle. Calyx persistent, often foliaceous and accrescent. Filaments short. Hypogynous disk wanting. Styles as many or half as many as the cells of the ovary. 2 to 8, distinct or partly united: stigmas sometimes 2-parted. Stipules none. Flowers axillary, articulated with the pedicels. Wood very hard; that of several species of *Diospyros* furnishes ebony. — Hiern, Mon. Eben. in Trans. Cambr. Phil. Soc. xii. part i. — A small order, of warm regions, nearly two thirds of the species belonging to the following genus.

1. DIOSPYROS, L. DATE-PLUM, PERSIMMON. (*Διός, πινός*, Jove's grain.) — Calyx 4-5-lobed, enlarging under the fruit. Corolla campanulate, short-salverform or urceolate. Ovary 4-12-celled; a pair of ovules in each cell. Berry maturing only 4 to 8 oblong bony flattened seeds. Flowers essentially diœcious; but the fertile flowers (commonly solitary in the axils) may have sterile stamens more or less polliniferous; the sterile flowers much smaller, usually racemose or clustered, and with more numerous stamens. — A large genus, widely dispersed, but the greater portion Asiatic: fruit edible.

D. Virginiana, L. (COMMON PERSIMMON.) Tree 20 to 70 feet high, with a rough bark: leaves thickish-membranaceous, more or less pubescent when young, commonly soon glabrate, oval (2 to 5 inches long): sterile flowers in threes: calyx 4-parted: corolla 4-lobed, greenish-yellow, thickish, glabrous: stamens 16, in pairs, somewhat pubescent; the sterile ones of the fertile flowers 8: styles 4, 2-lobed at apex: ovary 8-celled, nearly glabrous: fruit plum-like, an inch in diameter, excessively astringent when green, yellow when ripe, and when frosted sweet and luscious. — Gärtn. f. Carp. Suppl. t. 207; Michx. f. Sylv. ii. t. 93 (Catesb. Car. ii. t. 76). *D. concolor*, Mœnch. *D. pubescens*, Pursh, Fl. i. 265 (var. *microcarpa*, Raf. Med. Fl.). — Woods and fields, Rhode Island? and New York near the coast, also from Ohio to Iowa, and south to Florida and Louisiana: fl. early summer: fr. Oct. (Too near the N. Asiatic *D. Lotus*, L.)

D. Texána, Scheele. (MEXICAN PERSIMMON.) Shrub or tree 10 to 29 feet high, widely much branched, with smooth bark and heavy white wood: leaves cuneate-oblong or obovate, rounded at apex, often retuse (an inch or two long), almost sessile, tomentose, as also the branchlets: flowers silky-tomentose outside; sterile few in a fascicle: calyx 5-6-parted: stamens 16 to 20 in two ranks, glabrous; none in the fertile flowers: ovary and young fruit pubescent, 8-celled: stigmas 4, each 2-lobed: fruit globose, black, luscious (ripe in August), with 3 to 8 triangular seeds. — *Linnaea*, xxii. 145; *Torr. Mex. Bound.* 109; *Hiern, Mon. Eben.* l. c. 239. — Woods along streams, Southern and Western Texas. (Adjacent parts of Mex.)

ORDER LXXXV. STYRACACEÆ.

Shrubs or trees, with alternate simple leaves, and mostly perfect regular flowers, having at least twice as many stamens as the petals or lobes to the corolla, borne on its tube or base, or sometimes inserted with it; the filaments monadelphous or 4-5-adelphous at base; style and stigma one; calyx more or less adnate to the 2-5-celled ovary; the fruit or its cells one-seeded; seed anatropous, with a mostly straight embryo in copious fleshy albumen. Calyx either imbricated or open in bud. Anthers introrse or innate. Disk none. Ovules solitary, in pairs, or few in each cell, most of them aborting in the fruit. Style filiform. — A small order, in warm regions; but nearly half the genera are represented in the United States. — *Gray, Mem. Am. Acad.* v. 334; *Benth. & Hook. Gen.* ii. 667.

TRIBE I. SYMPLOCINÆ. Stamens in several series: anthers short, innate. Calyx-lobes imbricated in the bud. Pubescence simple. Embryo terete.

1. **SYMPLOCOS.** Calyx 5-lobed; the tube adnate to the 2-5-celled ovary. Corolla 5-parted, or nearly 5-petalous. Stamens very numerous, with filiform filaments, usually a cluster adnate to the base of each petal. Ovules mostly a pair suspended from the summit of each cell. Fruit a small dry drupe or nut-like, mostly 1-celled and 1-seeded.

TRIBE II. STYRACÆ. Stamens definite in a single series: anthers linear or oblong, adnate, introrse. Pubescence more or less stellate or scurfy. Calyx-lobes or teeth mostly very short or obsolete, open in the bud. Cotyledons flat or foliaceous.

2. **HALESIA.** Calyx-tube obconical or obpyramidal, 4-ribbed, adnate to the 2-4-celled ovary; the short truncate limb 4-toothed. Corolla campanulate, 4-cleft, or sometimes nearly 4-petalous, convolute or imbricated in the bud. Stamens 8 to 16; filaments flattened, more or less monadelphous in a ring at base and somewhat adnate to the base of the corolla. Ovules 4 in each cell, the upper pair ascending, the lower pendulous. Fruit dry-drupaceous or at maturity nut-like, 2-4-winged, within bony, 1-4-celled, pointed with the persistent base of the style. Seeds single in each cell, cylindrical, with a thin coat.
3. **STYRAX.** Calyx-tube campanulate; its base adnate only to the lower part of the primarily 3-celled ovary; the truncate limb of very small or obsolete teeth. Corolla 5-petalous or 5-parted, or rarely 4-8-parted; the lobes or petals imbricate, or nearly convolute, or valvate in the bud. Stamens double the number of the lobes of the corolla or rarely fewer: filaments flat, in ours borne on the base of the corolla, either monadelphous or nearly distinct: anthers linear. Ovules several in each cell, ascending. Fruit usually globular, becoming one-celled and dry, coriaceous or crustaceous, sometimes 3-valved from the top. Seed mostly solitary, filling the cell, erect, with a bony smooth coat.

1. **SÝMPLOCOS**, Jacq. SWEET-LEAF. (*Σύμπλοκος*, connected, referring to the stamens, which in some are highly monadelphous.) — Shrubs or small trees (American and Asiatic); with pinnately veined leaves, which commonly turn yellowish in drying and yield a yellow dye; the flowers axillary and yellow. — *Jacq. Stirp. Amer.* 166; *L. Gen.* 677. *Hopea*, Garden; *L. Mant.* 15.

S. tinctoria, L'Her. Shrub 4 to 18 feet high: leaves rather coriaceous, oblong, acute or acuminate, obscurely more or less serrate (4 or 5 inches long), soon glabrate and shining

above, pale and pubescent beneath, tardily deciduous, or far south more persistent: flowers in sessile fascicles from the axils of the preceding year, 6 to 16 in a cluster, scaly-bracteate, the scales deciduous: calyx-tube turbinate: petals oblong, obtuse, barely connected at base and bearing the stamen-clusters: ovary 3-celled: fruit nut-like, oblong, half inch or less long. — Linn. Trans. i. 176; Willd. Spec. iii. 1436. *Hopca tinctoria*, L. Mant. 105; Michx. f. Sylv. iii. 9. — In rich soil, Delaware (*Commons*) to Florida and Louisiana; fl. spring. Flowers fragrant. Leaves sweet to the taste and in autumn greedily devoured by cattle and horses (hence called HORSE-SUGAR); also used for yellow dye.

2. HALÉSIA, Ellis. SNOWDROP or SILVER-BELL TREE. (Commemorates *Stephen Hales* of England, author of *Vegetable Statics*, &c.) — Small trees of the Atlantic United States; with partly stellate soft pubescence: leaves rather large, ovate-oblong, acuminate, more or less depectulate, slender-petioled, deciduous; flowers showy, drooping on slender pedicels, in fascicles (or rarely very short racemes) from the axils of fallen leaves of the preceding year, produced in spring at leafing-time; corolla white. Thin testa of the seed adherent to the pericarp; the delicate inner coat adherent to the albumen. — (*Pterostyrax*, Sieb. & Zucc., of Japan, referred to this genus by Benth and Hooker, although nearly related, is better kept distinct, on account of the terminal paniculate inflorescence, quinary flowers, and thinner small fruit.) Ellis in Phil. Trans. li. t. 22; L. Gen. no. 596.

H. díptera, L. Tall shrub or small tree: leaves ovate or inclined to obovate, when full-grown thinnish and venulose-reticulated (4 to 6 inches long): corolla three-fourths inch long: stamens 8 to 16, mostly 8, sometimes free: ovary rarely 4-celled: fruit oblong (2 inches long), 2-winged; its strongly angled body tapering into a long stipe within the wing. — Spec. ed. 2, 636; Cav. Diss. vi. t. 187; Lodd. Cab. t. 1172. *H. reticulata*, Buckley in Proc. Acad. Philad. 1860. — Rich woods, Georgia and Florida to Louisiana. Flowers larger and more numerous and showy than in the next.

H. tetráptera, L. Small tree (or in the mountains even a large tree): leaves oval or ovate-oblong: corolla half inch long: stamens 10 to 16: ovary 4-celled: fruit ellipsoidal, equally 4-wing-angled, over an inch long. — (Catesb. Car. i. t. 64.) Lam. Ill. t. 204; Cav. l. c. t. 186; Bot. Mag. t. 910; Lodd. Cab. t. 1173. — Woods and along streams, W. Virginia and Illinois to Florida, mostly along and near the mountains.

H. parviflóra, Michx. Foliage of *H. tetraptera*, but smaller: corolla 4 or 5 lines long: fruit an inch or less in length, narrowly 2-winged, the oblong-clavate body with stipe included in the acute base of the wing. — Fl. ii. 40, not Lindl. Bot. Reg., which is *Styrax Americana*. — Georgia and Florida.

3. STÝRAX, Tourn. STORAX. (Greek *Στύραξ*, ancient name of the tree which yields *ρό στύραξ*, storax.) — Shrubs or small trees, the pubescence when present scurfy or stellular. Leaves deciduous, at least in our species; the flowers (in spring) racemose, subcorymbose or somewhat cymulose, or sometimes solitary, from the axils or summit of the branchlets. Corolla white, in ours campanulate or more open, of petals distinct to the base or nearly so, soft and tomentulose or puberulent, at least outside. Ovary 3-celled at base, with a thick placenta, which divides and becomes obsolete at the summit. A widely dispersed genus, chiefly of warm regions. — Gray, Mem. Am. Acad. l. c., Proc. vi. 326, & Man. ed. 5, 309; Benth. & Hook. l. c.

* Petals nearly valvate in the bud, a third to barely half inch long.

S. Americana, Lam. Shrub 4 to 8 feet high, glabrous or nearly so throughout: leaves small (1 to 3 inches long), bright green, commonly entire, oblong or oval, mostly acute at both ends, often acuminate: flowers single or in very few-flowered racemes, nodding: peduncles or branchlets minutely glandular, not hoary: 5-toothed calyx and sometimes

the pedicel glandular-dotted: petals lanceolate-oblong, nearly glabrous. — Dict. i. 82; Gray, Man. l. c. *S. leve*, Walt. Car. 140. *S. glabrum*, Cav. Diss. vi. 500, t. 188; Michx. Fl. ii. 41. *S. levigatum*, Ait. Kew. ii. 75; Bot. Mag. t. 921. *Ilalesia parviflora*, Lindl. Bot. Reg. t. 952? — Along streams, Virginia to Florida, Louisiana, and Arkansas.

* * Petals lightly but decidedly imbricated or convolute in the bud, minutely soft-puberulent outside, barely half inch long: calyx and inflorescence with the lower face of the leaves more or less canescent.

S. pulverulenta, Michx. Low shrub: leaves as in the preceding, but more or less pubescent or scurfy and hoary beneath, rarely 2 inches long on flowering stems: flowers geminate in the axils on short branchlets and in short terminal racemes, fragrant: pedicels not longer than the calyx: petals oblong-lanceolate. — Fl. ii. 41; Ell. Sk. i. 505. — Pine-barren swamps, S. Virginia to Florida and Texas.

S. grandifolia, Ait. Shrub from 4 to 12 feet high: leaves membranaceous, oval or obovate, usually denticulate, green and glabrous above, canescently pubescent or tomentose beneath, the larger 3 to 6 inches long: flowers mainly in loose naked racemes of 3 to 6 inches in length, or some in leafy-bracted clusters, larger than in the preceding: petals more overlapping in bud, oblong, fully half inch in length. — Lodd. Cab. t. 1016 (poor); Michx. Fl. ii. 41, as *S. grandiflorum*. *S. officinale*, Walt., not L. — Rich woods, S. Virginia to Florida.

* * * Petals conspicuously overlapping in the bud, obovate or broadly oblong, two thirds to three fourths inch long: short peduncle terminating the branches or short lateral branchlets, corymbosely 1-4-flowered: bracts minute: style long and filiform.

S. platanifolia, Enzelm. Shrub 12 feet high, green and glabrous or nearly so: leaves roundish, with subcordate or truncate broad base and slender petiole, undulate or angulate-toothed, or even sinuate-lobed, sometimes abruptly acuminate, reticulate-veiny (2 to 4 inches in diameter): even the pedicels and calyx glabrous or nearly so. — Torr. in Smiths. Contrib. vi. 4, note. — Wooded bottoms, Texas, *Lindheimer*, *Wright*, &c.

S. Californica, Torr. Shrub 5 to 8 feet high, with scurfy stellular pubescence, at first hoary, sometimes soon green and glabrate: leaves oval, entire or sparingly undulate (an inch or two long), short-petioled: pedicels with the calyx and corolla minutely canescent: style becoming an inch long. — Smiths. Contrib. l. c. & Pacif. R. Rep. iv. 118; Gray, Bot. Calif. i. 470. — W. side of the Sierra Nevada, California, *Fremont*, &c. Bony seed as large as a small cherry.

ORDER LXXXVI. OLEACEÆ.

Trees or shrubs, rarely almost herbaceous, with colorless bland juice, opposite (rarely alternate) leaves destitute of stipules, perfect or diœcious and regular flowers (gamopetalous, 2-4-petalous, apetalous, or even achlamydeous); with stamens 2 to 4, mostly 2 and fewer than the parts of the corolla, distinct; the free ovary 2-celled; style one or none; anatropous ovules mostly one or two pairs in each cell; seeds with a rather large straight embryo (its cotyledons flat or plano-convex) in firm fleshy albumen, or sometimes exalbuminous.

FORSYTHIA VIRIDISSIMA and *F. SUSPensa*, of Japan and China, cultivated ornamental shrubs, noted for their very early yellow blossoms, are peculiar in having numerous ovules.

SYRINGA, the Lilac, of the Old World, becomes spontaneous in a few places.

LIGUSTRUM VULGARE, the Privet, used for ornamental hedges, may be occasionally found wild in the vicinity of towns in the Eastern Atlantic States, but is not a really naturalized plant.

OLEA EUROPEA, the Olive, has long been planted in the southern part of California.

TRIBE I. FRAXINEÆ. Fruit entire, dry, indehiscent, winged, a samara. Seed suspended.

1. **FRAXINUS.** Flowers diœcious or polygamous, sometimes perfect. Calyx very small, 4-cleft or irregularly toothed, or entire, or wanting. Petals none, or 4 and either separate

or united in pairs at the very base. Stamens 2, sometimes 3 or 4. Fruit by abortion mostly 1-celled and 1-seeded, rarely 2-seeded; the wing mainly terminal.

TRIBE II. OLEINÆ. Fruit fleshy and indehiscent, a drupe or rarely a berry, not lobed. Seed suspended or pendulous. Leaves simple.

* Flowers apetalous, diœcious or polygamous.

2. **FORESTIERA**. Calyx minute, 4-parted or toothed, sometimes wanting or deciduous. Corolla none, or rarely one or two small deciduous petals. Stamens 2 to 4; anthers ovate or oblong. Ovary ovate, with 2 ovules in each cell: style slender: stigma somewhat 2-lobed. Drupe 1-seeded.

* * Flowers complete, sometimes polygamous: parts of the calyx and corolla 4.

3. **CHIONANTHUS**. Calyx 4-cleft, persistent. Corolla of 4 long and linear petals, which are plane in the bud with slightly induplicate margins, and united only and often slightly at the base. Stamens 2, rarely 3, short. Style short. Ovules a pair in each cell. Drupe mostly 1-seeded. Embryo in copious fleshy albumen: cotyledons flat.

4. **HESPERELÆA**. Calyx of 4 somewhat colored sepals, imbricated in the bud, deciduous. Corolla of 4 spatulate unguiculate petals, imbricated at summit in the bud, accrescent, deciduous. Stamens 4, hypogynous: filaments subulate: anthers oblong, mucronulate. Style stout: stigma thick, 2-lobed. Ovules a pair in each cell.

5. **OSMANTHUS**. Calyx 4-cleft, short, persistent. Corolla short, 4-cleft; the lobes broad and obtuse, imbricated in the bud. Stamens 2 (rarely 4), on the short tube of the corolla, included; anthers ovate. Style short: stigma small, entire. Ovules a pair in each cell. Drupe globose or ovoid, mostly 1-seeded.

TRIBE III. JASMINEÆ. Fruit didymous or septicidally 2-partible. Seeds ascending or erect. Parts of calyx and corolla 5 or more.

6. **MENODORA**. Calyx 5-15-cleft, persistent; the lobes mostly linear. Corolla from rotate to salverform; limb 5-6-parted, the lobes imbricated in the bud. Stamens 2, rarely 3: anthers oblong or nearly linear. Ovary emarginate: style slender: stigma usually capitate or 2-lobed. Ovules 4 (or in a S. Amer. species only 2) in each cell. Fruit a didymous or 2-parted at length membranaceous capsule, circunscissile at or near the middle. Seeds usually a pair in each cell, large, with a thickened and spongy outer coat: no albumen. Leaves often alternate!

1. **FRÁXINUS**, Tourn. **ASH**. (Classical Latin name.) — Trees; with rather light tough wood, chiefly opposite and odd-pinnate leaves, and small flowers, in panicles, developed in spring. Petals when present narrow, induplicate-valvate in the bud, white: anthers yellow, large in proportion. Stigma 2-lobed. Ovules a pair from the summit of each cell, only one usually fertile; the oblong seed filling the cell of the samara or key-fruit. Bark of shoots ash-color. Winter-buds of few and usually dark-colored thickish scales. (Shape of the wing of samara variable, not rarely some are 3-winged and 3-celled.)

ORNUS AMERICANA, Pers. &c., is probably only *Fraxinus Ornus*, L., and wrongly thought to be American. A host of nominal species of Ash which were named by Bosc, characterized mainly by the foliage, and upon which his herbarium throws little or no light, must pass unnoticed.

§ 1. **ÓRNUS**, Pers. Flowers 2-4-petalous, polygamous (many perfect), in loose panicles, which mostly terminate leaf-bearing branches or spring from the axils of new leaves.

* Petals 2: style manifest: Californian.

F. dipétala, Hook. & Arn. Small tree, glabrous: leaflets 5 to 9, oval or oblong, obtuse, serrate, mostly petiolulate, an inch or two long: panicles usually clustered on short lateral spurs, naked or subtended by one or two leaves: calyx truncate and somewhat toothed: petals oblong-obovate, equalling the linear anthers: fruit from linear-oblong to spatulate-oblong (usually an inch long), the flat body several-nerved on each side and with sharp edges. — Bot. Beech. 362, t. 87; Gray, Bot. Calif. i. 472. *Ornus dipetala*, Nutt. Sylv. iii. 66, t. 101. *Chionanthus fraxinifolius*, Kellogg, Proc. Calif. Acad. v. 18. — Western part of California.

Var. brachýptera, a form with short obovate fruit, only half to three-fourths inch long, and the terminal part of the wing only half the length of the body. — Borax Lake, California, *Torrey*.

Var. trifolioláta, Torr. Leaves (only the uppermost known) 1-3-foliolate: leaflets small, an inch or less long, coriaceous, obsoletely serrate: fruit rather small. — Bot. Mex. Bound. 167. — Mountains south of the boundary between Upper and Lower California, *Parry*.

* * Petals (always?) 4: style none or hardly any: North Mexican and Texan species, with small and minutely punctate leaflets, and small panicles chiefly terminating short 1-2-leaved lateral branchlets: flowers of the second species unknown.

F. cuspidáta, Torr. Shrub 5 to 8 feet high, with slender branches, glabrous: leaflets 5 to 7, lanceolate or ovate-lanceolate and gradually acuminate into a cuspidate tip, or some of them ovate or oval and obtuse or even emarginate, acutely and sparsely few-toothed or entire, petiolulate (half to a full inch or more in length): petiole slightly margined between the leaflets: calyx deeply 4-cleft or 4-toothed: corolla 4-parted, half inch long; the lobes long-linear, several times exceeding the oblong anthers: stigma sessile: fruit spatulate-oblong or obovate-oblong (half inch long), its wing rather shorter than the flattened nerveless body. — Bot. Mex. Bound. 166. — South-western Texas, on the Rio Grande from the great cañon upwards, *Parry, Wright, &c.*, in fruit. New Mexico, *Palmer*, in flower.

F. Gréggii, Gray. Shrub 5 to 9 feet high, glabrous, with slender mostly terete branches: leaflets 3 to 7, from narrowly spatulate to oblong-obovate, obtuse, obtusely few-toothed or entire, plane, firm-coriaceous, veinless or nearly so (a half to nearly an inch long), sessile: petiole wing-margined between the leaflets: fruit 6 to 8 lines long, oblong-linear, the retuse apex tipped with a very short distinct style. — Proc. Am. Acad. xii. 64. *F. Schiedeana*, var. *parvifolia*, Torr. l. c. — On limestone, S. W. Texas, *Schott, &c.* Adjacent parts of Mexico, *Gregg, Bigelow, Parry*.

§ 2. FRAXINÁSTER, DC. Flowers apetalous, in mostly denser panicles (especially the staminate), which are developed from separate buds from upper axils of the preceding year, or on the leafless base of shoots of the season.

* Flowers polygamous: leaves mostly simple!

F. anómala, Torr. Shrub or low tree, more or less soft-pubescent when young: leaves thin-coriaceous, ovate, rotund, or cordate, rarely obovate, entire or partly serrate, many-veined (an inch or two long), sometimes 2-3-foliolate with similar sessile leaflets: panicles short: calyx campanulate, erose-toothed, longer than the ovary: anthers linear-oblong: fruit oblong (7 to 10 lines long), winged from the base, the flattened striate-nerved body as long as the terminal part of the wing. — Watson, Bot. King, 233. — S. Utah, *Newberry, Palmer, Bishop, &c.*

* * Flowers diœcious; the pistillate rarely with abortive stamens; the staminate reduced to 2 or 4 stamens with a minute or obsolete calyx or none: leaves 3-11- (mostly 5-9-) foliolate.

+ Leaflets petiolulate: anthers linear-oblong, mucronate or apiculate: small calyx to fertile flowers present and persistent, sometimes deciduous in *F. quadrangulata*.

++ Fruit winged only from the summit or upper part of the terete or nearly terete body,

= Which is marginless: the wing wholly terminal.

F. pistaciæfólia, Torr. Small tree, either velvety-pubescent or nearly glabrous: leaflets 5 to 9, short-petiolulate, sometimes subsessile, small (one or two inches long), from lanceolate to oval, entire or somewhat serrate: fruits small and crowded, spatulate (either broadly or narrowly), the terete body (3 to 5 lines long) somewhat clavate, about equaling and sometimes exceeding the wing. — Pacif. R. Rep. iv. 128, & Bot. Mex. Bound. 166. — S. W. Texas to Arizona. (Adjacent Mex.)

Var. coriácea. A rigid form of arid districts: leaflets 3 to 5, firm-coriaceous, usually more serrate. — *F. velutina*, Torr. in Emory, Rep. 1848, 149, a velvety-tomentose form. *F. coriacea*, Watson in Am. Nat. vii. 302, excl. pl. coll. *Bigelow*. — Arizona, *Emory, Wheeler*.

F. Americána, L. (WHITE ASH.) Large timber-tree: branchlets and petioles glabrous: leaflets 7 to 9, from ovate to oblong-lanceolate, mostly acuminate, entire or sparsely serrate or denticulate (3 to 5 inches long), pale or whitish and often pubescent beneath: fruit usually about an inch and a half long; the body oblong and cylindraceous, completely

terete, barely acute at base, merely 1-nerved at what would be the margins, half or thrice shorter than the lanceolate or oblanceolate wing. — Spec. ed. 2, 1510, excl. syn. Catesb.; Muhl. in N. Schrift. Berl. iii. (1801); Michx. f. Sylv. t. 118 (excl. fruit, which is apparently that of *F. viridis*); Torr. Fl. N. Y. ii. 125, t. 89 (on plate *F. acuminata*); Emerson, Rep. Trees, ed. 2, t. 12. *F. acuminata*, Lam. Dict. ii. 542. *F. Novæ-Angliæ* & *F. Caroliniana*? Wangenheim. *F. alba*, Marsh. Arbust. 51. *F. juglandifolia*, Lam. l. c. ? & Bosc in Mem. Inst. 1808, 209. *F. epiptera*, Michx. Fl. ii. 256. *F. Canadensis*, Gært. Fruct. i. 122, t. 49. *F. discolor*, Muhl. Cat. 111. — Rich or moist woods, Canada to Florida and Louisiana. Very valuable timber-tree: fruit variable in size and shape of wing, but that of the terete cylindrical body quite constant. Monœcious flowers have been met with.

Var. microcarpa. Fruit (seemingly full grown but seedless) remarkably small, half to two thirds inch long. — *F. albicans*, Buckley in Proc. Acad. Philad. 1862, partly. *F. Curtissii*, Vasey, Cat. Trees U. S. 20. — Eufaula, Alabama (*Curtiss*), &c.

Var. Texensis. Low tree, glabrous throughout: leaflets mostly 5, slender-petiolulate, from ovate to broadly oval, $1\frac{1}{2}$ to 2 inches long, either rounded at apex or slightly acuminate: fruit small, two-thirds to barely an inch long, the wing hardly double the length of the body. — *F. albicans*, Buckley, l. c., in part. *F. pistaciifolia*, E. Hall, List. Pl. Tex. no. 527. *F. coriacea*, Watson, l. c., as to pl. Bigelow, "Devil's Run Cañon," Texas (not "Arizona"), a form with remarkably long-petiolulate leaves of firmer texture, without flowers or fruit. — Texas, on rocky hills, from Austin to Devil's River, near the Rio Grande. Perhaps a distinct species.

== Body of the fruit more slender, tapering gradually from summit to base, more or less margined upward by the decurrent wing.

F. pubescens, Lam. (RED ASH.) Tree of middle or large size: inner face of the outer bark of the branches red or cinnamon-color when fresh: young parts velvety-pubescent, commonly permanently so: leaflets as of the preceding, or else longer and narrower, the lower face and the petioles more tomentose: fruit commonly $1\frac{1}{2}$ to 2 inches long; its body more than half (or even little less than) the length of the linear or spatulate wing. — Dict. ii. 548; Walt. Car. 254; Muhl. in N. Schrift. Berl. l. c.; Gray, Man. ed. 5, 402. *F. Pennsylvanica*, Marsh. Arbust. 51. *F. nigra*, DuRoi. *F. tomentosa*, Michx. f. Sylv. t. 119. *F. oblongocarpa*, Buckley, l. c. — Low grounds, Canada to Dakota, and south to Florida; rare west of Ohio.

F. viridis, Michx. f. (GREEN ASH.) Small or middle-sized tree, glabrous: leaflets 5 to 9, bright green both sides, or barely pale beneath, from oblong-lanceolate to ovate, mostly acuminate and sparsely and sharply serrate or denticulate (2 to 4 inches long): fruit nearly as in the preceding or with a rather more decurrent wing (from 9 to 18 lines long). — Sylv. t. 120, excl. fruit (which must belong to *F. Americana*); Bosc, l. c.; Gray, Man. ed. 2, 358. *F. concolor*, Muhl. Cat.; Torr. Fl. N. Y. (on plate, *F. pubescens* in letter-press) t. 90. *F. juglandifolia*, Willd. Spec. iv. 1104. *F. Caroliniana* (Willd. ?), Pursh, Fl. i. 9. *F. expansa*, Willd. Baum. 150. — Along streams, Canada and Dakota to Florida, Texas, and Arizona? Pale-leaved forms, with some pubescence on the veins of the leaflets beneath, pass into the preceding.

Var. Berlandieriana. Leaflets 3 to 5, with a more cuneate base: wing of the fruit rather wider and more decurrent on the body. — *F. Berlandieriana*, DC. Prodr. viii. 278. *F. triolata*, Buckley, l. c., a state with 3-winged samara. — Texas. (Cuba?)

++ ++ Fruit with compressed and wing-margined body.

F. platycarpa, Michx. (WATER ASH.) Tree of middle size, glabrous or pubescent: branchlets terete: leaflets 5 to 7, ovate or oblong, acuminate, sharply serrate or entire, conspicuously petiolulate: fruit elliptical, obovate, or spatulate (one or two inches long), contracted below into a stalk-like base, each face with an impressed midnerve, not rarely 3-winged. — Fl. ii. 256; Michx. f. Sylv. t. 124; Chapm. Fl. 370. *F. Carolinensis*, &c., Catesb. Car. i. t. 80. *F. Caroliniana*, Lam. l. c. ? *F. excelsior*? Walt. Car. 254. *F. Americana*, Marsh. Arbust. 50. *F. pallida*, Bosc, l. c. *F. pauciflora*, Nutt. Sylv. iii. 61, t. 100. *F. triptera*, Nutt. l. c., with 3-winged samara. *F. Nuttallii* & *F. nigrescens*, Buckley, in Proc. Philad. Acad. 1860 & 1862. — Deep river-swamps, Virginia to Louisiana. (Cuba.)

F. quadrangulata, Michx. (BLUE ASH.) Large timber-tree, the inner bark yielding a blue color to water, glabrous: branchlets square: leaflets 7 to 9, ovate-oblong to lanceolate, acuminate, sharply serrate (3 or 4 inches long), short-petiolulate, when young often pubes-

cent beneath: fruit linear-oblong or cuneate-oblong (one or two inches long, 4 to 7 lines wide), not stipitate and oftener not narrowed at base, lightly several-nerved on both faces, somewhat twisted when mature; the minute calyx at length deciduous or obsolete. — Fl. ii. 225; Michx. f. Sylv. t. 123. — Dry rich woods, Michigan to Tennessee.

+ + Lateral leaflets sessile: common petiole angled: anthers short-oblong.

= Calyx small, persistent.

F. Oregána, Nutt. Tree of middle or ample size, with wood like that of White Ash, the foliage and shoots villous-pubescent, at least when young: leaflets 5 to 7, lanceolate-oblong to oval, entire or nearly so (2 to 4 inches long), veiny, the upper surface soon glabrous: fruit with nearly clavate and slightly compressed body, the margined edges gradually widened upwards into the longer oblanceolate wing (of an inch or less in length). — Sylv. iii. 59, t. 99; Gray, Bot. Calif. i. 472. *F. pubescens*, var., Hook. Fl. ii. 51. *F. grandifolia*, Benth. Sulph. 33. — Along streams, Washington Terr. near the coast to California.

= = Calyx wanting: the flowers wholly naked.

F. sambucifolia, Lam. (BLACK ASH.) Small or middle-sized tree, with very tough and fissile wood; glabrous, except bearded hairs along the midribs beneath: leaflets 7 to 11, green and of similar hue both sides, oblong-lanceolate from a roundish base, gradually acuminate, finely and acutely serrate (3 to 5 inches long), the pinnate primary veins of numerous pairs: fruit lanceolate-oblong or linear-oblong, flat throughout, finely nervose, the acutely margined body of the same breadth as the wing. — Dict. ii. 549; Muhl. l. c.; Michx. f. Sylv. t. 122; Emerson, Rep. Trees, ed. 2, ii. 381, t. 13. *F. nigra*, Marsh. Arbust. 51. — Swamps and wet banks, Nova Scotia to Wisconsin, the mountains of Virginia and Kentucky. Bruised foliage exhales the odor of Elder. Remarkable for the total absence of calyx.

2. FORESTIÉRA, Poir. (*M. Forestier*, a French physician.) — Shrubs (North American and W. Indian); with opposite simple leaves, inconspicuous flowers, in early spring, from imbricated-scaly axillary buds, and small dark-colored drupes; the putamen thin. Fascicles or panicles very short, few-flowered; the staminate sessile and in a sessile globular scaly glomerule: the bracts or bud-scales deciduous. Branches minutely warty. — Tulasne in Ann. Sci. Nat. ser. 3, xv. 265. *Adelia*, Michx. *Borya*, Willd. *Bigelovia*, Smith. *Piptolepis*, Benth.

* Leaves membranaceous and deciduous, not perulose, mostly minutely serrate: flowers from axils of the preceding year.

F. acumináta, Poir. Shrub somewhat spinescent, 5 to 10 feet high, glabrous throughout: leaves ovate-lanceolate and ovate-oblong, conspicuously acuminate, slender-petioled, 1½ to 4 inches long: fertile flowers several in a panicle: calyx obsolete or caducous: drupe (when forming fusiform acuminate, and somewhat arcuate) elongated-oblong. — Dict. Suppl. ii. 664; Gray, Proc. Am. Acad. iv. 363, excl. var. *Adelia acuminata*, Michx. Fl. ii. 225, t. 48. *Borya acuminata*, Willd. Spec. iv. 711. *Forestiera ligustrina*, Willd. ex char. & hab.; Gray, Man. ed. 2, 358, not Poir. — Wet and shady river-banks, W. Illinois and Missouri to W. Georgia and Texas. The habitat of this and of *F. ligustrina* must have been transposed in Michaux's Flora.

F. Neo-Mexicána, Gray. Shrub 6 to 10 feet high, glabrous: leaves spatulate-oblong, obtuse or obtusely acuminate, short-petioled, obtusely or obsoletely serrulate, an inch long: fertile flowers in sessile fascicles: calyx minute and rather persistent: drupe obtuse, short-oblong or ovoid. — Proc. Am. Acad. xii. 63. *F. acuminata*, var. *parvifolia*, Gray, Proc. Am. Acad. iv. 364. — New Mexico, and adjacent borders of Texas and Colorado, Fendler, Wright, Palmer, Brandegees.

Var. Arizónica. Young shoots and foliage soft-pubescent; only earliest leaves seen, those entire. — Near Prescott, Arizona, Palmer.

F. ligústrina, Poir. More or less pubescent with short spreading hairs: leaves obovate or oblong with narrowed base, short-petioled, appressed-serrulate, rounded at apex, usually an inch long: fertile flowers in simple fascicles: calyx almost obsolete: drupe short-ovoid, sessile: putamen smooth and even. — Gray, Proc. Am. Acad. iv. 364, partly. *Adelia ligus-*

trina, Michx. l. c., excl. hab. *Borya ligustrina*, Willd. l. c., but character wrongly altered, as also by Poiret, l. c. — Tennessee to Florida, &c., but not Illinois.

F. pubescens, Nutt. Soft-pubescent: fertile flowers and oblong drupes pedicellate: putamen striate: otherwise like the preceding. — Trans. Am. Phil. Soc. n. ser. v. 177. *F. ligustrina*, var. *pubescens*, Gray, l. c. — Florida, Arkansas, and Texas.

* * Leaves coriaceous (very small), not porulose.

F. sphærocárpa, Torr. Low shrub; leaves oblong or oval, obtuse, obscurely crenulate, minutely soft-pubescent, half inch long, short-petioled, mainly crowded at the tip of the branchlets: drupe globular, very short-pedicelled. — Bot. Mex. Bound. 168. — S. W. Texas, in dry ravines of the Rio Limpio, *Bigelow*.

* * * Leaves coriaceous, porulose-punctate beneath, often persistent until flowers develop in their axils, or even to the maturity of the fruit,

+ Their margins plane, often serrulate.

F. reticuláta, Torr., l. c. Glabrous throughout: leaves ovate or almost oblong, with rounded base and obtuse or acute mucronulate apex, short-petioled, firm-coriaceous, lucid above, conspicuously venulose-reticulated, an inch or more long: fascicles few-flowered and very short in the axils of persistent leaves: drupe short-ovoid. — Western borders of Texas, *Wright*, *Bigelow*, *Schott*.

+ + Margin of the leaves narrowly revolute, entire.

F. porulósa, Poir. Much branched shrub, glabrous: leaves thin-coriaceous, obovate-oblong to lanceolate, tapering at base into a short distinct petiole, obtuse or rounded at apex (one or two inches long), the scattered and spreading veins manifest: drupes short-oblong, short-pedicelled. — Gray, l. c., excl. vars. *Myrica segregata*, Jacq. Obs. ii. 273, & Ic. Rar. t. 625. *Adelia porulosa*, Michx. l. c. *Borya porulosa*, Willd. l. c. *Forestiera Jacquiniana*, Didrichson, Ind. Sem. Hamb. 1838, & Linn. xxvii. 737. — S. Florida: rare. (W. Ind.)

F. angustifólia, Torr. Densely branched and rather large shrub, glabrous: leaves firm-coriaceous, linear or spatulate-linear (6 to 12 lines long and 1 to 3 wide), sometimes linear-oblong (short and 4 lines wide), very obtuse, veinless or nearly so: flowers not rarely hermaphrodite, few in the close cluster: drupe ovate, acute, very short-pedicelled. — Bot. Mex. Bound. 168. *F. porulosa*, var. ? *angustifolia*, Gray, l. c. — Texas, from Matagorda Bay and New Braunfels southward to Mexico.

F. PHILLYREIOIDES, Torr. l. c. (*Piptolepis phillyreioides*, Benth. Pl. Hartw. 29), of Mexico (*Hartweg*, *Gregg*, &c.), appears to have leaves destitute of the pore-like punctuations, smaller than those of *F. porulosa*, but similar in form and venation, the lower face more or less pubescent, and the drupes oblong.

3. CHIONÁNTHUS, L. FRINGE-TREE. (From *χιών*, snow, and *ἄθος*, blossom, alluding to the snow-white and light clusters of flowers.) — Shrubs or low trees (the genuine species E. North American and Chinese); with simple and entire opposite deciduous leaves, and loose compound panicles of white flowers, in early summer, from the uppermost axils of the leaves of the preceding year. Petals sometimes nearly separate or separable, oftener united (but irregularly) to about twice the length of the small calyx, in cultivation occasionally 5 or 6. — Gray, Proc. Am. Acad. v. 231; Benth. & Hook. Gen. ii. 677.

C. Virginica, L. Somewhat pubescent: leaves oval or oblong, 3 to 6 inches long, short-petioled: panicles drooping, with very slender branches and pedicels and usually some foliaceous bracts: petals an inch long, acute: fruit black or bluish, with thin pulp, globular, half inch or more long. — (Catesb. Car. t. 68.) Lam. Ill. t. 9; Lodd. Bot. Cab. t. 1264. — Along streams, S. Pennsylvania to Florida and Texas.

4. HESPERELÆA, Gray. (*Εσπέρα*, evening or occidental, *ἐλαία*, the olive-tree.) — Proc. Am. Acad. xi. 83. — Single species.

H. Pálmeri, Gray. Small tree, glabrous: leaves opposite, entire, coriaceous, oblong, veiny: flowers sulphur-colored, crowded in a terminal compound panicle: pedicels short,

articulated: petals twice the length of the sepals: fruit not seen, but evidently drupaceous. — Guadalupe Island, off Lower California (beyond the limits of this Flora), *Dr. E. Palmer*.

5. OSMÁNTHUS, Lour. (From *ὄσμή*, odor, and *ἄνθος*, blossom, the flowers fragrant.) — Shrubs and small trees (of E. United States, Pacific Islands, and N. E. Asia); with evergreen chiefly opposite leaves, and small flowers in axillary clusters. Genus founded on the Chinese *O. fragrans*, cultivated as a house-plant for its deliciously fragrant small blossoms; now distinguished from *Olea* by the imbricated instead of valvate æstivation of the corolla. — Benth. & Hook. Gen. ii. 677.

O. Americanus, Benth. & Hook. (DEVIL-WOOD.) Tall shrub or small tree, glabrous: bark whitish: leaves firm-coriaceous, lanceolate-oblong, tapering into a short petiole, entire, bright green, shining above (3 to 6 inches long), much longer than the panicles of dull white (polygamous or even diœcious) flowers: drupe small, dark purple. — *Ligustrum laurifolio*, &c., Catesb. Car. i. 61, t. 61. *Olea Americana*, L. Mant. 24; Michx. Fl. ii. 222; Michx. f. Sylv. iii. t. 6. — N. Carolina to Florida near the coast: fl. spring.

6. MENODÓRA, Humb. & Bonpl. (*Μέρος*, force, and *δῶρον*, gift.) Low shrubby, suffruticose, or nearly herbaceous plants (American and one S. African); with simple entire or pinnately lobed leaves, many of them alternate, and conspicuous flowers terminating the branches, or becoming lateral, or sometimes loosely corymbosely cymose: fl. in spring or summer: corolla in ours yellow. — Pl. Æquin. ii. 98, t. 110; Gray in Am. Jour. Sci. ser. 2, xiv. 43; Benth. & Hook. l. c. *Bolivaria*, Cham. & Schlecht. in Linn. i. 207. *Calyptrospermum*, Dietr. Spec. i. 226.

§ 1. **BOLIVÁRIA**. Corolla with short or very short tube; its lobes blunt or hardly acute; the throat commonly bearded within: filaments filiform: anthers pointless. (§ *Bolivaria* & § *Menodora*, Gray, l. c.)

* Calyx-lobes rather short, 5 or 6, rarely some intermediate ones: leaves entire.

M. spinescens, Gray. Thorny shrub, 2 to 4 feet high, rigid, divergently branched, obscurely puberulent: leaves alternate, spatulate-linear and very small, commonly reduced to minute scales or scars on the main branchlets: flowers small, almost sessile, terminating short shoots: calyx-lobes a little shorter than the light yellow corolla, the oblong lobes of which (a line and a half long) are rather shorter than the funnelform tube: capsule of 2 almost separate and diverging obovoid divisions. — Proc. Am. Acad. vii. 388, & Bot. Calif. i. 471. — Nevada and adjacent borders of California, *Anderson, Cooper*.

M. scopária, Engelm. Shrubby at base, the slender branches herbaceous, glabrous or nearly so: leaves linear or lanceolate, entire; or the lower oblong or obovate, the upper mainly alternate: flowers sparsely corymbose, short-peduncled: calyx-lobes at first little longer than the tube of the almost rotate corolla (lobes of the latter ovate and 3 or 4 lines long): divisions of the capsule globular. — Bot. Calif. l. c. — S. E. California, Arizona, and adjacent parts of Mexico. Related to *M. integrifolia* of Buenos Ayres, and to the next.

* * Calyx-lobes 7 to 15, slender, linear or subulate: corolla nearly rotate, its obovate lobes much longer than the tube.

M. scábra, Gray. Herbaceous from a woody branching base, a span to a foot high, Flax-like, whole herbage or at least the lower part puberulent-scabrous: leaves mostly alternate, linear or the lower oblong, chiefly entire, 4 to 10 lines long: flowers rather numerous: peduncles remaining erect: lobes of the bright yellow corolla obovate, 3 or 4 lines long. — Am. Jour. Sci. l. c.; Torr. Pacif. R. Rep. vii. t. 7. — W. Texas to N. New Mexico and S. Arizona.

M. heterophýlla, Moricand. Nearly herbaceous, diffusely spreading, a span high, almost glabrous but roughish: leaves mostly opposite and pinnately 3-7-cleft or parted;

the lobes and uppermost leaves linear: flowers sparse: lobes of the corolla obovate, 3 to 5 lines long, light yellow, sometimes purplish outside: short peduncles recurved in fruit. — DC. Prodr. viii. 316; Gray, l. c. *Bolivaria Grisebachii*, Scheele in Linn. xxv. 254. — Dry or rich soil, Texas. (Adjacent Mex.)

§ 2. *MENODORÓPSIS*, Gray, l. c. Corolla salverform with a long tube, glabrous within; the oval or ovate lobes mucronate-acuminate: anthers almost sessile in the throat, apiculate: flowers vespertine, odorous, bright yellow: calyx with about 10 setaceous lobes, exceeding the fruit: habit of *M. scabra*.

M. longiflora, Gray. Glabrous, numerous almost simple herbaceous stems a foot or more high from a woody and branching base: leaves linear or lanceolate (an inch or less long), smooth, entire (or some of the lowest rarely 3-cleft), the upper commonly alternate: flowers several and cymose: tube of corolla $1\frac{1}{2}$ to 2 inches long, slightly widening to the summit; the lobes half an inch long. — Am. Jour. Sci. l. c. 45. — S. & W. Texas, *Lindheimer, Wright*.

M. púbens, Gray, l. c. Pubescent throughout with soft and spreading hairs: leaves rather broader: otherwise nearly resembling the preceding. — Valley of the Pecos, western part of Texas, *Wright*.

ORDER LXXXVII. APOCYNACEÆ.

Herbaceous or woody plants, with milky and mostly acrid juice, simple and entire pinnately-veined leaves, either alternate, opposite, or verticillate, no stipules, and perfect regular 5-merous flowers; the calyx free from the ovary or nearly so, imbricated in the bud and persistent; the lobes of the gamopetalous corolla convolute and often twisted in the bud; stamens as many as the corolla-lobes and alternate with them; anthers introrsely dehiscent; pollen of ordinary loose but often glutinous grains; two carpels either distinct or united into a 2-placentiferous ovary; a single common style, surmounted by a single stigma; the proper stigmatic surface a ring underneath a thickened or lengthened sterile terminal portion. Ovules few or numerous, amphitropous or sometimes anatropous. Seeds with or without a coma. Embryo straight and rather large, in sparing albumen. Anthers distinct, but connivent around the stigma, and not rarely adhering to it (by a process from the base of the connective). Inflorescence various: peduncles either terminal or axillary.

NERIUM OLEANDER, L., escaping from gardens and yards, inclines to be spontaneous in Florida and Louisiana.

THEVETIA NERIIFOLIA, Juss., of Tropical America, grows on Key West, doubtless introduced.

TRIBE I. *PLUMERIEÆ*. Anthers free (unconnected with the stigma); the cells polliniferous to the pointless and usually rounded base. Ovaries 2, connected only by the common (filiform) style. Corolla sinistrorsely convolute in the bud, in our genera unappendaged and salverform, with tube more or less dilated at summit. (Calyx in ours small, and anthers from ovate to oblong-lanceolate.)

* Anthers blunt, on very short filaments, inserted and included in the throat or enlarged summit of the tube of the corolla, which is villous or hispidulous: seeds not comose.

+ Disk none: leaves alternate.

1. *VALLESIA*. Corolla conspicuously constricted at the orifice. Stigma clavate or cylindrical. Carpels drupaceous in fruit, oblong or clavate and curved, 2-4-ovuled, 1-seeded. Seed erect: radicle inferior. Shrubs.

2. *AMSONIA*. Corolla slightly or decidedly constricted at the villous throat. Stigma girt underneath by a reflexed cup-like membrane; the apex truncate-capitate or didymous. Carpels many-ovuled, becoming slender terete and often torose follicles, erect, several-

seeded. Seeds cylindraceous or oblong, obliquely truncate at both ends, in a single row; the coat corky. Herbs.

+ + Disk of 2 oblong or linear glands alternate with the carpels: leaves opposite.

3. **VINCA.** Corolla callous-constricted at the orifice; the lobes broad. Stigma a viscid ring between a rotately dilated upper and a lower hairy or bearded sterile portion, the upper truncate and often 2-apiculate, the lower subtended by a reflexed membranous ring or cup. Carpels few-many-ovuled, in fruit narrow terete follicles. Seeds oblong, truncate, with rough-granulate coat. Radicle superior.

* * Anthers acute, inserted at or below the middle of the tube: disk none: seeds comose.

4. **HAPLOPHYTON.** Calyx 5-parted; the lobes linear-subulate. Corolla salverform with open throat; its tube about the length of the obovate lobes. Anthers short-sagittate with the short bases rounded. Style rather short: stigma cylindraceous, 2-lobed at apex, unappendaged. Follicles filiform, striate, several-seeded. Seeds linear-fusiform, fixed by the middle, sessile, furnished with a deciduous coma at both ends.

TRIBE II. ECHITIDÆ. Anthers with the cells produced into a sterile appendage at base, connivent around the stigma and adherent to it by a point at the base of the polliniferous portion. Ovaries 2, united only by the common style or stigma, in fruit follicles containing (at least in ours) comose seeds. Lobes of the corolla almost always dextrorsely convolute, and the leaves opposite. (Stamens in all ours included.)

* Calyx-tube by means of a thickish disk adnate to the back of the ovaries below: corolla appendaged within: style hardly any.

5. **APOCYNUM.** Calyx small, deeply 5-cleft. Corolla campanulate, 5-lobed, toward the base bearing 5 small triangular-subulate appendages alternate with the stamens and inserted rather higher. Stamens on the base of the corolla: filaments very short, broad: anthers sagittate, acute. Disk fleshy at base, the free summit 5-lobed. Stigma ovoid, obscurely 2-lobed. Follicles slender, terete. Seeds numerous, with a long coma at apex: albumen little.

* * Calyx wholly free: style filiform, girt below by a ring which is commonly extended into a reflexed entire or 5-lobed membranous cup or appendage, less conspicuous in no. 9: seeds numerous and comose at the apex.

+ Stems erect, not twining.

6. **CYCLADENIA.** Calyx 5-parted, naked within; the lobes slender. Corolla funnelform with dilated throat, in the base of which are 5 minute callous appendages, one behind each stamen; lobes ovate or obovate, not twisted in the bud. Stamens borne on the base of the dilated portion of the tube: anthers sagittate, on short filaments, the tips and the basal lobes slender-cuspidate. Disk an entire shallow cup encircling the base of the ovaries. Stigma capitate-5-angled and truncate, girt by a conspicuous 5-lobed reflexed membrane. Follicles lanceolate, turgid, smooth. Seeds ovate, narrowed at the apex under the copious coma.

7. **MACROSIPHONIA.** Calyx 5-parted, multiglandular at base within; the lobes slender. Corolla salverform, with a long tube and enlarged cylindraceous or funnelform throat; the lobes broad, dextrorsely convolute but sometimes sinistrorsely twisted in the bud, often crisped. Stamens borne in the throat: filaments short: anthers oblong or sagittate-lanceolate, mostly obtusely tipped, and the basal appendages obtuse. Disk of 5 fleshy and distinct or partly united scales. Stigma thickened and firm, 5-costate, with entire or 2-cleft small apex, the base appendaged with 5 reflexed lobes or a 5-cleft membrane. Follicles long and slender, terete. Seeds oblong.

+ + Stems twining, or at least sarmentose: calyx gland-bearing at base within: corolla wholly destitute of internal scales or appendages; the lobes usually more or less twisted (to the left, i. e. contrary to the overlapping) in the bud: filaments very short: disk mostly 5-lobed or of 5 glands: follicles long and slender.

8. **ECHITES.** Flowers comparatively large. Corolla salverform, funnelform, or with abruptly dilated campanulate throat. Appendage of the stigma conspicuous and reflexed, in the form of a reversed membranous cup or of 5 strong lobes. Inflorescence simple or nearly so.

9. **TRACHELOSPERMUM.** Flowers comparatively small. Corolla salverform or somewhat funnelform. Tips of the sagittate and gradually acuminate anthers sometimes exerted; the basal lobes acute. Apex of style more or less thickened or obconical under the narrow or inconspicuous ring of the stigma. Seeds linear, beakless. Inflorescence open-cymose.

1. **VALLÉSIA**, Ruiz & Pav. (*Francis Vallesio*, a Spanish physician.) — Glabrous shrubs; with alternate leaves, and small terminal or soon lateral cymes of small flowers. Calyx not glanduliferous within. — Prodr. Fl. Per. 28, t. 5. — The principal species is —

V. glábra, Cav. Leaves coriaceous and somewhat fleshy, shining, almost veinless, oblong or oblong-lanceolate, acute, short-petioled, about 2 inches long: corolla white, 3 lines long: drupes half inch long, dry, slender, often single. — Ic. iii. t. 297. *V. dichotoma*, Ruiz & Pav. (Fl. Per. ii. 26, t. 151) & *V. chiococcoides* (HBK.); A. DC. Prodr. viii. 349. — Key West, Florida. (W. Ind. to Lower Calif. and Chili.)

2. **AMSÓNIA**, Walt. (Dedicated to *Charles Amson*.) — Perennial herbs (E. North America and Japan); with very numerous membranaceous and alternate leaves, varying from ovate to linear, and rather compact small cymes of blue or bluish flowers in a terminal thyrsus: fl. spring and early summer. Inside of the tube of the corolla below the stamens beset with reflexed hairs. Liber of tough fibres, as in *Apocynum*, &c.

§ 1. Stigma with depressed-capitate or truncate entire apex: corolla not constricted under the limb: eastern species.

A. Tabernæmontána, Walt. About 3 feet high, glabrate: leaves from ovate to lanceolate, acuminate (2 to 5 inches long), distinctly petioled, pale beneath: calyx very small: corolla in the bud slender-beaked by the convolute limb; its lobes lanceolate, becoming linear and as long as the tube; the latter at first mostly villous at the enlarging summit: foliicles slender, 2 or 3 inches long. — Car. 98; A. DC. Prodr. viii. 385. (*Tabernæmontana Amsonia*, L.) *A. latifolia*, Michx. Fl. i. 121; Bot. Reg. t. 151. *A. tristis*, Smith in Rees Cycl. *A. salicifolia*, Pursh, Fl. i. 184; Bot. Mag. t. 1873; A. DC. l. c., with var. *ciliolata*. — Low grounds, N. Carolina and Illinois to Florida and Texas.

A. angustifolia, Michx. Stems (1 to 3 feet high) and commonly inflorescence and leaves (or at least their margins) when young villous with loose hairs, these deciduous: leaves much crowded, linear-lanceolate to narrowly linear (an inch or two long, half line to 4 lines wide), indistinctly petioled, the margins at length somewhat revolute: calyx small and short: corolla glabrous outside; its funnelform tube (3 or 4 lines long) little longer than the ovate-oblong or at length linear-oblong lobes: foliicles slender and even, 2 to 5 inches long. — Fl. i. 121; Pursh, l. c. *Tabernæmontana angustifolia*, Ait. Kew. ed. 1, i. 300 (1789). *Amsonia ciliata*, Walt. Car. (1788), 98; A. DC. l. c.; Chapm. Fl. 260; a deceptive specific name, and barely the older. — Dry soil, N. Carolina to Florida and Texas.

Var. Texána. A foot or two high from creeping woody subterranean shoots, completely glabrous: leaves of firmer texture, lanceolate-oblong to linear. — Texas, in rocky prairies and at the base of limestone hills, *Pope*, *Lindheimer*, *E. Hall*, &c.

§ 2. Stigma apiculate with two distinct obtuse lobes above the truncate body: tube of the corolla clavate, being constricted (at least in bud) under the conspicuously shorter limb: calyx deeply 5-parted into slender-subulate lobes (2 or 3 lines long): stems lower, more branching, and bearing smaller or simpler cymes: western species.

* Follicles torose, inclined to break into thickish articulations: corolla rather short.

A. brevifolia, Gray. About a foot high, glabrous: leaves thickish, ovate, varying above to lanceolate, nearly sessile by a narrowed base (8 to 18 lines long): lobes of the corolla ovate or becoming oblong, 2 or 3 lines long, nearly half the length of the tube; the throat bearded only within the constricted orifice: mass of the stigma between the ring and the apical lobes longer than wide: foliicles 2 or 3 inches long, thickish, irregularly moniliform, chartaceous, and disposed to break into one-seeded joints. — Proc. Am. Acad. xii. 64. — Southern Utah and W. Arizona to the border of California, *Mrs. Thompson*, *Parry*, *Palmer*.

A. tomentosa, Torr. A foot or more high, cinereous-tomentose or puberulent, varying to glabrous: leaves from lanceolate to narrowly linear, sessile: lobes of the corolla oblong,

2 or 3 lines long, fully half the length of the tube; orifice bearded: mass of the stigma between the ring and the lobes broader than high: follicles as in the preceding? — Frem. Rep. ed. 2, 316, & Bot. Mex. Bound. 158. — Sandy plains and ravines, W. border of Texas to S. Utah, *Fremont, Wright, Mrs. Thompson, &c.*

* * Follicles slender and continuous: tube of the corolla much longer than the lobes.

A. Palmeri, Gray. Glabrous or nearly so, a foot or two high: leaves narrowly lanceolate or linear, sessile ($1\frac{1}{2}$ to 3 inches long): clusters simple and few-flowered: lobes of the white corolla ovate, $1\frac{1}{2}$ to 2 lines long, about a quarter the length of the tube, which is reflexed-bearded within almost to the base: mass of the stigma didymous, puberulent, divided almost down to the ring. — Proc. Am. Acad. l. c. — Arizona, *Palmer*.

A. longiflora, Torr. Minutely scabrous or even scabrous-pubescent, or above glabrous: leaves linear, sessile ($\frac{1}{2}$ to 2 lines wide, 1 to 2 inches long): lobes of the corolla narrowly oblong, white, a quarter the length of the greenish-purple clavate tube; this over an inch long and glabrous within except toward the summit: body of the stigma trochleate, much longer than wide, surmounted by the small and short lobes. — Bot. Mex. Bound. 158. — Rocky ravines, W. Texas and New Mexico on the Rio Grande, and adjacent Mexico.

3. VÍNCA, L. PERIWINKLE. (Ancient Latin name, of obscure meaning.) — Flowers handsome, usually axillary. Juice hardly milky. — Two distinct subgenera: § 1. *PERVINCA*; herbaceous and procumbent or creeping Old World species, blue-flowered, anthers with wide connective, and carpels only 6–8-ovuled; includes *V. minor*, L., the common Periwinkle of the gardens and the related species. § 2. *LOCHNERA*, A.DC.; low and erect shrubby plants, with white or rose-colored corolla, anthers with narrow connective and carpels several-seeded; represented by the following species.

V. rósea, L. Low erect shrub, puberulent: leaves oblong, short-petioled: flowers almost sessile: tube of corolla an inch long, the narrowly dilated upper portion with a nectariferous pit (externally salient) behind each anther; the throat with a hairy ring over the tips of the stamens and a slighter one at the narrow orifice; lobes obovate, shorter than the tube, white with a pink eye, sometimes all rose-color or white, showy. — Bot. Mag. t. 248. — *Lochnera vincoidea*, Reichenb. — S. Florida: possibly native. Widely distributed as a weed in the tropics; cult. as a house-plant. (Trop. Amer.)

4. HAPLÓPHYTON, A.DC. (Composed of *ἀπλός*, simple, and *φῦτόν*, plant, alluding to the want of calycine glands and disk.) — DeCandolle was not aware of the double coma, and Benth. & Hook. (Gen. ii. 722) wrongly assign to it adnate anthers with empty tails, referring it to the *Echitideæ*. Single species.

H. cimícium, A.DC. Herbaceous or nearly so from a suffrutescent base, slender, a foot or two high, branching, somewhat cinereous-puberulent: leaves hispidulous-scabrous, opposite and alternate, lanceolate or ovate-lanceolate, short-petioled, an inch or two long: flowers terminating the branches, short-peduncled: corolla sulphur-color, half inch or more long; the lobes as long as the tube. — Prodr. viii. 412; Torr. Bot. Mex. Bound. 159. — S. Arizona, in crevices of rocks, *Wright, Schott, Thurber*. (Mex., Guatemala, Cuba.)

5. APÓCYNUM, Tourn. DOGBANE, INDIAN HEMP. (Ancient Greek name for Dogbane; *ἀπό*, far from, *κύων*, dog.) — Perennial herbs (of northern temperate zone), pale or glaucescent; the liber very tough-fibrous; and the leaves opposite, oval or oblong, mucronate-tipped. Flowers (in summer) small, in terminal minutely subulate-bracteate cymes, white or rose-color. Follicles 2 to 7 inches long, slender-pointed, often deflexed.

A. androsæmifolium, L. A foot to a yard high, glabrous, or rarely soft-tomentose, branched above: branches widely spreading: leaves ovate or roundish, distinctly petioled:

cymes loose, spreading, naked and mostly surpassing the leaves: corolla flesh-color, open-campanulate (3 or 4 lines long) with revolute lobes; the tube exceeding the ovate acute calyx-lobes. — Spec. i. 213; Lam. Ill. t. 176; Bot. Mag. t. 280; Bigel. Med. t. 36. — Borders of thickets, Canada to Georgia, New Mexico, California, and Brit. Columbia. Var. *incanum*, A.DC., is the downy-leaved form, not uncommon northward.

Var. *pumilum*, a very low and peculiar round-leaved form, common from California to Brit. Columbia.

A. cannábinum, L. Erect or ascending, glabrous or sometimes soft-pubescent: branches ascending, leafy to the top: leaves from oval to oblong and even lanceolate, from short-petioled to sessile, with a rounded or obscurely cordate base: cymes erect, densely flowered: corolla greenish-white or slightly flesh-color, smaller than in the preceding, with almost erect lobes, and tube not longer than the lanceolate calyx-lobes. — Spec. l. c.; Hook. Fl. t. 139; Gray, Man. ed. 5, 394. *A. hypericifolium*, Ait. Kew. ed. 1, i. 304; Hook. l. c. t. 140; form with mostly sessile and sometimes subcordate leaves. *A. Sibiricum*, Jacq. Vind. iii. t. 66. *A. pubescens*, R. Br. in Vern. Soc. i. 67; the downy form. — Moist grounds and banks of streams, same range as the preceding, and more southern; occurring in a much greater number of forms, hardly to be distinguished as named varieties.

6. CYCLADÉNIA, Benth. (*Κύκλος*, a ring, and *ἀδία*, gland, from the circular glandular disk around the pistil.) — Low perennial herbs (Californian); with a creeping rhizoma sending up a simple stem, hardly a span high, and bearing 2 or 3 pairs of opposite petiolate leaves, of a thickish texture, and one or two slender terminal or apparently axillary peduncles, with a few rose-purple flowers on slender pedicels, developed in spring. — Pl. Hartw. 322.

C. húmilis, Benth. Glabrous and green, or pruinose when young: leaves ovate or obovate, thickish, 1 to 3 inches long: calyx-lobes from lanceolate to nearly linear: corolla three-fourths inch long. — Yuba to Shasta Co., California, in the mountains, Hartweg, Brewer, &c.

C. tomentósa, Gray. Densely tomentose-pubescent throughout: leaves ovate and oblong, 2 or 3 inches in length: calyx hirsute. — Bot. Calif. i. 474. — Plumas Co., California, with the preceding, Lemmon.

7. MACROSIPHÓNIA, Muell. (Arg.) (*Μακρός*, long, and *σίφων*, tube, in reference to the corolla.) — Erect suffrutescent or more woody plants (of Mexico, Texas, and Brazil); with rather simple stems or branches, numerous opposite or sometimes verticillate leaves, and proportionally large showy flowers, either terminal or becoming lateral, on short peduncles or pedicels: the corolla commonly soft-puberulent or tomentose outside. Follicles erect. — Mart. Fl. Bras. vi. 137, t. 42, 43; Benth. & Hook. Gen. ii. 727. — Flowers in ours white or externally tinged with rose-color, vespertine, fragrant, in spring or summer; the leaves very short-petioled.

M. Berlandiéri. A foot or two high, shrubby, white-tomentose: leaves from oval or cordate-ovate to orbicular (an inch and more long), becoming greenish and merely pubescent above, the diverging veins at length conspicuous: corolla merely puberulent outside, its slender tube (with the cylindraceous-dilated throat) 3 to 5 inches long, many times exceeding the calyx and the round-obovate (nearly inch long) lobes. — *Echites macrosiphon*, Torr. Bot. Mex. Bound. 158, t. 43. — Rocky soil, W. Texas and adjacent parts of Mexico, Berlandier, Wright, Lindheimer.

M. Wrightii. Slender, branching, a foot high, soft-puberulent: leaves narrowly lanceolate, acute, white-tomentulose beneath, glabrous or nearly so above: tube of the corolla and its cylindraceous throat each half inch or more in length, tomentulose, the lobes half inch long. — W. Texas, in mountains beyond the Limpio, Wright.

M. brachýsiphon. A span to a foot high, branching, minutely puberulent, green or barely cinereous: leaves oblong or ovate, acute or mucronate-pointed, or some rounded at

the apex (half to barely an inch long): corolla minutely puberulent outside; its somewhat funnellform throat and the obovate lobes as well as the narrow tube each about half an inch in length. — *Echites brachysiphon*, Torr. l. c. — Southern New Mexico and Arizona, Wright, Schott, Thurber, Palmer, Rothrock.

8. ECHITES, P. Browne, L. (*Ἐχίτης*; is the serpent-stone; application to this genus obscure.) — Twining woody plants; with opposite leaves, and terminal or lateral peduncles, bearing racemosely or sometimes simply cymosely disposed flowers, of ample size; the corolla white, rose-color, or more commonly yellow. Nearly all tropical American, barely reaching the south-eastern shores of the United States, in three species belonging to as many genera of Mueller, hesitatingly adopted by Bentham; perhaps better as two, viz., the following, here arranged as subgenera.

§ 1. MANDEVILLEA. Corolla with cylindrical or cylindraceous tube abruptly dilated above into an inflated- or oblong-campanulate wide throat. — *Mandevillea*, Lindl. (*Amblyanthera*, Muell.), with *Rhabdadenia* & *Urechites*, Muell.

E. Andréwsii, Chapm. Glabrous or occasionally pubescent, low, usually twining: leaves oval or oblong, often mucronate (about 2 inches long): peduncles corymbosely 3-5-flowered: lobes of the calyx as long as the proper corolla-tube, linear-subulate: corolla yellow (2 inches long and the limb as broad); the much enlarged throat oblong-campanulate, hardly thrice the length of the narrow tube, little longer than the ovate spreading lobes: anthers abruptly produced at apex into a long linear-filiform appendage: seeds with a long filiform beak, the lower half of which is naked, the upper plumosely comose. — Fl. 359 (1860). *Echites suberecta*, Andr. Bot. Rep. t. 187; Sims, Bot. Mag. t. 1064, not Jacq. *E. neriandra*, Griseb. Fl. W. Ind. 415 (1864). *E. Catesbaei*, Don? *Neriandra suberecta*, A.DC. Prodr. viii. 422. *Urechites suberecta*, Muell. in Linn. xxx. 444, in part? — S. Florida and Keys, Blodgett, Palmer. — *E. suberecta*, Jacq. & Griseb., is hardly distinguishable except by the longer throat and shorter lobes of the corolla, and the unappendaged anthers! (W. Ind.)

E. Sagrei, A.DC. Much smaller than the preceding: leaves half to barely an inch long, the margins more revolute: peduncles longer than the leaves, somewhat racemosely flowered: calyx-lobes ovate-subulate and much shorter than the tube of the yellow (barely inch long) corolla, the lobes of which are half the length of the throat: anthers bluntish, unappendaged: beak of the seed plumosely-comose to the base. — Prodr. viii. 450; Griseb. l. c. *Rhabdadenia Sagrei*, Muell. l. c. 435. — Pine Key, Florida, Blodgett. (W. Ind.)

§ 2. EUECHITES, A.DC. Corolla truly salverform, i.e. cylindrical up to the limb, but the upper half (above the insertion of the stamens) abruptly somewhat larger. — *Echites* & *Stipecoma*, Muell.

E. umbellata, Jacq. Glabrous, twining: leaves ovate or oval (2 inches long), mucronate or short-pointed, slightly cordate: peduncles exceeding the leaves, somewhat umbellately 3-7-flowered: calyx short: corolla greenish-white, 2 inches long, narrow-tubular: the tube abruptly swollen a little below the middle, thence tapering upwards, 4 times the length of the roundish lobes: anthers rigid, slender-hastate, bluntish and unappendaged at tip: coma sessile on the top of the seed. — Amer. Pict. t. 29 (Catesb. Car. i. t. 58); Chapm. l. c.; Griseb. l. c. — S. Florida. (W. Ind.)

9. TRACHELOSPERMUM, Lemaire. (*Τράχηλος, σπέρμα*, i.e. seed with a neck: unhappily it has none or hardly any: the proposer, ignorant of this, gave the name in reference to *Rhynchospermum*.) — Twining shrubby plants; with oval or oblong opposite short-petioled leaves, and small or smallish flowers in terminal or lateral loose cymes: corolla white or greenish-white. — "Lemaire, Jard. Fleur. i. t. 61; Moore & Henfr. Mag. Bot. ii. 113;" Benth. & Hook. Gen.

ii. 720; name changed from *Rhynchospermum*, Lindl. (not Reinw., nor A.DC., nor is there a beak to the seed). *Parechites*, Miq., Gray in Mem. Am. Acad. vi. 403. To this (Japanese, Himalayan, and Malayan) genus is here referred, somewhat dubiously, the following.

T. diffôrme. Climbing 10 or 15 feet high, somewhat pubescent when young or glabrous: stems slender: leaves from ovate or oval to lanceolate, acuminate, membranaceous ($1\frac{1}{2}$ to 3 inches long): peduncles shorter than the leaves: flowers rather numerous in open cymes, short-pedicelled: corolla "greenish," 4 lines long; the ovate lobes much shorter than the cylindraceous tube with its considerably dilated throat: style obscurely dilated under the narrow membranous ring of the stigma: follicles long (6 to 9 inches) and slender.—*Echites diffôrme*, Walt. Car. 98; Bart. Fl. Am. Sept. i. t. 10. *E. puberula*, Michx. Fl. i. 120. *Forsteronia diffôrme*, A.DC. Prodr. viii. 437. *Secundatia*, Benth. & Hook. l.c. — Riverbanks, Virginia to Florida and Texas: fl. spring and summer.

ORDER LXXXVIII. ASCLEPIADACEÆ.

Characters of *Apocynaceæ* as to herbage and general structure of flowers and fruit; distinguished by the peculiar aggregation and cohesion of the pollen into granulose or waxy masses (pollinia), one or sometimes two in each anther-cell, and connected with the stigma or rather stigmatic disk in pairs or fours by means of 5 glands or corpuscles, which alternate with the anthers. Æstivation of the corolla often valvate or nearly so. A corona (crown) of five parts or lobes usually present between the corolla and the mostly monadelphous stamens, and adnate either to the one or the other. Hypogynous disk within the stamens none. Styles distinct up to the common stigmatic mass, or none. Fruit always of 2 follicles, or by abortion of one ovary solitary, several-many-seeded; the seeds almost always bearing a long and soft coma at the apex. Radicle superior. Stems herbaceous or merely shrubby, not rarely twining. Leaves almost always opposite or whorled, destitute of stipules. Inflorescence terminal, pseudo-axillary, or sometimes axillary, cymose, often umbelliform. Bracts small or minute. The tube of monadelphous filaments, commonly named *gynostegium* (a term which has been applied also to the anther-portion), we call the *column*.

PERÍPLOCA GRECA, L., a woody climbing plant of the Old World, in ornamental cultivation, and in one or two places inclined to be spontaneous, represents the tribe or suborder *Periploceæ*, with granulose pollen loosely aggregated in two masses in each anther-cell. All the American genera have a single firm-waxy pollen-mass to each anther-cell, i.e. they belong to the suborder *ASCLEPIADEÆ*.

TRIBE I. CYNANCHEÆ. Anthers tipped with an inflexed or sometimes erect scarious membrane; the polliniferous cells lower than the top of the stigma: pollinia suspended, attached in pairs (one of each adjacent cell of different anthers) to the corpuscle or gland.

* Crown (corona) or appendages to the corolla or andræcium none.

1. **ASTEPHANUS.** Calyx destitute of glands. Corolla urceolate or short-campanulate, 5-cleft; the lobes slightly and dextrorsely convolute: stamens inserted on the base of its tube. Top of the stigma obtusely conical or more elevated. Follicles smooth.

* * Crown double; the exterior annular, interior of 5 flat fleshy or hood-like scales or processes.

2. **PHILIBERTIA.** Calyx minutely 5-glandular within. Corolla open-campanulate or (in all ours) rotate; the lobes dextrorsely convolute, narrowly overlapping. Exterior crown a membranaceous ring adnate to the base of the corolla; interior of 5 scales adnate to the base of the usually very short stamen-tube or column. Top of stigma flat or unbonate, or with a short 2-cleft beak. Follicles rather thick, smooth, acuminate.

* * * Crown single, sometimes with accessory processes or denticulations alternate with the anthers: calyx 5-parted, mostly small, commonly bearing some minute glandular processes at base within.

+ Stems erect or merely decumbent, never twining: corolla rotate, 5-parted, dextrorsely valvate-convolute in the bud (the lobes obscurely or more manifestly overlapping by their edges, or at least by their tips): body of the stigma 5-angular or 5-lobed, flat-topped: crown consisting of distinct cucullate or hollowed nectariferous appendages (*cuculli* or *hoods*), one opposite each anther: anthers margined with mostly corneous and salient wings.

++ Hoods remote from the anthers, at the base of the long column.

3. **PODOSTIGMA.** Corolla oblong-campanulate, 5-parted nearly to the 5-angular base; the lobes erect, oblong, obtuse. Hoods of the crown short, somewhat incurved, and the margins involute, forming pitcher-shaped nectariferous bodies. Column (and enclosed styles) slender, almost as long as the corolla: five small processes under and alternating with the short anthers. Wings of the latter widening downward to the truncate acute-angled base. Follicles linear-fusiform, unarmed.

++ ++ Hoods approximate to the anthers: corolla in anthesis patent or reflexed.

= Hoods cristate- or corniculate- appendaged within.

4. **ANANTHERIX.** Corolla reflexed in anthesis. Column under the hoods very short but distinct. Hoods as long as the corolla and far longer than the anthers, ascending, oblong-clavate with incurved summit, mainly solid, with narrow bilamellate ventral margin widening to and rounded at the summit, there enclosing a narrower and pointless lamelliform crest. Anthers of membranous texture throughout; their papery (instead of corneous) wings much broadened downward and horizontally truncate at base. Caudicles almost capillary, more than double the length of the oblong pollinia! Leaves opposite.

5. **ASCLEPIODORA.** Corolla rotate-spreading in anthesis. Hoods basilar, inserted over the whole very short column, spreading and arcuate-assurgent, little surpassing the anthers, slipper-shaped and the rounded apex fornicate, hollow and with a thickish fleshy back, traversed (at least the upper part) by a salient crest which near the apex divides the cavity. Anther-wings (corneous) narrowed at base, angulate above the middle if at all. Caudicles shorter than the pyriform pollinia. Leaves commonly alternate.

6. **ASCLEPIAS.** Corolla almost always reflexed in anthesis. Hoods involute or complicate, not fornicate, bearing a horn or crest-like (pointed or rarely pointless) process from the back or toward the base within, either sessile next the corolla or elevated on a column which is shorter than the anthers. Corneous anther-wings widening down to the base, usually triangular, the salient base being truncate or semihastate, or not rarely broadly rounded. Leaves opposite, sometimes varying to alternate or verticillate.

= = Hoods wholly destitute of crest or appendage within: corolla reflexed in anthesis.

7. **ACERATES.** Hoods involute-concave or somewhat pitcher-shaped. Anther-wings widened or angulate if at all near or above the middle, thence narrowed to the base. Otherwise as *Asclepias*. Leaves prevailingly alternate or scattered.

8. **SCHIZONOTUS.** Hoods saccate, dorsally bivalvular, cleft posteriorly from apex to base, the ventral side adnate to the whole length of the column. Leaves opposite. Anthers, &c., of *Acerates*.

9. **GOMPHOCARPUS.** Hoods various, open ventrally or at the top. Anthers, &c., of *Asclepias*.

+ + Stems twining (at least in ours): corolla 5-parted or deeply cleft: crown of distinct or united plane or concave processes, or rarely cup-shaped.

++ The 5 divisions abruptly pointed, 2-3-lobed or appendaged at the apex.

10. **ENSLENIA.** Corolla erect-campanulate; lobes ovate-lanceolate, slightly dextrorse-overlapping in the bud. Crown nearly sessile at base of the anthers; its divisions distinct, thin, oblong, the abrupt or truncate apex bearing a long-ligulate or awnlike (single or) double appendage. Pollinia elliptical. Stigma with an elevated 2-lobed tip. Anther-wings, follicles (smooth, ovate), seeds, &c., nearly of *Asclepias*.

11. **ROULINIA.** Corolla rotate-spreading. Crown 5-parted; its divisions simply and abruptly acuminate or ligulate-tipped. Anther-wings tuberculiform and short. Stigma flat-topped. Otherwise nearly as the preceding.

++ ++ Divisions or lobes of the crown not tipped with any appendage or prolonged middle lobe: follicles smooth.

12. **METASTELMA.** Calyx short and the lobes obtuse. Corolla usually campanulate, 5-cleft or 5-parted; the lobes strictly valvate in the bud, commonly papillose-puberulent

or bearded within. Crown of 5 flat or slender and distinct scales or processes, borne either on the corolla or the column. Stigma with flat top or with a mere apiculation at the centre.

13. **MELINIA**. Calyx-lobes narrow and acute. Corolla with thin-edged lobes slightly overlapping in the bud. Crown of 5 distinct fleshy scales at the base of the column. Stigma abruptly long-rostrate, the beak entire.
14. **VINCETOXICUM**. Corolla rotate or somewhat campanulate, 5-parted; the lobes dextrorsely overlapping or nearly valvate in the bud. Crown on the short column or at its junction with the corolla, cup-shaped or annular and usually 5-10-lobed or parted, or of 5 distinct plane scales, not appendaged. Stigma with flat or obtusely conical top.

TRIBE II. GONOLOBEÆ. Anthers usually with short if any scarious tip, and borne on the margin of or close under the disk of the stigma; the cells opening more or less transversely. Pollinia horizontal or nearly so, otherwise as in the preceding tribe, but usually smaller.

15. **GONOLOBUS**. Corolla rotate or rarely campanulate, 5-parted or 5-lobed; the lobes dextrorsely convolute in the bud: crown annular or cupulate, entire or lobed, rarely divided. Stigma flat-topped.

1. **ASTÉPHANUS**, R. Br. (*Ἀστέφανος*, crownless.) — Slender and small-flowered herbaceous or suffrutescent plants, chiefly of the southern hemisphere. — Benth. & Hook. Gen. ii. 747.

A. Utahensis, Engelm. Perennial from a thick root, low, nearly glabrous: stems filiform, twining: leaves filiform-linear, acute: short peduncles umbellately 3-5-flowered: corolla dull yellow, little longer than the calyx, campanulate (a line high and wide); the lobes ovate, somewhat cucullate with points inflexed, papillose-puberulent internally: foli-les long-acuminate: surface of the seed rough-granulate. — Am. Naturalist, ix. 349. — Dry sandhills, St. George, S. Utah, *Parry*. Hardyville, Arizona, *Palmer*.

2. **PHILIBÉRTIA**, HBK., Benth. & Hook. (*J. C. Philibert*, author of some French elementary botanical works.) — Perennial herbaceous or shrubby twining plants (of warmer N. and S. America); with petiolate leaves, and usually dull-colored or parti-colored fragrant flowers: peduncles umbellately several-many-flowered: fl. summer. — Benth. & Hook. Gen. ii. 750. *Sarcostemma*, as to spec. Amer., HBK., Decaisne in DC., &c. Corolla in our species deeply 5-cleft or parted (= *Sarcostemma*, HBK.), the lobes commonly ciliate.

* Column manifest, rather longer than the tumid scales of the inner crown on its summit.

P. unduláta, Gray. Low-twining, glabrous or cinereous-puberulent, pale: leaves thickish, from lanceolate and gradually acuminate to linear from a hastately cordate base (2 or 3 inches long), the margins undulate-erisped: peduncle 6-10-flowered, longer than the petiole and pedicels: corolla dull purple, glabrous above, half inch in diameter; the lobes ovate; outer crown saucer-shaped: follicles 4 or 5 inches long. — Proc. Am. Acad. xii. 95. *Sarcostemma undulata*, Torr. Bot. Mex. Bound. 161. — W. Texas and New Mexico, *Parry*, *Bigelow*, *Wright*, &c.

* * Column none or very short and inconspicuous: peduncles about equalling or surpassing the plane leaves: follicles tomentulose or glabrate.

P. Torreyi, Gray. Freely twining, densely pubescent with soft spreading hairs: leaves cordate-lanceolate and acuminate or sagittate, an inch or more long: peduncle 10-15-flowered: corolla apparently white, two-thirds to three-fourths inch in diameter; the lobes little shorter than the pedicel, broadly ovate, obtuse, externally puberulent, strongly villose-ciliate, outer and inner crowns contiguous. — Proc. Am. Acad. xii. 94. *Sarcostemma elegans*, Torr. l. c., not Decaisne. — Rocky hills, S. W. Texas, on the Rio Grande and its tributary the Cibolo, *Parry*, *Bigelow*. — *P. elegans* is less pubescent, with smoother corolla purple in part within, the lobes narrower, and a short column developed between the thick and prominent outer crown and the inner.

P. cynanchoides, Gray, l. c. Tall-climbing (8 to 40 feet), glabrous or glabrate: leaves from deeply cordate to sagittate or almost hastate, abruptly cuspidate or short-acuminate,

1 to 2½ inches long: peduncle 15-25-flowered: pedicels filiform and much longer than the flowers: corolla white or whitish, scarcely half inch in diameter, smoothish; the lobes oblong-ovate, acutish, somewhat ciliate: crowns separated by a very short column. — *Sarcostemma cyanchoides*, Decaisne in DC. Prodr. viii. 541. *S. bilobum*, Torr. l. c., not Hook. & Arn. ? *Gonolobus viridiflorus*, Torr. in Ann. Lyc. N. Y. ii. 219, not Nutt., and probably not from "St. Louis." — Along rivers, Texas to S. Utah and Arizona. (Adjacent Mex.)

P. lineáris, Gray, l. c. Slender, low twining or when young erect, puberulent or glabrate: leaves narrowly linear, acute or nearly so at both ends, short-petioled (an inch long): peduncle exceeding the leaves, 8-10-flowered: corolla yellowish, purplish, or whitish, barely puberulent, a third inch in diameter; the lobes ovate: crowns contiguous. — *Sarcostemma lineare*, Decaisne, l. c., & in Pl. Hartw. 25. — S. Arizona. (Mex.)

Var. hirtélla. Cinereous-pubescent throughout with short spreading hairs, little climbing: leaves as in the original species in form and size: sepals more slender. — *Sarcostemma heterophyllum*, var. *hirtellum*, Gray, Bot. Calif. i. 478. — Fort Mohave, California, on sandy river-banks, Cooper, &c. Hardyville, Arizona, Palmer.

Var. heterophýlla. More twining, glabrous, merely puberulent or above pubescent: leaves 1 or 2 inches long, 1 or 2 lines wide, some tapering into the petiole, some with rounded and more with somewhat dilated or auriculate-cordate or truncate base: corolla smoother, half inch in diameter. — *Sarcostemma heterophyllum*, Engelm. in Torr. Pacif. R. Rep. v. 363, & Bot. Mex. Bound. l. c. (with var. ?); Gray, Bot. Calif. l. c. — California, from San Luis Rey, San Diego, &c. to Arizona.

P. viminális, Gray, l. c. Glabrous or nearly so, freely twining: leaves thickish, from ovate-oblong to lanceolate, cuspidate-acuminate, obtuse or rounded at base, short-petioled (an inch or two long), shorter than the many-flowered peduncle: corolla half an inch or more in diameter, white; the lobes ovate, puberulent outside. — *Asclepias viminalis*, Swartz, Prodr. 53; Willd. Spec. i. 1270 (Sloane, Jam. t. 131, f. 1). *Sarcostemma Brownii*, G. F. Meyer, Fl. Essq. 139; Griseb. Fl. W. Ind. 419. *S. clausum*, Decaisne, l. c. *S. crassifolium*, Chapm. Fl. 368. — Keys of Florida. (W. Ind. to Guiana.)

3. PODOSTÍGMA, Ell. (Πούς, ποδός, foot, and στίγμα, i. e. stalked stigma.) — Sk. i. 326. *Stylandra*, Nutt. Gen. i. 170. — Single species.

P. pubéscens, Ell. l. c. Perennial herb, a span to a foot high from a thickened root: stem erect, simple or sparingly branched: leaves opposite, linear-lanceolate, nearly sessile: peduncles terminal and axillary, short, umbellately several-flowered: flowers greenish-yellow, fragrant, 4 lines long: follicles tomentulose. — Deless. Ic. v. t. 65; Chapm. Fl. 366. *Asclepias pedicellata*, Walt. Car. 106. *Stylandra pumila*, Nutt. l. c. — Low pine barrens, N. Carolina to Florida: fl. summer.

4. ANÁNTHERIX, Nutt. (Composed of α, privative, and ἀνθήριξ, awn, i. e. destitute of the horn of *Asclepias*.) — Single species, being *Anantherix*, Nutt. Gen. i. 169, not of Trans. Am. Phil. Soc. ser. 2, v. 201, except as to the first species.

A. connívens, Gray. Stem erect, 2 feet high from a perennial root, minutely pubescent above: leaves opposite, sessile, oblong (1½ to 2½ inches long), or the uppermost small and lanceolate, transversely veined, rather fleshy: umbels 2 to 6 along the naked summit of the stem, several-flowered: lobes of the greenish corolla ovate, 5 lines long: hoods whitish, incurved-conniving over the stigma; a pair of small and narrow internal appendages before the base of each: hyaline anther-tips elongated: follicles not seen. — Proc. Am. Acad. xii. 66. *Asclepias connivens*, Baldw. in Ell. Sk. i. 320 (1817). *Anantherix viridis*, Nutt. Gen. l. c. (1818), but not *Asclepias viridis*, Walt. *Acerates connivens*, Decaisne in DC. Prodr. viii. 521. — Wet pine barrens of Georgia and Florida: fl. summer.

5. ASCLEPIODÓRA, Gray. (Ἀσκληπιός and δῶρον or δωρεά, the gift of *Asclepias*.) — Perennial herbs (of Atlantic N. America), rather low and stout, often decumbent; distinguished from *Asclepias* by the anther-wings and hood, the latter with a crest answering to the horn of that genus, from the original *Anan-*

therix by the same characters. Leaves mainly alternate or scattered. Flowers proportionally large: corolla-lobes ovate, greenish. Follicles ovate or oblong and acuminate, usually bearing some scattered soft-spinulose projections, arrect on recurved or sigmoid pedicels.—Proc. Am. Acad. xii. 66. *Anantherix* in part, Nutt. in Trans. Am. Phil. Soc. l. c. *Acerates* in part, Decaisne, l. c.

A. viridis, Gray, l. c. About a foot high, almost glabrous, very leafy to the top: leaves from ovate-oblong to oblong-lanceolate, mostly obtuse, short-petioled, 3 or 4 inches long: umbels few and corymbose or clustered, sometimes solitary: corolla globular-ovate in bud; the lobes a third to half inch long: hoods purplish or violet, about half the length of the corolla-lobes, lower than the anther-column: wings of the anthers narrow, hardly angulate above, and below less prominent than the connectives: pollinia narrow, little longer than their caudicles.—*Asclepias viridis*, Walt. Car. 107. *Podostigma? viridis*, Ell. Sk. i. 327. *Anantherix paniculatus*, Nutt. Trans. Am. Phil. Soc. l. c. *A. Torreyanus*, Don, Syst. iv. 146. *Asclepias longipetala*, Scheele in Linn. xxi. 757. *Acerates paniculata*, Decaisne, l. c. 521.—Prairies and dry barrens, S. Carolina to Texas, New Mexico, and westward of the Alleghanies north to Illinois.

Var. angustior, a lower form, with smaller and oblong-linear leaves, and rather more assurgent hoods.—*Anantherix paniculatus*, var. *angustior*, Engelm. ined.—Texas, Lindheimer, E. Hall.

A. decumbens, Gray, l. c. Scabrous-puberulent: leaves firmer in texture, from lanceolate to linear, tapering to the apex: umbel solitary: corolla depressed-globular in bud, 4 or 5 lines long, hardly twice the length of the yellowish or dark-purplish hoods, which overtop the somewhat depressed anther-column: anther-wings salient, especially at the broader and strongly angulate upper portion: pollinia pyriform, short-caudicled.—*Anantherix decumbens*, Nutt. l. c. (& in Torr. Ann. Lyc. N. Y. ii. 219, without name).—*A. Nuttallianus*, Don, Syst. iv. 147. *Acerates decumbens*, Decaisne, l. c. *Asclepius brevicornu*, Scheele, l. c. 756.—Dry plains, Arkansas and Texas to New Mexico and Utah. Follicles always smooth? (Adjacent Mex.)

6. ASCLÉPIAS, L. MILKWEED, SILKWEED. (The Greek name of *Æsculapius*, applied by the ancient herbalists to various plants of the present and the preceding order.)—Herbs, rarely woody at base (American, mainly North American with one or two African): upright or merely spreading stems from deep and thickish perennial roots: leaves opposite varying to verticillate, or sometimes alternate or irregularly scattered. Flowers (in summer) umbellate; the peduncles terminal and lateral, usually between the petioles. Stem often marked with decurrent lines of pubescence. Follicles soft-echinate or warty in two or three species, otherwise naked. Coma of the seeds often wanting in *A. perennis*. Corolla not reflexed in *A. Feayi*.—Benth. & Hook. Gen. ii. 754; Gray, Proc. Am. Acad. xii. 66.

§ 1. Hoods sessile, broader or at least not attenuate at base; the horn or crest various, but conspicuous: anther-wings broadest and usually angulate-truncate and salient at base.

* Corolla and hoods orange-color: follicles arrect on a deflexed fruiting pedicel, naked: leaves mostly irregularly alternate, seldom truly opposite: juice of stem not milky!

A. tuberósa, L. (BUTTERFLY-WEED, PLEURISY-ROOT.) Hirsute or roughish-pubescent, a foot or two high, very leafy to the top: leaves from lanceolate-oblong to linear-lanceolate, sessile or slightly petioled: umbels several and mostly cymose at the summit of the stem, short-peduncled: column short: hoods narrowly oblong, erect (2 or 3 lines long), deep bright orange, much surpassing the anthers, almost as long as the purplish- or slightly greenish-orange oblong corolla-lobes, nearly equalled by the filiform-subulate horn: follicles cinereous-pubescent.—(Dill. Elth. t. 30, f. 34.) Bot. Reg. t. 76; Bart. Med. t. 22; Bigel. Med. t. 26. Dry and especially sandy soil, Canada to Florida, Texas, and Arizona.

Var. decumbens, Pursh, a form with reclining stems, broader and more commonly opposite leaves, and umbels from most of the upper axils, racemously disposed. — *A. decumbens*, L. Spec. 216; Sweet, Br. Fl. Gard. ser. 2, t. 24, but flowers too red. — Ohio to Georgia, &c. (A hybrid between *A. tuberosa* and *A. incarnata* was found in South Carolina by Dr. Mellichamp.)

* * Corolla bright red or purple: follicles naked, fusiform, arrect on the deflexed fruit-bearing pedicel, except in the first and last species: leaves opposite, mostly broad. (*A. quadrifolia* might be sought here.)

— Hoods bright orange, raised on a distinct column: plants glabrous.

A. Curassávica, L. A foot or two high, becoming somewhat woody at base: leaves oblong-lanceolate, thin, short-petioled, 2 to 4 inches long: peduncles not longer than the leaves: lobes of the scarlet corolla ovate: hoods ovate, equalling the anthers, shorter than their subulate incurved horn: follicles and fruiting pedicels erect. — (Herm. Par. t. 36; Dill. Elth. t. 30, f. 33.) Bot. Reg. t. 81. — S. Florida and Louisiana: perhaps introduced from Tropical America.

A. paupércula, Michx. Stem 2 to 4 feet high, remotely leafy above or naked at the peduncle-like summit, which bears solitary or few pedunculate naked umbels: leaves elongated-lanceolate or linear and tapering to both ends, 4 to 10 inches long, nearly sessile, thickish, very smooth except the roughish margins: flowers rather few (5 to 12) in the umbels, large (fully half inch long when the narrowly oblong lobes of the deep red corolla are reflexed): bright orange hoods obovate or broadly oblong, not twice the length of the anthers, much exceeding the incurved horn. — *A. lanceolata*, Walt. Car. 105. — Marshes near the coast, New Jersey to Florida and Texas.

— Hoods purple or purplish: umbel mostly many-flowered.

++ Flowers rather large; the hoods about a quarter inch long and double the length of the anthers: lobes of the corolla dull-colored outside, deep-colored within: leaves transversely veined, 3 to 8 inches long.

A. rúbra, L. Glabrous, 1 to 4 feet high, somewhat remotely leafy: leaves from ovate to lanceolate, sessile or almost so, tapering from near the rounded or obscurely cordate base to an acuminate apex, bright green: umbels solitary (terminal and from the uppermost axils) or 2 to 4 raised on a naked common peduncle: corolla-lobes and hoods lanceolate-oblong, purplish-red, or the hoods obscurely orange-tinged; the horn of the latter long, very slender, straightish: column short but manifest. — Spec. 217 (founded on pl. Clayt. no. 263, Gronov. Fl. Virg., with upper leaves accidentally alternate); Gray, in DC. Prodr. & Man. ed. 1, 368. *A. polystachia*, Walt. ? *A. cordata*, Walt. ? *A. laurifolia*, Michx. Fl. i. 117. *A. acuminata*, Pursh, Fl. i. 182. *A. periplocifolia*, Nutt. Gen. i. 167. — Moist grounds, New Jersey and Penn. to Florida and Louisiana.

A. purpuráscens, L. Stem 1 to 3 feet high, leafy to top: leaves ovate-oval or oblong, short-petioled, tomentulose beneath, soon glabrous above: peduncles shorter than the leaves: corolla dark and deep (sometimes dull) purple within; the lobes oblong: hoods pale red or purple, oblong or somewhat ovate; the horn short-subulate from a broad base, falcate-recurved: column extremely short. — Spec. 214 (Dill. Elth. 32, t. 28, f. 31); Willd. Spec. i. 1265; Decaisne in DC. viii. 464; Torr. Fl. N. Y. ii. 120, t. 85. *A. amœna*, L. Spec. 217 (pl. Dill. 1. c. 31, t. 27, f. 30); Michx. l. c.; Sweet, Brit. Fl. Gard. ser. 2, t. 82. — Dry ground, New England to Wisconsin and Tennessee. Habit of *A. Cornuti*.

++ ++ Flowers small; the hoods a line long and equalling the anthers: veins of the leaves ascending: milky juice scanty.

A. incarnáta, L. Nearly glabrous or a little pubescent: stem 2 or 3 feet high, very leafy to the top, sometimes branching: leaves oblong-lanceolate, short-petioled (3 to 5 inches long), obtuse or acutish at base: peduncles somewhat corymbose at or near the summit of the stem, shorter than the leaves: corolla from deep rose-purple to flesh-color; the lobes oblong (2 lines long): column narrow, more than half the length of the broadly oblong obtuse pale hoods; these a little exceeded by their slender uncinat-incurved horn: follicles only 2 or 3 inches long, erect on erect pedicels. — (Cornuti, Canad. t. 93.) Jacq. Vind. t. 107; Bot. Reg. t. 250; Decaisne, l. c. excl. syn. in part. *A. amœna*, Brongn. in Ann. Sci. Nat. xxiv. t. 13, anal. — Swamps, Canada to Saskatchewan and Louisiana.

Var. púlchra, Pers., the form with copious and somewhat hirsute pubescence, and usually broader leaves (lanceolate to oblong) often subcordate at base. — *A. incarnata*, L.

as to Hort. Cliff.; Michx. l. c. *A. pulchra*, Ehrhart; Sweet, Brit. Fl. Gard. ser. 2, t. 18. — With the smooth form.

Var. longifolia. Leaves elongated- or linear-lanceolate, 4 to 7 inches long, a third to half inch wide, glabrous or with minute pubescence: stems 4 to 6 feet high: flowers paler. — *A. tuberosa*, Torr. in Pacif. R. Rep. vii. 18. — Texas to New Mexico.

* * * Corolla and crown greenish, yellowish, white, or merely purplish-tinged: leaves opposite or sometimes whorled, or the upper rarely alternate or scattered.

+ Follicles echinate with soft spinous processes and densely tomentose, large (3 to 5 inches long) and ventricose, ovate and acuminate, arrect on deflexed pedicels: leaves large and broad, short-petioled, transversely veined: stems stout and simple, 2 to 5 feet high.

A. speciosa, Torr. Finely canescent-tomentose, rarely glabrate with age: leaves from subcordate-oval to oblong, thickish: peduncles shorter than the leaves: pedicels of the many-flowered dense umbel and the calyx densely tomentose: flowers purplish, large: corolla-lobes ovate-oblong, 4 or 5 lines long: hoods 5 or 6 lines long, spreading, the dilated body and its short inflexed horn not surpassing the anthers, but the centre of its truncate summit abruptly produced into a lanceolate-ligulate thrice longer termination: column hardly any: wings of the anthers notched and obscurely cernicate at base. — Ann. Lyc. N. Y. ii. 218. *A. Douglasii*, Hook. Fl. ii. 53, t. 142, & Bot. Mag. t. 4413. — Along streams, Nebraska to Arkansas, and west to S. Utah, California, and Washington Territory.

A. Cornuti, Decaisne. (COMMON MILKWEED.) Finely soft-pubescent or tomentulose: leaves green and early glabrate above, oval or oblong, obtuse or roundish at base: peduncles little longer than the very numerous pubescent pedicels: corolla dull purple or greenish-purple, rarely almost white; the lobes ovate, three or four lines long: hoods whitish, ovate, rather longer than the anthers, with a tooth on each side below the middle; the subulate horn short and incurved: column short. — Prodr. l. c. 564; Torr. Fl. N. Y. ii. 119. *A. Syriaca*, L. (Cornuti, Canad. t. 90); Spenner in Nees Gen. Germ. fasc. 21, t. 1-3. — Canada to Saskatchewan and N. Carolina, chiefly in fields.

+ + Follicles minutely warty-echinate along the tapering apex, otherwise as in the succeeding: wings of the anthers emarginately bicorniculate at base.

A. Sullivantii, Engelm. Glabrous throughout, a yard high, leafy to the top: leaves opposite, thickish, oblong, with subcordate or rounded base, nearly sessile (4 or 5 inches long): umbels terminal and from the uppermost axils, short-peduncled, rather many-flowered: flowers flesh-colored: corolla-lobes oval, 5 lines long: column short: hoods oval, with a gibbosity on each side near the base, almost truncate at summit, a third longer than the anthers; the falcate-subulate horn rising from near the base, horizontally and slightly exerted from the middle. — Gray, Man. ed. 1, 366, ed. 5, 395. — Low grounds, Ohio (*Sullivant*) to Kansas (*Fremont*). Follicle 3 to 5 inches long, ovate-lanceolate, nearly glabrous, smooth, except small and soft conical warty processes scattered along the beak.

+ + + Follicles wholly unarmed and smooth throughout, either glabrous or tomentulose-pubescent.

+ + Arrect or ascending on the deflexed or decurved fructiferous pedicels.

= Umbel solitary on the perfectly simple strict stem, elevated on a naked terminal peduncle: leaves all closely sessile, broad, transversely veined: plant glabrous and pale or glaucous: follicles fusiform: anthers either bicorniculate or salient-angled at base of the wing.

A. obtusifolia, Michx. Stem 2 or 3 feet high: leaves undulate, oblong or elliptical, 3 to 5 inches long, with rounded or retuse apex and cordate-clasping base: peduncle 2 to 12 inches long: umbel loosely many-flowered: corolla dull greenish-purple; the lobes oblong, 4 lines long: column as high as broad: hoods flesh-color, erosely truncate and somewhat toothed at the broad summit, hardly exceeding the anthers, shorter than the falcate-subulate incurved horn: anther-wings bicorniculate at base in the manner of *A. Sullivantii*. — Fl. i. 113; Decaisne, l. c. 565. *A. purpurascens*, Walt. Car. 103. — Dry or sandy soil, New England to Florida, Texas, and Nebraska.

A. Meadii, Torr. A foot or two high: leaves plane and even, ovate-lanceolate, or rarely lanceolate, obtuse or acute, rounded at the sessile base, rough-margined, $1\frac{1}{2}$ to 3 inches long: peduncle 2 to 4 inches long: umbel 6-20-flowered: corolla greenish-yellow: the lobes ovate, 3 or 4 lines long: column very short: hoods purplish, with rounded-truncate entire summit and a tooth at the inner margins, exceeding the anthers and the subulate inflexed horn: anther-wings with entire but descending salient angle at base. — Gray, Man. ed. 2, addend. 704, ed. 5, 397. — Dry ground, Illinois, *S. B. Mead*, Iowa, *Vasey*, &c.

= = Umbels usually more than one and on peduncles overtopping or equalling the leaves: stem tall and simple: leaves broad, resembling those of the three preceding species.

A. glaucéscens, HBK. Glabrous up to the peduncles, and inclined to be glaucous: leaves as of *A. obtusifolia*, but only slightly undulate, $2\frac{1}{2}$ to 4 inches long: umbels 2 to 4 or rarely solitary, many-flowered: pedicels pubescent or villous, rather short: corolla greenish-white; the lobes ovate, 3 or 4 lines long: column very short: hoods obovate-truncate, about equalling the anthers, with fleshy gibbous-incurved back and (white?) petaloid sides, the whole length within occupied by a broad and thin crest, which is 2-lobed at the summit, the outer lobe broad and rounded, the inner a short and triangular-subulate nearly included horn. — Nov. Gen. & Spec. iii. 290, t. 127; Decaisne in DC. l. c. 565. *A. Sallivantii*, Torr. Bot. Mex. Bound. 162, wholly? — S. W. Texas and New Mexico (but the only specimen in herb. Torr. from "Plains near the Rio Limpio"), *Bigelow*. (Mex.)

= = = Umbels more than one, on peduncles longer than the orbicular leaves or than the much abbreviated stem.

A. nummulária, Torr. Clustered stems an inch or two high: leaves in 2 or 3 approximated pairs, orbicular, mucronate, thickish, canescently tomentose, glabrate with age: peduncles $1\frac{1}{2}$ to 2 inches long, many-flowered: corolla greenish-white; the lobes ovate, 2 lines long: column hardly any: hoods ovate, a little longer than the anthers: the horn short and stout: follicles ovate-lanceolate, tomentulose. — Bot. Mex. Bound. 163, t. 45. — New Mexico, *Bigelow*, *Thurber*, &c. (Adjacent Mex.)

= = = Umbels mostly more than one: peduncle not overtopping the leaves (except perhaps in *A. cinerea*), sometimes none.

a. Leaves broad (from orbicular to oblong-lanceolate), proportionally large: hoods broad, little if at all overtopping the anthers: stems from a foot to a yard or more in height, except the first species.

1. Glabrous or some minute pubescence or tomentum on young parts, no floccose wool.

A. cryptóceras, Watson. A span or two high, almost completely glabrous: stems decumbent: leaves 3 or 4 pairs, ovate-orbicular with mucronate apiculation, glaucescent, 1 or 2 inches long, very short-petioled: flowers large, all at the summit, few in each of the 2 or 3 umbels: the lateral of these sessile, the terminal short-peduncled: lobes of the greenish-yellow corolla ovate, 5 lines long: column none: hoods flesh-colored, saccate-ovate, abruptly and minutely bi-acuminate, equalling the anthers, enclosing the falcate-subulate horn: follicles ovate. — King Exped. 283, t. 28. *Acerates latifolia*, Torr. in Frem. Rep. ed. 2, 317. — Utah, W. Nevada, and Idaho, *Nuttall*, *Fremont*, *Watson*, &c.

A. amplexicaúlis, Michx. Glaucous and glabrous: stems decumbent, a foot or two long: leaves in numerous rather crowded pairs, cordate-ovate and clasping, obtuse, succulent, whitish-veiny, 3 to 5 inches long: peduncles about half the length of the leaves, longer than the numerous slender pedicels: lobes of the greenish-purplish corolla oblong, 3 lines long: column very short: hoods white, obovate-truncate, nearly enclosing the triangular-areolate crest-like horn: follicles ovate-lanceolate. — Fl. i. 113; Ell. Sk. i. 322. *A. humistrata*, Walt. Car. 105, except "floribus rubris." — Dry sandy barrens, North Carolina to Florida.

A. Jamésii, Torr. Farinose-puberulent when young, soon green and glabrous: stem stout, erect or ascending, a foot or more high: leaves about 5 pairs, approximate, remarkably thick and large (when dry coriaceous, the larger 4 to 6 inches long), orbicular or broadly oval, often emarginate and with a mucronation, subcordate at base, nearly sessile, copiously transversely veined: umbels 2 or 3, all or mostly lateral, densely many-flowered, on peduncles shorter than the pedicels: flowers greenish: lobes of the corolla ovate, 4 or 5 lines long: column very short but distinct: hoods barely equalling the anthers, broad, with truncate entire summit, which is equalled by the upper margin of the falciform-triangular crest, the apex of which extends into a short subulate horn partly over the top of the stigmatic disk: follicles turgid-ovate, barely acute, $2\frac{1}{2}$ or 3 inches long. — Bot. Mex. Bound. 162. *A. obtusifolia*, var. *latifolia*, Torr. in Ann. Lyc. ii. 117. — Plains of Colorado to W. Texas and E. Arizona.

A. phytolaccoides, Pursh. Bright green and glabrous: stem 4 or 5 feet high: leaves membranaceous, from oval to ovate-lanceolate, acuminate at both ends, short-petioled, 4 to 8 inches long: peduncles (1 or 2 inches long) seldom longer than the numerous filiform lax pedicels: corolla greenish; the lobes ovate or oblong, 4 lines long: column short:

hoods white or pale, flesh-colored, broad and erect, rather shorter than the anthers, truncate horizontally, the truncate margin somewhat erose or toothed and with a slender tooth at the inner angles, much surpassed by the erect or slightly incurved slender-subulate horn: follicles fusiform and slender-acuminate, at length glabrous. — Fl. i. 180; Decaisne in DC. l. c. *A. Syriaca*, var. *exaltata*, L. Spec. ed. 2, 313. *A. nivea*, Sims, Bot. Mag. t. 1181, not L. *A. exaltata* (*acuminata*), Muhl. Cat. 28. — Shaded and moist ground, New England to Wisconsin and south to Georgia in the mountains.

A. variegata, L. A foot or two high: leaves 3 to 7 pairs, thinnish (the middle ones sometimes 4-nate), oval or ovate, or the upper oblong, obtuse at both ends, mucronate-apiculate or short-acuminate, not rarely somewhat undulate, bright green and glabrous above, pale and sometimes tomentulose beneath (at least when young), 3 to 6 inches long, conspicuously petioled: peduncles 1 to 3, terminal and subterminal, short, equalling or exceeding the very numerous pedicels of the compact umbel, both usually tomentulose: flowers white with some pink or purple at the centre, i. e. on the distinct column and base of the corolla: lobes of the latter ovate or oval, 3 lines long: hoods globular-ventricose from a narrow base, spreading, overtopping the short anthers and stigmatic disk; the semilunate subulate horn horizontally short-exserted: follicles fusiform and long-acuminate. — Spec. 215, & ed. 2, 312 (founded on syn. Dill. & Pluk.); Walt. Car. 104; Sims, Bot. Mag. t. 1182; Ell. l. c.; Decaisne, l. c. (excl. syn. Hook.); Gray, Man. l. c.; Torr. Fl. N. Y. t. 86. *A. nivea*, L. as to syn. Gronov. & herb. *A. citrifolia*, Jacq. Coll. & Ic. Rar. t. 343. *A. hybrida*, Michx. l. c. — Dry shaded grounds, S. New York and Ohio to Florida, Arkansas, and W. Louisiana.

2. Tomentose or pubescent, South Atlantic States or New Mexican species: umbels all lateral, short-peduncled: flowers greenish: follicles tomentose or canescent.

A. tomentosa, Ell. Tomentulose or merely soft-pubescent, sometimes minutely so: stems a foot or sometimes a yard high, very leafy above: leaves from oval-obovate to oblong-lanceolate, obtuse or short-acuminate at both ends, 2 to 4 inches long, rather conspicuously petioled: umbels 3 to 10 in alternate axils, very short-peduncled, loosely many-flowered: lobes of the corolla ovate, 3 or 4 lines long: column very short: hoods oval-obovate, obliquely truncate, decidedly shorter than the broadly-winged anthers; the broadly subulate horn ascending and moderately exserted at the upper interior angle: "follicles lanceolate." — Sk. i. 320; Chapm. Fl. 363. *A. aceratoides*, M. A. Curtis in Am. Jour. Sci. ser. 2, vii. 407. — Dry sandy barrens, N. Carolina to Florida.

A. arenaria, Torr. Lanuginous-tomentose, in age glabrate: stems about a foot high, stout, ascending, thickly leaved: leaves coriaceous when old, obovate or oval and retuse or the lower ovate, with rounded or subcordate base, somewhat undulate, distinctly petioled, 2 to 4 inches long: umbels rather densely many-flowered, shorter than the leaves: lobes of the greenish-white corolla oval, 5 lines long: column nearly half the length of the anthers: hoods about as broad as high, surpassing the anthers, truncate at base and summit, the latter oblique and notched on each side near the inner angle, which forms an obtuse tooth; horn with included ascending portion or crest broadly semilunate as high as the hood; the abruptly incurved apex subulate-beaked, horizontally exserted, or the slender termination ascending: follicles oblong-ovate and long-acuminate, tomentulose. — Bot. Mex. Bound. 162. — Colorado, on sand-banks of the Upper Canadian and Red Rivers (*Bigelow, Marcy*) to New Mexico, *Wislizenus*, &c. — Allied to *A. Jamesii*.

3. Floccose-lanuginous or tomentose-canescant, Western species; the dense wool not rarely deciduous with age: stems stout, 1 to 4 feet high: leaves occasionally alternate, large (2 to 6 inches long): umbels terminal and lateral, many-flowered: follicles (where known) ovate.

A. Fremonti, Torr. Canescently tomentose with short and fine wool, or the stem (a foot or less high) puberulent: leaves oval or oblong, obtuse, retuse, or apiculate-acute, often subcordate, smooth-edged, distinctly petioled: umbels 1 or 2, on peduncles not longer than the lanuginous pedicels: lobes of the whitish corolla oblong-ovate, 3 lines long: column very short: hoods nearly erect, equalling the anthers, somewhat evenly truncate and the inner angles produced into an acute or obtusish tooth, with no notch behind it; the subulate apex of the broad horn inflexed and a little exserted. — Pacif. R. Rep. vi. 87, name only. — California, on the Upper Sacramento, *Fremont, Newberry*, &c. Follicles when young densely canescent-tomentose, in age glabrate. Herbage with the pubescence of the preceding rather than of the following species.

A. erósa, Torr. Canescent with fine and appressed white wool when young, or the stem only puberulent: leaves glabrate and green with age, sessile, ovate to ovate-lanceolate, acuminate, coriaceous, the base rounded or slightly cordate, the margin scarious-cartilaginous and rough with minute irregular denticulation or erosion: umbels numerous, on peduncles equalling (or the lower exceeding) the lanuginous pedicels: lobes of the greenish-white corolla oval, fully 3 lines long, merely hoary and soon glabrate outside: column distinct: hoods yellowish, with a duplication on each side at the edge below, erect and nearly horizontally truncate, rather surpassing the anthers; the falcate or claw-shaped horn attached below the middle and longer than the hood, incurving over the disk of the stigma: ovaries glabrous: follicles canescent when young, often glabrate at maturity. — Bot. Mex. Bound. 162, glabrate state. *A. leucophylla*, Engelm. in Am. Naturalist, ix. 349; Gray, Bot. Calif. i. 476, in the canescent-lanuginous state. — Arizona on the Gila (*Schott, Thurber*) to S. Utah (*Parry*) and San Diego Co., California, *Cooper, Palmer*.

Var. obtúsa, a form with elliptical and very obtuse leaves and scanty wooliness. — *A. leucophylla*, var. *obtusa*, Gray, l.c. — Bartlett's Cañon, interior of Santa Barbara Co., California.

A. eriocárpa, Benth. Densely floccose-woolly, even to the calyx, the loose wool hardly deciduous except from the angled stem below: leaves not rarely ternate and the uppermost alternate, elongated-oblong or the upper lanceolate, obtuse or subcordate at base, short-petioled, 4 to 8 inches long: umbels few or several, all on stout peduncles mostly longer than the pedicels: flowers dull white: corolla at first woolly outside; the lobes ovate, 3 lines long: column short but distinct: hoods shorter than the anthers, rather spreading, ventricose, oblately seniorbicular in outline and open round to near the middle of the back, the summits produced inwardly into an acute angle or tooth, barely enclosing the falciform acute horn: ovaries glabrous or merely the summit or the styles villous: "follicles densely woolly," according to Benth. Pl. Hartw. 323. — California, in dry ground, from near Monterey (*Hartweg*) to San Diego Co.

A. vestíta, Hook. & Arn. Densely floccose-woolly, usually even to the outside of the corolla, the white wool deciduous in age: leaves from ovate to oblong-lanceolate, very acute or acuminate, often subcordate, short-petioled or the upper sessile, 4 to 6 inches long: umbels 1 to 4, the terminal usually peduncled, the lateral all sessile: corolla greenish-white or purplish; the lobes ovate, 3 lines long: column very short: hoods nearly erect, ventricose, slightly surpassing the anthers, entire at the back of the somewhat truncate summit, auriculate-extended at the inner angle, the auricles or angles involute; the vomer-shaped crest rather than horn attached up to the summit of the hood, blunt, not exerted: an interior crown of 10 tooth-like processes in pairs between the hoods: ovaries glabrous: follicles at first canescent. — Bot. Beech. 363 (not Bot. Mag. t. 4106); Gray, Bot. Calif. i. 476. *A. eriocarpa*, Torr. in Pacif. R. Rep. iv. 128, not Benth. — Dry ground, California, from the Sacramento to San Diego Co. and the Mohave.

b. Leaves narrow (lanceolate or linear, 1 to 3 inches long), green and nearly glabrous; the veins oblique: stems branching, ascending, a span or two high: hoods obtuse, shorter or little longer than the anthers: corolla-lobes oblong-ovate, about 2 lines long: column hardly any: follicles ovate, acute or acuminate, when young tomentose-canescant.

A. brachystéphana, Engelm. Stems 6 to 10 inches high, very leafy, cinereous-puberulent or tomentose when young, the inflorescence more floccose-tomentose: leaves from lanceolate with a broader rounded base to linear, short-petioled (sometimes 3 inches long), when young often cinereous-tomentulose beneath, very much surpassing the (3 to 8) few-flowered umbels: peduncles as long as the pedicels or much shorter: flowers lurid-purplish: hoods only half the length of the anthers, erect, strongly angulate-toothed at the front; the tip of the erect subulate horn exerted. — Torr. Bot. Mex. Bound. 163. — Dry sandy soil, from Wyoming Terr. and Colorado to W. Texas and Arizona. (Adjacent Mex.)

A. involucráta, Engelm. Minutely pubescent when young, glabrate, a span or less in height: clustered stems spreading: leaves from lanceolate with roundish or subcordate base to linear with acute base, short-petioled (occasionally alternate), tomentose on the margins; the uppermost involucreting the mostly solitary sessile or short-peduncled 10-20-flowered umbel and commonly overtopping it: flowers greenish-white or purplish-tinged: hoods ovate, moderate-longer than the anthers; the short incurved horn slightly exerted from about their middle. — Torr. Bot. Mex. Bound. 163. — Sandy soil, New Mexico and Arizona. (Adjacent Mex.)

c. Leaves extremely narrow, sessile: hoods thrice the length of the anthers, slender, acute, open.

A. macrótis, Torr. Glabrous or nearly so: stems barely a span high, numerous and much branched from a suffrutescent thickened base: leaves narrowly linear with revolute margins, almost filiform, an inch or more long: umbels 3–5-flowered, terminal and lateral, short-peduncled or sessile: pedicels little longer than the purplish or greenish flowers: corolla-lobes ovate, 2 lines long: column hardly any: hoods with ovate erect base as long as the anthers, above contracted into a gradually attenuate twice longer subulate spreading portion, the apex incurving; the broad horn short and blunt, with barely exerted apex: follicles ovate-lanceolate, an inch long. — Bot. Mex. Bound. 164, t. 45. — Rocky hills along the Rio Grande, borders of Texas, New Mexico, and Chihuahua, especially near El Paso, *Bigelow, Parry, Wright*.

d. Leaves from ovate to oblong, mostly pubescent or puberulent: stems erect, a foot or more high: hoods obtuse, twice or thrice the length of the anthers, not tapering to base, entire at summit,

1. Involute-concave or more open; the falcate or subulate horn free at or below the middle of the hood, and incurved or inflexed over the stigmatic disk: follicles tomentose or soft-pubescent.

A. ovalifolia, Decaisne. Tomentulose-pubescent: stem rather slender: leaves thinish, from ovate or oval to ovate-lanceolate, mostly acute, rounded at base, distinctly petioled ($1\frac{1}{2}$ to 3 inches long), glabrate with age, at least the upper face, the midrib as well as primary veins slender, and veinlets reticulated: umbels few, loosely 10–18-flowered, on peduncles which seldom equal the pedicels, or sometimes sessile: corolla greenish-white with purplish outside; the lobes oblong-ovate, 2 or 3 lines long: hoods oval or broadly oblong in outline, not auriculate at base, the inner margins below the middle extended into a large acute tooth or lobe; the horn broad and rather short: anther-wings rounded and entire or minutely and obscurely notched at the prominent base. — DC. Prodr. viii. 567 (excl. habitat); Gray, Man. ed. 5, 396. *A. variegata*, var., Hook. Fl. ii. 252, t. 141. *A. Nuttalliana*, Gray, Man. ed. 2, 352, 704. — Saskatchewan, Lake Winnipeg, and Dakota to N. Illinois and Wisconsin, in oak-openings and prairies.

A. Hallii, Gray. Puberulent, glabrate: stem stout: leaves thickish, ovate-lanceolate or oblong-lanceolate with rounded base and rather acute apex (3 to 5 inches long), short-petioled, the stout midrib and the slightly ascending straight veins prominent underneath: umbels few and greenish, many-flowered, on peduncles somewhat longer than the pedicels: corolla greenish-white and purplish; the lobes oblong, 3 lines long: hoods elongated-oblong in outline (3 lines long), entire, hastately 2-gibbous above the narrower base, a little surpassing the sickle-shaped horn: anther-wings even and unappendaged at base. — Proc. Am. Acad. viii. 63. *A. ovalifolia*, Gray in Proc. Acad. Philad. March, 1863, 75, coll. E. Hall. n. 480. — Colorado, near Denver? *E. Hall*. Head-waters of the Arkansas, *Brandegee*, &c. Follicles tomentulose, glabrate. In aspect resembles *A. Sullivantii*, but with some pubescence, and base of the anther-wings destitute of the corniculation.

A. obovata, Ell. Cinereous with soft pubescence or tomentum on the lower face of the leaves: stem a foot or two high: leaves oval or oblong, only the lower obovate, somewhat undulate, mucronate-apiculate, rounded or subcordate at base, very short-petioled ($1\frac{1}{2}$ to 3 inches long), the midrib stout, the veins transverse and slender: umbels (3 or 4 at the upper axils) almost sessile, densely 10–14-flowered: lobes of the yellowish-green corolla oblong, 3 or 4 lines long, half the length of the pedicels: hoods purplish, oblong, strictly erect (3 or 4 lines long), involute so that the thin inner edges meet for almost their whole length, dorsally hastately bigibbous above a short contracted base, thence narrowly wing-appendaged upward and inward for some length, a pair of broad and short fleshy internal auricles at very base within; horn narrowly falcate, fleshy; the exerted upper part of the free portion strongly inflexed, subulate, its upper or dorsal face caniculate-concave: anther-wings bicorniculate at the basal angle (in the manner of *A. obtusifolia* and *A. Sullivantii*). — Sk. i. 321; Decaisne, l. c. 570 (excl. syn. Torr.); Chapm. Fl. 363. — Dry ground, S. Carolina, near the coast, to Florida and Louisiana.

2. Hoods laterally much compressed, mainly solid, with a narrow dorsal keel and a broader ventral wing: the latter bearing two semi-obovate lamellæ, its broad upper part enclosing a lamelliform crest of equal width, which bears a short subulate exerted horn at the inner angle.

A. nyctaginifolia, Gray. Roughish-puberulent, apparently a foot high and ascending: leaves rhombic-ovate, with ascending and branching veins, 2 or 3 inches long, rather long-petioled: umbels all lateral, very short-petioled, 4–8-flowered: pedicels equalling the

petiole: lobes of the greenish corolla oblong (half inch long): column hardly any below the greenish white hoods, which are little shorter than the petals, almost thrice the length of the anthers, barely retuse at apex; the truncate upper edge of the crest erose; the exerted horn from its inner angle thin-subulate, a line long: auricles at base of the hood very small, roundish: anther-wings broadly rounded at base: follicles not seen. — Proc. Am. Acad. xii. 70. — Rock Spring, Providence Mountains, S. E. California, *Palmer*.

++ ++ Follicles pendulous on recurving pedicels, at least not erect: leaves subulate-filiform or wanting on the junciform naked stems: hoods elongated, broader upward.

A. subuláta, Decaisne. Cineræous-puberulent or soon glabrous and glaucous: stem 3 or 4 feet high, naked and rush-like or bearing a few nearly filiform leaves, usually few-branched above: umbels terminal and lateral, 5-20-flowered, on peduncles mostly shorter than the pedicels: flowers yellowish-white: lobes of the corolla oblong, 4 or 5 lines long: column distinct: hoods purplish, narrowly oblong-panduriform, erect, twice the length of the column, entire, a narrow crest adnate up to the apex, above dilated and inwardly pointed by a very short and blunt subulate horn; 10 short internal appendages forming a pair of fleshy auricles within the base of each hood: follicles fusiform and long-acuminate, 4 inches long, smooth. — DC. Prodr. viii. 571; Torr. in Pacif. R. Rep. v. 362, t. 7. — Desert region of S. E. California and W. Arizona. (Lower Calif., W. Mex.?)

++ ++ ++ Follicles erect on erect fruiting pedicels, fusiform: leaves not rarely verticillate, in one species commonly alternate: hoods moderately if at all exceeding the anthers.

= Leaves from ovate to broadly lanceolate, glabrous or nearly so, thin, rather slender-petioled: corolla white or pinkish.

A. quadrifólia, L. A foot or two high, simple, usually leafless below: leaves 3 or 4 pairs, or commonly a whorl of four in place of each middle pair, ovate to ovate-lanceolate, acuminate, 2 to 4 inches long: umbels 2 to 4, loosely many-flowered: peduncle seldom longer than the slender pedicels: corolla from light pink to almost white; the lobes $2\frac{1}{2}$ lines long, oblong: column short: hoods white, twice the length of the anthers, ovate-oblong, a salient tooth or lobe on each margin toward the base; horn short, very broadly falcate-subulate, incurved over the anther-tips. — Jacq. Obs. t. 33; Barton, Fl. Am. Sept. ii. t. 43; Lodd. Bot. Cab. t. 1258. *A. vanilla*, Raf. in Am. Month. Mag. iv. 39 (1818), ex Neob. 62. — Dry soil, Canada and Wisconsin to N. Carolina and Arkansas.

A. perénis, Walt. Stem a foot or two high, commonly branching, leafy throughout, sometimes rather woody at base: leaves all opposite, from ovate to oblong-lanceolate, mostly acuminate at both ends, 2 to 4 inches long: umbels several and rather small, on peduncles of about twice the length of the pedicels: flowers white throughout: lobes of the corolla 1 or 2 lines long, oblong: column narrow, half to three fourths of a line long: hoods oval, entire, erect, not twice the length of the column, hardly surpassing the anthers, one third shorter than their straightish or falcate almost filiform horn: seeds not rarely destitute of coma. — Car. 107; Gray, Man. ed. 5, 396; Chapm. Fl. 365. *A. debilis*, Michx. Fl. i. 116, in part; the Obs. relates to *A. quadrifolia*. *A. parviflora*, Ait. Kew. i. 307; Pursh, Fl. i. 180; Decaisne, l. c. *Matalea? levis*, Nutt. in Am. Jour. Sci. v. 291. — Muddy shores, &c. from S. Indiana and Illinois, and from Carolina to Florida and Texas.

Var. párvula, barely a foot high, and leaves an inch or two long. — Torr. Bot. Mex. Bound. 164. — Head of Rock Creek, W. Texas, *Bigelow, Wright*.

A. nívea, L. (Dill. Elth. t. 29, & Plum. Ic. t. 30), is a W. Indian species (Griseb. Fl. W. Ind., excl. syn. Bot. Mag.), very near *A. perennis*, but corolla greenish-white, hoods longer than the anthers, the wings of which become auriculate-undulate next the base, and are not overtopped by the horn. "Louisiana," Grisebach, l. c.; but this is probably a mistake.

A. virgáta, Lag. Gen. & Spec. 14, Sweet Brit. Fl. Gard. ser. 2, t. 85 (*A. angustifolia*, Hort. Berol., Roem. & Sch., & *A. linearis* of gardens, *A. linifolia*, HBK.?) is a nearly related species, with white or rose-tinged corolla, anther-wings plane, and narrow leaves as of the succeeding section, probably only Mexican. See Proc. Am. Acad. xii. 70.

= = Leaves from elongated-lanceolate to filiform, sessile or nearly so, glabrous.

a. Corolla reflexed (as in the genus generally): horn of the hoods subulate and exerted.

1. Column conspicuous, at length about half as long as the anthers.

A. Mexicána, Cav. Stem 3 to 5 feet high: leaves in whorls of 3 to 6, or uppermost and lower opposite, sometimes also in axillary fascicles, linear or narrowly lanceolate (3 to 6

inches long, 2 to 6 lines broad): umbels corymbose, densely many-flowered, on peduncles longer than the pedicels: flowers greenish-white, sometimes tinged with purple: corolla-lobes oblong, 2 lines long: hoods broadly ovate, entire, shorter than the anthers, exceeded by the stout-subulate incurved horn. — Cav. Ic. i. 42, t. 58; Gray, Proc. Am. Acad. xii. 71. *A. fascicularis*, Decaisne in DC. Prodr. viii. 467; Gray, Bot. Calif. i. 475. *A. macrophylla*, Nutt. Pl. Gamb. 180. — Dry or moist ground, Oregon and California, to Nevada and Arizona. (Mex.)

A. verticillata, L. Stems a foot or two high, slender, very leafy: leaves mostly in whorls of 3 to 6, or some scattered, filiform-linear and with revolute margins (2 to 4 inches long): umbels numerous, small, many-flowered, on peduncles longer than the pedicels: corolla greenish-white; the lobes oblong, 2 lines long: hoods white, broadly ovate and entire, with somewhat auriculate involute base, barely equalling the anthers, much shorter than their elongated-subulate falcate-incurved horn. — (Pluk. Alm. t. 336.) Hook. Fl. t. 144; Lodd. Cab. t. 1067; Sweet, Brit. Fl. Gard. t. 144; Decaisne, l. c. (excl. var. *linifolia*); Torr. Fl. N. Y. t. 87. *A. galioides*, HBK. Nov. Gen. & Spec. iii. 188. — Dry soil, Canada to Nebraska and south to Florida, Texas, and New Mexico. (Mex.)

Var. púmila, Gray, l. c. A span or more high, many-stemmed from a fascicled root: leaves much crowded, filiform; peduncles seldom longer than the pedicels. — Dry plains, Nebraska to Kansas and New Mexico.

Var. subverticillata, Gray, l. c. Stems single, 1 to 2½ feet high: leaves all opposite or barely in threes, 3 to 5 inches long, 1 to 3 lines wide, flatter, the margins less or little revolute: horns sometimes rather less exerted. — *A. verticillata*, var. *galioides*, Torr. Bot. Mex. Bound. 164, chiefly, hardly of Decaisne. *A. linearis*, Scheele in Linn. xxi. 753. *A. verticillata*, var. *linifolia*, Engelm. ined., but not *A. linifolia*, HBK. (which may rather be *A. virgata*, Balb.), nor of Decaisne, l. c., which seems to be a mixture of two or three species. — W. Texas and New Mexico. (Adjacent Mex.)

A. LINÁRIA, Cav., with the aspect of the foregoing, has the horn short and nearly included in the hood, a very short column, and turgid-ovate follicle arrect on the deflexed pedicel: enumerated in Torr. Mex. Bound. l. c., from Northern Mexico, but not yet found very near the U. S. boundary.

2. Column manifest, but not higher than broad.

A. quinquedentata, Gray. A span or two high: leaves all opposite, narrowly linear and elongated, resembling those of *A. verticillata*, var. *subverticillata*: umbels 4-10-flowered: peduncle longer than the pedicels: lobes of the greenish-white corolla oval, 2½ or 3 lines long: hoods white, about the length of the anthers, conduplicate, somewhat quadrate in outline, the keeled back ending below in a truncate salient base, the truncate summit prominently and acutely 5-toothed; horn adnate up to the summit, falcate, ending in a small acute dorsal tooth and in an inflexed and moderately exerted subulate proper apex. — Proc. Am. Acad. xii. 71. *A. verticillata*, var. *galioides*, Torr. l. c. in part. — Prairies or rocky hills on the San Pedro River, W. Texas, Wright (1689). Fruit unknown; but, according to Engelmann, it may be arrect on a decurved pedicel, as in *A. Linaria*.

A. angustifolia, Ell. Minutely puberulent, or the foliage glabrous: stems a span to a foot long, decumbent or ascending, very leafy: leaves irregularly alternate or the lower opposite, narrowly linear (1½ to 4 inches long, 1 to 3 lines wide), the margins little if at all revolute: umbels 1 to 3, terminal, many-flowered: peduncle usually much longer than the pedicels: lobes of the greenish corolla oval, barely 2 lines long: hoods (purplish, "nearly orange-colored," Ell.) ovate, entire, considerably surpassing the anthers, longer than the broad subulate horn, which is inflexed-exserted from the middle. — Sk. i. 325. *A. tuberosa*? Walt. fide Ell. *A. longifolia*, Michx. herb., in part. *A. Michauxii*, Decaisne, l. c. 569; Chapm. Fl. 365. (Elliott's name was published in 1817, earlier than the homonyms.) — Low pine barrens and sand-hills, S. Carolina to Florida.

A. viridula, Chapm. Nearly glabrous: stem slender, erect, a foot or two high: leaves all opposite, narrowly linear or (when with revolute margins) filiform, erect or ascending (1 to 3 inches long), surpassing the short-peduncled 5-12-flowered umbels: lobes of the yellowish-green corolla oblong, 2 lines long: hoods oblong, one third longer than the anthers, the margins with an auriculate incurved tooth below the middle, otherwise entire, longer than the subulate incurved horn. — Fl. 362. — Wet pine barrens near Apalachicola, Florida, Chapman.

3. Column none.

A. cinérea, Walt. Glabrous or nearly so: stem very slender, a foot or two high: leaves all opposite, spreading, very narrowly linear (1 to 3 inches long, half to a line wide); umbels terminal and subterminal at the naked summit of the stem, loosely 5-7-flowered: filiform drooping pedicels longer than the peduncle: corolla dull purplish outside, ash-color within; the lobes tardily reflexed, oval, 3 lines long: hoods considerably shorter than the anthers, broader than high, truncate at the back, the involute inner angles extended in a triangular acute ascending lobe, which exceeds the broad triangular horn. — Car. 105; Ell. Sk. i. 325; Chapm. l. c. — Low pine barrens, S. Carolina to Florida.

b. Corolla and calyx merely rotately spreading, not reflexed.

A. Feáyi, Chapm. Stem filiform, erect, a foot or two high: leaves all opposite, in 4 to 6 pairs, spreading, linear-filiform (2 to 4 inches long, barely half a line wide), glabrous, often wanting above at the 2 or 3 approximate short-peduncled 3-5-flowered umbels: corolla white; the lobes oblong or at length narrower, 3 or 4 lines long: column none: hoods white and petaloid except a thickish midrib, barely as long as the sagittate-based anthers, spreading, concave, entire; in place of horn a semioval entire crest or plate adnate to the middle of the back within: follicles not seen. — Gray, Proc. Am. Acad. xii. 72. — Tampa, Florida, *Leavenworth* (in herb. Torr.), *Dr. Feay, Dr. Garber*.

§ 2. **PODOSTÉMA, Gray.** Hoods long-stipitate, their stalks adnate to nearly the whole length of the antheriferous column, surpassing the anthers; the crest-like process adnate to the nearly open lamina: anther-wings broader and somewhat angulate about the middle: umbels all lateral. — Proc. Am. Acad. xii. 72.

A. longicórnu, Benth. A span to a foot or more high, minutely and somewhat hirsutely pubescent: leaves all opposite, from ovate to oblong-lanceolate, obtuse, 2 to 4 inches long, petioled: umbels short-peduncled or nearly sessile, several-many-flowered: flowers yellowish-green: corolla-lobes a fourth to half inch long, oblong: hoods with stalk-like portion twice the length of the gradually dilated whitish somewhat 2-3-lobed or toothed lamina; the process infra-apical and divided into 2 short subulate and fleshy horns; the exterior horn barely equalling the apex of the hood; the inner twice longer, incurved and somewhat exserted: follicles arrect on the deflexed pedicel, ovate-oblong, acuminate, at first canescent or pubescent or roughish. — Pl. Hartw. 24; Decaisne, l. c. 570. *A. Lindheimeri*, Engelm. & Gray, Pl. Lindh. ii. 42. — Texas and New Mexico. (Mex., *Nearagua*.)

§ 3. **NOTHACÉRATES, Gray.** Anther-wings widening to the broadly rounded base and conspicuously auriculate-notched just above it: hoods sessile, with a narrow wholly adnate internal crest terminating in a minute horn: habit of *Acerates*: pollinia short and thick, arcuate-obovate.

A. stenophýlla, Gray. Puberulent, but foliage glabrous: stems slender, a foot or two high, simple: leaves long and narrowly linear (3 to 7 inches long, 1 to 2½ lines wide), with scabrous and more or less revolute margins and a strong midrib; the upper alternate and the lower opposite: umbels several, short-peduncled or subsessile, 10-15-flowered: pedicels about twice the length of the greenish flowers: corolla-lobes oblong, 2 lines long: column very short: hoods whitish, erect, equalling the anthers, oblong, conduplicate-concave, the base of each inner margin appendaged by a cuneate closely truncate lobe, the apex 2-lobed and the narrow internal crest exserted in the sinus in the form of an intermediate tooth: interior crown of 5 very small 2-lobed processes between the bases of the anthers: follicles slender-fusiform and long-acuminate, erect on the ascending pedicel. — Proc. Am. Acad. xii. 72. *Polypotus angustifolius*, Nutt. in Trans. Am. Phil. Soc. ser. 2, v. 201. *Acerates angustifolia*, Decaisne, l. c. 522. — Dry prairies, W. Arkansas and N. Texas to Nebraska and Colorado. Connecting link between *Asclepias* and *Acerates*.

7. **ACERÁTES, Ell.** (Formed of *a*, privative, and *κέρας*, a horn.) — Atlantic U. S. perennial herbs, resembling *Asclepias*; with comparatively small flowers greenish or barely tinged with purple, in summer. Umbels many-flowered, sessile or short-peduncled. Distinguished only by the total absence of horn or

crest to the hoods, and by the wings of the anthers not angulate nor dilated (but rather tapering) at base. — Ell. Sk. i. 316 (1817); Engelm. mss.; Gray, Proc. Am. Acad. l. c. *Polyotus*, Nutt. in Trans. Amer. Phil. Soc. l. c. *Gomphocarpus* in part, Benth. & Hook. Gen. ii. 754.

* Mass of anthers and stigma globular, not equalled by the hoods: column below the hoods evident: leaves mainly alternate-scattered, very numerous.

A. auriculáta, Engelm. Glabrous up to the inflorescence: stem 2 or 3 feet high, slender: leaves linear-filiform (4 to 6 inches long, a third to a line and a half wide), their scabrous margins not revolute: umbels several, lateral: pedicels short: column below the hoods very short: hoods oval or quadrate, emarginately or sometimes 3-crenately truncate, the involute margins at base appendaged with a pair of remarkably large and broad auricles: anther-wings narrow and of equal breadth from top to bottom: pollinia elongated-oblong, not tapering upward. — Engelm. in Bot. Mex. Bound. 169. — Prairies and rocky ground, from S. Texas and New Mexico to Colorado. Unless the characters are noted, very likely to be confounded with *Asclepias* (*Nothucerates*) *stenophylla*.

A. longifólia, Ell. Minutely hirsutely scabrous-pubescent, or smoothish: stems 1 to 3 feet high, erect or ascending: leaves from linear to elongated-lanceolate (3 to 8 inches long, 1 to 6 lines wide): umbels few or numerous, terminal and lateral: pedicels slender: column rather conspicuous below the hoods: these purple or purplish, oval, obtuse, entire, unappendaged, adnate by the ventral margins to the whole upper half of the column, therefore pitcher-like, rising barely to the middle of the anthers: anther-wings semi-rhombic, more attenuate to base: pollinia (as generally in the genus) with tapering apex. — Sk. i. 317; Decaisne in DC. Prodr. viii. 522. *Asclepias longifolia*, Michx. Fl. i. 116, mainly. *A. Florida*, Lam. Dict. i. 284. *A. incarnata*, Walt. Car. 106, not L. *Polyotus longifolius*, Nutt. in Trans. Am. Phil. Soc. v. 522. — Moist prairies and pine-barrens, Florida to Texas, and north to Ohio and Wisconsin. Varies greatly in height, length of peduncles, foliage, &c.: a Florida form has few or single slender-peduncled umbels, and smaller flowers.

* * Mass of anthers and stigma longer than broad, almost equalled by the hoods, the short insertion of which covers the very short column: leaves not rarely opposite, mostly broader.

A. viridiflóra, Ell. Tomentose-puberulent, becoming glabrate, or the foliage somewhat scabrous: stem a foot or two high: leaves oval or oblong and obtuse or retuse (one or two inches long), or sometimes narrower and longer and also acute, commonly mucronate, occasionally undulate: umbels 2 to 5 or sometimes solitary, mostly lateral and subsessile, dense: pedicels little over double the length of the reflexed narrowly oblong lobes of the greenish corolla: hoods somewhat fleshy, lanceolate-oblong, with small auricles at base much involute and concealed, otherwise entire, alternated by as many short and roundish or gland-like small internal teeth: anther-wings semi-rhomboid above, with a much longer tapering base. — *Asclepias viridiflora*, Raf. in Med. Rep. xi. 369, & Desv. Jour. Bot. i. 227; Pursh, Fl. i. 181; Torr. Fl. 284 (excl. var. *obovata*); Hook. Fl. ii. 53, t. 143. *Polyotus heterophyllus*, Nutt. l. c. — Dry sterile soil, New England and Canada to Saskatchewan, and south to Florida and Texas. Runs into

Var. lanceoláta, with lanceolate leaves $2\frac{1}{2}$ to 4 inches long. — *Asclepias lanceolata*, Ives in Amer. Jour. Sci. iv. 252, with plate. *A. viridiflora*, var. *lanceolata*, Torr. l. c.; Hook. l. c., dextral figure. With the broader-leaved form.

Var. lineáris, with elongated linear leaves and low stems: umbels often solitary. — Winnipeg Valley to New Mexico.

A. lanuginósa, Decaisne. Hirsute rather than woolly: stems a span or two high, terminated by a single pedunculate umbel: leaves frequently alternate or scattered, from oblong-ovate to lanceolate (1 to 3 inches long), with roundish base: pedicels 3 or 4 times the length of the oblong lobes of the greenish corolla: hoods purplish, broadly oblong, obtuse and entire, involute auricles at base obscure if any; the alternating internal teeth or lobes small and emarginate: anther-wings broadest and obtusely angulate below the middle (approaching those of *Asclepias*): fruit not seen. — Gray, Man. ed. 3, & ed. 5. *A. monocephala*, Lapham in Gray, Man. ed. 2, addend. *Asclepias lanuginosa*, Nutt. Gen. i. 168. *A. Nuttalliana*, Torr. in Ann. Lyc. N. Y. ii. 218. *Polyotus lanuginosus*, Nutt. in Trans. Am. Phil. Soc. l. c. — Prairies, Wisconsin and N. Illinois, Lapham, Vasey, &c., to the Missouri at White River, Nuttall, and the Yellowstone, Mr. Allen.

8. **SCHIZONÓTUS**, Gray. (Σχιζώ, I cleave, *ῥᾶτος*, the back, the hoods of the crown open posteriorly as if split down the back; in which it differs from *Acerates*.) — Single species.

S. purpurāscens, Gray. Herb a span to a foot high, canescently puberulent: leaves opposite, cordate (an inch or more long), thickish: umbels 2, terminal, densely many-flowered on peduncles longer than the pedicels: corolla reddish purple outside, flesh-color within; the oblong lobes a line and a half long; the pale hoods about the same length: anther-wings lunate. — Proc. Am. Acad. xii. 63. *Gomphocarpus purpurascens*, Gray, Proc. Am. Acad. x. 73, & Bot. Calif. i. 477 (§ *Schizonotus*). — California, on an open mountain summit in Lake Co., *Greene* (*Mr. Towle*): fl. June.

9. **GOMPHOCÁRPUS**, R. Br. (Γόμφος, a peg or club, and *καρπός*, fruit.) — Old World and chiefly African genus, to which these two Californian species are technically referred; distinguished from *Asclepias* merely by the absence of horn or crest to the hoods. — Benth. & Hook. l. c., excl. *Acerates* & *Anantherix*.

G. cordifolius, Benth. Glabrous: stem 2 or 3 feet high: leaves ovate or ovate-lanceolate with cordate clasping base, acute, opposite or rarely in threes, 2 to 5 inches long: umbels 1 to 4, loosely many-flowered; slender filiform pedicels equalling or shorter than the peduncles: calyx villous-pubescent: corolla dark red-purple; the lobes oval or oblong, 3 or 4 lines long: hoods erect on the summit of the short column, purplish, thin, ventricose, with dorsally truncate summit produced at the ventral margins into subulate slender ascending cusp, equalling the anthers, a narrow fissure down the ventral side: follicles ovate-lanceolate, smooth and glabrous, arrect on the deflexed fruiting pedicels. — Gray, Bot. Calif. i. 477. *Acerates cordifolia*, Benth. Pl. Hartw. 323. *A. atropurpurea*, Kellogg, Proc. Calif. Acad. i. 65. *Asclepias "ecornutum,"* Kellogg, l. c. 55. — California, common in dry ground through the great valley and foot-hills.

G. tomentósus, Gray, l. c. Tomentose up to the calyx or outside of the corolla with soft floccose matted wool, resembling *Asclepius vestita*: stem 2 or 3 feet high, angled: leaves opposite (rarely somewhat scattered), ovate or oblong, acute or acuminate (2 to 4 inches long), mostly rounded at base, short-petioled: umbels terminal and lateral, sessile or nearly so, loosely several-flowered: corolla greenish or dull purplish; the lobes 4 lines long: hood attached to the summit of the short distinct column, ventricose and rounded, spreading, reaching to near the middle of the anthers, pointless, open, and as if 2-valved across the top and to the middle of the back. — *Acerates tomentosa*, Torr. Bot. Mex. Bound. 160, t. 44. — Dry hills, California, from Monte Diablo to San Diego Co.

Var. Xánti, Gray, l. c., distinguished only by the hoods; these somewhat oval, and depending, so that the fissure becomes as if dorsal, and extends two-thirds down. — Fort Tejon, *Xantus*. Ojai, Santa Barbara Co., *Dr. Peckham*.

10. **ENSLÉNIA**, Nutt. (*Aloysius Enslen*, an Austrian botanist, who collected in the Atlantic U. S. early in the century.) — Perennial twining herbs (N. and S. American); with membranaceous and cordate opposite leaves, and whitish flowers in small axillary pedunculate cymes.

E. álvida, Nutt. Tall-climbing, glabrous, with some slight pubescence: leaves somewhat hastately cordate, slender-petioled, acuminate-tipped: cymes 15–30-flowered: appendages of the crown 2-awned: anther-tips erect, longer than the body of the anther: ligulate awn-like appendages of the crown geminate. — Gen. i. 164; Decaisne in DC. l. c. 518; Deless. Ic. v. t. 63. — River banks, S. Pennsylvania and Virginia to Illinois, Missouri and Texas: fl. summer.

11. **ROULÍNIA**, Decaisne. (*Dr. Roulin*, a French naturalist.) — Twining plants (Texas to Buenos Ayres), with the habit of *Enslenia*. — DC. Prodr. viii. 516; Deless. Ic. v. t. 62.

R. unifária, Engelm. Aspect and growth of *Enslenia alvida*: leaves deeply cordate, with rounded basal lobes of the larger ones incurved, abruptly slender-acuminate: cymes

10-20-flowered, somewhat paniculate or racemiform: flowers greenish-white, hardly 3 lines in diameter: corolla-lobes oblong, thickish-edged: divisions of the crown short (hardly at all exceeding the anthers), merely and obtusely 3-lobed at the apex; the middle lobe at most twice the length of the lateral ones, obtuse or emarginate: follicles oblong, thick, 3 or 4 inches long. — Torr. Bot. Mex. Bound. 160. *Gonolobus unifarius*, Scheele in Linn. xxi. 760, the insignificant specific name from the pubescence in a line down the stem, in a manner most common in the order. — Along streams, Texas, *Lindheimer*, *Wright*, &c.

12. METASTÉLMA, R. Br. (Formed of μετά, change of, and στέλμα, girdle or crown, having 5 processes or scales in place of the ordinary crown.) — Twining perennial herbs or somewhat woody plants (American and mainly tropical), usually slender, and with small opposite leaves. Flowers small in axillary umbelliform clusters, white or sometimes greenish.

§ 1. **EUMETASTELMA**, Benth. & Hook. Crown borne on the base of the corolla or of the short or else obsolete column.

M. FRASERI, Decaisne in DC. Prodr. viii. 513, “Carolina? *Fraser*,” was probably West Indian, perhaps same as *M. albiflorum*, Griseb., doubtless not Carolinian.

***M. barbigerum*, Scheele.** Glabrous: stems slender: leaves from ovate-oblong to narrowly lanceolate, cuspidate-acuminate, rounded at base, glandular at base of midrib: peduncles shorter than the petiole and the 3 to 5 pedicels, often very short: corolla (nearly 2 lines long, greenish outside), 5-parted; the lobes linear and strongly white-villous inside: scales of the crown slender-subulate, on the base of the corolla, a little surpassing the anthers: column extremely short. — Linn. xxi. 760; Torr. Bot. Mex. Bound. 159. — Open woods and rocky banks, Texas. (Adjacent Mex.)

***M. blodgettii*, Gray.** Nearly glabrous: stems filiform: leaves narrowly lanceolate, very acute (half inch or more long, a line or so wide), rounded at base, short-petioled: peduncle very short or obsolete, 3-6-flowered: pedicels about the length of the flower (one line): corolla cleft almost to base; the lobes oblong-lanceolate, within densely penicillate-bearded just below the apex, glabrous or with a few sparse hairs below: scales of the crown slender-subulate, inserted on the base of the corolla, half the length of its lobes, hardly surpassing the anthers: column distinct but shorter than the anthers. — Proc. Am. Acad. xii. 73. *M. parviflorum*, Chapm. Fl. 367, not R. Br. — Pine Key, S. Florida, *Blodgett*. (Probably also W. Indian.)

M. CALIFÓRNICUM, Benth. Sulph. 33, t. 18, is from Bay of Magdalena, Lower California, nearly under the tropic.

§ 2. **ERICION**, Griseb. Crown borne on the summit of the elongated column close to the anthers.

***M. Bahamense*, Griseb.** Nearly glabrous: leaves round-oval to oblong (an inch or less long), mucronate-cuspidate, slender-petioled: peduncles equally or slightly surpassing the petiole, 3-6-flowered: corolla 2 lines long, campanulate; the lobes ovate-oblong, densely puberulent along the broad thickened margins: column 3 or 4 times the length of the anthers, 5-wing-angled at base: scales of the crown oblong-falcate, laterally compressed and internally carinate, equalling the anthers. — Cat. Cubens. 174. *M. Cubense*, Griseb. Fl. W. Ind. 417, not Decaisne. *M. Schlechtendalii*, Chapm. Fl. 366, not Decaisne. — Keys of Florida, *Blodgett*. (Bahamas.)

13. MELÍNIA, Decaisne. (From μέλος, yellowish, the color of the small flowers.) — Two or three extra-tropical S. American species, which have cordate leaves and slender peduncles; to which is appended the following, doubtfully, for its habit is that of *Metastelma*.

***M. angustifolia*, Gray.** Nearly glabrous: stems filiform, branching from a ligneous base, a foot or two long, spreading, more or less twining: leaves opposite, narrowly linear (9 to 20 lines long, a line or less wide), acute, distinctly petioled: peduncles 1-2-flowered, hardly longer than the flowers: calyx-segments lanceolate-acuminate, nearly equalling the campanulate 5-parted corolla: scales of the crown spatulate-oblong, nearly plane, half the

length of the corolla-lobes, surpassing the column under the anthers: terminal membrane of the latter oblong, longer than their cells, slightly surpassed by the slender columnar entire beak to the stigma: young follicle tapering from the base. — Proc. Am. Acad. xii. 73. *Metastelma*? *angustifolia*, Torr. Bot. Mex. Bound. 159. — Ravine at Santa Cruz, Sonora, near the southern boundary of Arizona, Wright. Corolla a line long, smooth within, except a minute and apparently glandular tuft at the base of the midrib, and the obscurely puberulent recurved tips; the sides below narrowly but distinctly convolute-overlapping in aestivation. Scales of the crown wholly separate, inserted at the junction of the corolla with the column.

14. **VINCETÓXICUM**, Mœnch. (Old herbalist name of the typical species, from *vincens*, that which serves for binding, and *toxicum*, a poison, i. e. poisonous bindweed.) — Herbaceous perennial or under-shrubby plants (of the Old and New Worlds); with twining or erect stems, mostly opposite leaves, and small or minute flowers, usually dull-colored. — A polymorphous and rather loosely defined genus, as extended in Benth. & Hook. Gen. ii. 761; the indigenous North American (and most other American) species forming a distinct subgenus.

§ 1. **SEÜTERA**. Crown of 5 thin or thinnish scales or processes, either distinct or barely united at base: corolla-lobes narrowly or sometimes obscurely overlapping. — *Lyonia*, Ell., not Nutt., but rather earlier. *Seutera*, Reichenb. Consp. 131. *Amphistelma*, Griseb.

V. palustre. Stems filiform, herbaceous, freely twining upon rushes and saline grasses: leaves linear, acute, fleshy (an inch or two long, a line or two wide): peduncles longer than the leaves, umbellately several-many-flowered: corolla greenish, with ovate-lanceolate acuminate lobes nearly 2 lines long: scales of the crown oblong-obovate, retuse or emarginate, nearly half the length of the corolla, slightly surpassing the deeply sagittate-based anthers, distinct or very nearly so: stigma with obtusely conical apex. — *Ceropegia palustris*, Pursh, Fl. i. 184. *Lyonia maritima*, Ell. Sk. i. 316. *Cynanchum angustifolium*, Nutt. Gen. i. 164. *Seutera maritima*, Decaisne in DC. l. c. 590. *Amphistelma salinarum*, C. Wright in Griseb. Cat. Cubens. 175. — Salt marshes along the coast from North Carolina to Texas: fl. summer. (W. Ind.)

V. scoparium. Stems filiform, much branched, ligneous below, the branches diffuse and more or less twining, becoming leafless and rush-like: leaves slender-linear, thin, very acute: umbels sessile and few-flowered: flowers very small (only a line long), greenish: corolla-lobes lanceolate, almost valvate in the bud: scales of the crown much shorter than the anthers, ovate, hardly united at base. — *Cynanchum scoparium*, Nutt. in Am. Jour. Sci. v. (1822) 291. *Cynoctonum*? *scoparium*, Chapm. Fl. 367. *Amphistelma filiforme*, Griseb. Fl. W. Ind. 418. *A. ephedroides* & *graminifolium* (probably), Griseb. Cat. Cubens. 174. *Metastelma filiforme*, C. Wright, in Sauvalle, Fl. Cubana, 120. — Dry soil, E. Florida. (W. Ind., Mex.?)

§ 2. **VINCETOXICUM** proper. Crown more fleshy and cup-like, almost entire, lobed, or sometimes 5-parted: stems erect or feebly twining.

V. nigrum, Mœnch, of Europe, with feebly twining stems, ovate acute leaves, and peduncled cymes of blackish-purple flowers (3 or 4 lines in diameter), the saucer-shaped crown crenately 5-lobed and with obscure interposed denticulations — sparingly occurs as a weed in and near gardens, New England to Penn., but does not deserve a place in our flora.

15. **GONÓLOBUS**, Michx. (Formed of *γωνία*, angle, and *λόβος*, pod, one of the original species having ecostate-angled follicles.) — Perennial herbs, or in warmer regions shrubby (all American): with twining or trailing stems, usually cordate opposite leaves, and mostly umbellate cymes or small fascicles of dull or dark-colored flowers, produced in summer, succeeded by follicles which generally resemble those of *Asclepias*. — Fl. i. 119; Gray, Proc. Am. Acad. xii. 73, 74.

§ 1. *DICTYÓLOBUS*, Gray, l. c. Corolla reticulated and sometimes rugulose with a fine network of colored veins; the lobes commonly broad or roundish: crown single. (The species mainly tropical and rather large-flowered.)

G. reticulátus, Engelm. High-climbing, hirsute (especially the stems) with spreading and reddish bristly hairs, minutely somewhat glandular: leaves ($1\frac{1}{2}$ to 4 inches long) deeply cordate with incurved auricles, acute or acuminate: peduncles equalling or exceeding the slender petiole and sometimes longer than the leaf, 5-9-flowered, thrice the length of the flower: corolla lurid green, with purplish venation, half inch in diameter, glabrous within, somewhat hairy without; the lobes broadly ovate or obovate: crown a narrow entire ring around the base of the distinct column: stigma circular: follicles fusiform and long-acuminate, 3 to 5 inches long, strongly muricate. — Gray, l. c. *G. granulatus*, Torr. Bot. Mex. Bound. 165, not Scheele. — Thickets and rocky banks, Texas to E. Arizona. (Monterey, Mex.)

§ 2. *EUGONÓLOBUS*, Gray, l. c. Corolla not venulose-reticulated (at least not conspicuously); the lobes from ovate-acuminate to linear: crown simple, unappendaged within, inserted at the junction of corolla and column or higher on the latter: angles of the stigma little or not at all salient: stems herbaceous, usually freely twining. (Pubescence variable, especially the hirsute and spreading or reflexed hairs, which often occur on the stems, petioles, and sometimes on the leaves.)

* Peduncles umbellately or sometimes more cymosely few-many-flowered: corolla rotate, 5-parted; the lobes stellately spreading or recurving,

+ Thickish in texture, dull or dusky yellowish-green, sometimes turning lurid-purplish within, at least toward the base; the bud conical-acuminate, at least the outside (as well as calyx, pedicels, and short peduncle) glabrous: crown a low and undulately 10-lobed fleshy disk at base of short column under the stigma: anthers narrowly bordered at summit with a scarious membrane which overlies the edge of the stigma: follicles unarmed, glabrous, 3-5-costate or angled, fleshy and when mature and dry of spongy texture.

G. suberósus, R. Br. Leaves cordate with an open and shallow or sometimes deeper and narrow sinus, acuminate, minutely pubescent, glabrate, or sometimes hairy (3 to 5 inches long): umbels 3-9-flowered, much shorter than the petiole: corolla broadly conical and with abrupt acumination, twisted in the bud; its lobes ovate or becoming triangular-lanceolate, acute, of thickish and firm texture, dusky, minutely whitish-pubescent inside, but sometimes glabrate, hardly double the length of the calyx-lobes. — Mem. Wern. Soc. (name only) & Hort. Kew. ed. 2, ii. 82 (1811); Gray, Proc. l. c., not Decaisne. *Cynanchum suberosum*, L. Spec., as to Dill. Elth. i. 300, t. 220, f. 296. *Vincetoxicum gonocarpos*, Walt. Car. 104, at least in part. *Gonolobus macrophyllus*, Chapm. Fl. i. 368, not Michx. — Virginia to Florida, along and near the coast.

G. lævis, Michx. Usually less pubescent or hairy: leaves (in the typical form) oblong-cordate with a deep and narrow but open sinus, conspicuously acuminate (3 to 6 inches long): umbels 5-10-flowered, barely equalling the petiole: corolla rather elongated-conical in the bud, not twisted; its lobes (3 to 5 lines long) narrowly or linear-lanceolate, obtuse, glabrous inside, 3 or 4 times the length of the calyx. — Fl. ii. 119; Gray, Man. ed. 5, 399. — Mississippi to Arkansas and E. Texas. Passes freely into

Var. *macrophyllus*. Leaves broadly cordate, and with the rounded basal lobes approximate or even overlapping, abruptly acuminate, the larger often 9 or 10 inches long and 7 or 8 broad, the under side commonly soft with a fine and short or sometimes granular-glandular pubescence: calyx-lobes often ciliolate toward the apex. — *G. macrophyllus*, Michx. l. c. *G. viridiflorus*, Nutt. Gen. i. 163; therefore *G. Nuttallii*, Decaisne in DC. Prodr. viii. 598. *G. tiliaefolius*, Decaisne, l. c. 596. *G. granulatus*, Scheele in Linn. xxi. 759. *Vincetoxicum gonocarpos*, Walt. Car. 104, in part. — Virginia and Carolina to Texas, Kentucky and Missouri.

+ + Corolla thinner in texture, mostly purple or whitish; the lobes obtuse: crown cupulate, as high as the anthers: membrane of the latter inconspicuous or obsolete, or not inflected over the edge of the stigma: peduncle with the umbel or cymose cluster equalling or surpassing the petiole: follicles ovate-lanceolate, terete, muricate: stems in all variably hirsute: calyx and outside of the corolla more or less pubescent or puberulent.

++ Crown fleshy, the border merely crenate.

G. obliquus, R. Br. Leaves from rounded- to ovate-cordate with a narrow sinus, abruptly acuminate (3 to 8 inches long): umbel many-flowered, sometimes cymosely compound or geminate: corolla in the bud oblong-conical; its lobes linear-ligulate (5 or 6 lines long, barely a line wide), crimson-purple inside, dull or greenish and minutely pubescent outside: margin of the crown 10-crenulate, with the intermediate crenatures sometimes 2-dentate. — Rœm. & Schult. Syst. vi. 64; Bart. Fl. Am. Sept. iii. t. 99; Gray, Man. ed. 5, 399. *G. hirsutus*, Nutt. Gen. i. 163, not Michx. *G. macrophyllus*, Decaisne, l. c., chiefly, not Michx. *Gonolobium hirsutum*, Pursh, Fl. i. 179. *Cynanchum obliquum*, Jacq. Coll. i. 148, & Ic. Rar. t. 341. *C. discolor*, Sims, Bot. Mag. t. 1273; therefore *Gonolobus discolor*, Rœm. & Schult. l. c. *C. hirtum*, L. ?, as to *Apocynum scandens Virginianum*, etc., Moris. Hist. iii. 611, t. 3, fig. 61. — Mountains of Virginia (and Carolina ?) to Pennsylvania, Ohio and Kentucky. Anthers with a distinct dorsal membrane which barely reaches the edge of the stigma.

Var. Shórtii, apparently a form with dull purplish and larger flowers (corolla-lobes a line and a half wide), said to have the scent of *Calycanthus*-blossoms. — Dry woods, near Lexington, Kentucky, *Short, Peter*.

G. hirsútus, Michx. Commonly more hairy: leaves nearly as the preceding, the basal lobes sometimes overlapping: peduncles fewer-flowered: corolla in the bud ovate; its lobes elliptical-oblong, 3 or 4 lines long, barely puberulent outside, dull or brownish-purple: margin of the crown obtusely 10-crenate. — Fl. i. 119 (excl. syn. Walt.); Gray, Man. l. c., excl. syn. in part. *Apocynum hirsutum*, etc., Pluk. Alm. 37, t. 76. — Maryland and Virginia to Tennessee and Florida. Corolla in dried specimens showing some reticulate venation.

++ ++ Crown of thinner texture, 5-lobed and with intermediate geminate or 2-cleft longer teeth: peduncle commonly longer and inflorescence more cymose or umbellate-clustered: leaves, &c., as in the preceding species: flower-bud oblong, barely puberulent outside.

G. Carolinénsis, R. Br. Corolla brownish-purple; the lobes oblong or linear-oblong, 4 or 5 lines long: crown undulately and very obtusely 5-lobed and with a longer bifid subulate process in each sinus which equals or somewhat surpasses the stigma. — Rœm. & Schult. l. c. 62; Ell. Sk. i. 328 (excl. fruit); Gray, Proc. Am. Acad. l. c. *G. hirsutus*, Sweet, Br. Fl. Gard. t. 1. *Cynanchum Carolinense*, Jacq. Coll. ii. 228, & Ic. Rar. t. 342. *Vincetoxicum acanthocarpus*, Walt. Car. 104, ex char. — S. Carolina to Louisiana and Arkansas.

G. Baldwiniánus, Sweet. Corolla whitish, thin in texture; the lobes less spreading, oblong or becoming spatulate, 4 or 5 lines long: crown almost membranaceous, deeply cleft; the 5 broader lobes quadrate, with the summit commonly emarginate; in their sinuses a pair of slender linear-subulate processes of about double the length, which prominently surpass the stigma. — *G. macrophyllus*, Ell. Sk. i. 327 ("corolla obscure yellow"), not Michx. *G. Carolinensis*, Nutt. Gen. i. 163 ("flowers yellowish"), not R. Br. *G. hirsutus*, Lodd. Cab. t. 365? — Georgia and Alabama (*Buckley*, "flowers white") to N. W. Arkansas, *Engelmann*; "flowers whitish with offensive odor." Transition to *Polymeria* of Decaisne.

* * Flowers solitary and subsessile in the axils: corolla depl'y 5-cleft: anthers prominent and more separate from the stigma.

G. sagittifólius, Gray. Barely puberulent, small and low, but twining: leaves rather fleshy (a quarter to half inch long, and with petiole of half the length), sagittate, with auricles obtuse or rounded: corolla "yellow," glabrous, 2½ lines long; the lobes lanceolate-linear: crown at the base of corolla, entire and saucer-shaped: follicles lanceolate, smooth and nearly glabrous. — Proc. Am. Acad. xii. 77. — Mountain sides along the Rio Limpio, Western Texas, *Wright*. A peculiar species, in Bot. Mex. Bound. confounded with *G. pareifolius*.

§ 3. **CHTHAMÁLIA, Gray, l. c.** Corolla not conspicuously venulose-reticulated, campanulate or rotate: crown appendaged or crested within, or else double (the internal appendages being free), inserted at the junction of the column with the corolla, or more adnate to one or the other: anthers more prominent and distinct from the stigma (not rarely with short corneous wings in the manner of *Asclepias*): flowers small: stems mostly low and little or not at all twining. — *Chthamalia* (at least in part) & *Lachnostoma*, in part, Decaisne in DC. l. c. *Lachnostoma*, Benth. & Hook. in part, not HBK. (The first species nearly wants the technical character.)

* Peduncles none, or merely a terminal one by the reduction of uppermost leaves to bracts: pedicels 2 or 3 in a fascicle, as long as the flower: stems a foot or two long, procumbent or diffuse, not twining.

G. pubiflorus, Engelm. Soft-pubescent and somewhat hirsute: leaves (about an inch long) broadly cordate or reniform, on petioles hardly longer than the basal lobes, the upper acute or sometimes acuminate: pedicels rather shorter than the flower: corolla campanulate, 5-cleft barely to the middle (3 lines long); its lobes oblong-ovate, very villous inside: crown globular cup-shaped, higher than the anthers and acutely 5-angled stigma, thinnish, obscurely 5-lobed at the involute somewhat plaited summit; the lobes undulate-truncate and with a prominent callous tip, obscurely glandular within, and the tube within traversed with 5 light salient (or almost obsolete) ribs or crests; also 5 small adnate auricles at very base within: follicles "oval, smooth." — Pl. Lindh. i. 44; Torr. Bot. Mex. Bound. 165. *G. prostratus*, Baldw. in Ell. Sk. i. 329, not R. Br. *Clithamalia pubiflora*, Decaisne in DC. l. c. 605. — Georgia, on sandhills of the Altamaha River, &c., Lyon, Baldwin, LeConte: rare.

G. biflorus, Nutt. Hirsute-villous: leaves cordate (an inch or so in length), on slender petioles much longer than basal lobes, the upper triangular-cordate, uppermost occasionally reduced and bract-like: pedicels in pairs or sometimes solitary, nearly equalling the petiole: corolla rotate, deeply 5-cleft, dark dull-purple ($2\frac{1}{2}$ lines long); the lobes oblong, sparsely pubescent both sides: crown saucer-shaped, 5-lobed, and the sinuses occasionally 2-3-denticulate; the lobes traversed within by a salient canaliculate crest, which at base is adnate to the base of the column and at summit extends into a conspicuous callous acumination which incurses over the edge of the stigma: follicles muricate. — Torr. l. c. 165. *Clithamalia biflora*, Decaisne, l. c. — Arkansas (Nuttall, &c.) and Texas.

Var. Wrightii, a form with corolla almost 5-parted into oblong-linear lobes: the callous acumination of the crown shorter, and the large and stout follicles hirsute as well as muricate. — E. Texas, Wright.

G. cynanchoides, Engelm. Pubescent and somewhat hirsute: leaves cordate (an inch or two long) on short petioles mostly longer than the basal lobes, the upper often ovate-lanceolate and subcordate, uppermost not rarely reduced to bracts; the inflorescence thus becoming somewhat racemose-clustered at naked summit: pedicels also in pairs from a few of the axils below, rather longer than the petiole: corolla rotate-campanulate, dark greenish-purple (2 lines long), almost 5-parted; its lobes ovate or oblong, somewhat pubescent outside, glabrous within: crown saucer-shaped, thick, 5-lobed; the lobes broad and rounded, with a callous obscurely 3-crenulate margin, appendaged inside by a prominent crest or ligule; which is free and obtuse at apex, channelled below, and at base decurrent on the column: anther-tips (as in preceding) partly inflexed over the stigma: follicles ovate, sparsely short-muricate, pubescent. — Pl. Lindh. i. 43; Torr. l. c. — Dry prairies, Arkansas and Texas, Berlandier, Drummond, Lindheimer, &c.

* Peduncles none: flowers solitary (or rarely geminate) and nearly sessile in the axils of the very small and somewhat hastate leaves: stems low but twining.

G. parvifolius, Torr. Puberulent, much branched, sparingly climbing: leaves thickish, deltoid or hastate, 2 to 5 lines long, and rather long-petioled: corolla globose in the bud, barely a line and a half long, dull yellow, glabrous throughout, nearly rotate, deeply 5-lobed; the lobes ovate, obtuse: crown at the base of the very short column, fleshy, deeply 5-lobed; the lobes broadly ovate, obtuse or emarginate, spreading, almost equalling the undivided portion of the corolla, concave, appendaged by a broad and wholly adnate thin crest which is connected with the base of the very short column, and at tip within is extended into a minute projecting tooth. — Bot. Mex. Bound. 166 (excl. fruit); Gray, Proc. Am. Acad. xii. 78. — S. W. Texas, in a cañon of the Rio Grande below Mount Carmel, Parry. Fruit unknown, that described belonging to *G. sagittifolius*.

G. hastulatus, Gray, l. c. Canescently pubescent: filiform stems freely twining: leaves mostly hastate, 2 or 3 lines long, slender-petioled: corolla narrowly oblong in the bud, 2 lines long, whitish, glabrous, 5-parted; the lobes ligulate-linear: crown borne on the summit of the distinct column close to the anthers, of 5 white and thinnish Asclepias-like hoods, which are complicate-concave, acutely 3-toothed at summit, its internal crest free at the apex, falcate, and extended into a subulate process which is inflexed over the stigma: follicles fusiform, sparsely muricate. — *Lachnostoma hastulatum*, Gray, Bot. Calif. i. 620. — Tantillas Cañon, below the southern boundary line of California, Palmer.

* * * Peduncles at the axils shorter than the leaf and umbellately 3-5-flowered: corolla 4 lines long: crown cup-shaped, crenately lobed: stem twining or trailing, 2 to 4 feet long.

G. productus, Torr. Minutely pubescent: leaves sagittate-cordate, or the broadest with somewhat reniform base, and above gradually tapering-acuminate (an inch or two long), the rounded and mostly incurved auricles much shorter than the slender petiole: peduncles about the length of the petiole: corolla oblong-campanulate, as long as the pedicel, dull greenish-purple, puberulent outside, nearly glabrous within, 5-cleft to rather below the middle; the lobes linear-oblong, somewhat erect: crown nearly equalling the anthers and stigma, thinnish, inserted at base of the short column, and connected with it by 5 membranaceous lamellæ or crests (2-toothed at the upper edge, which only is free) opposite the short lobes, the cavity of the crown thus as it were 5-celled: follicles ovate, smooth. — Bot. Mex. Bound. 185. — W. Texas to Arizona. (Adjacent Mex.)

* * * * Peduncles at the axils and terminal, filiform, surpassing the leaves, somewhat racemously several-flowered: corolla a line long: crown lacinate and double: stems not twining.

G. parviflorus, Gray, l. c. Hirsute-pubescent: stems much branched from the tuberos base, a span or more high: leaves thinnish, ovate or the lower almost orbicular, not cordate, often undulate, an inch or less long, short-petioled, the upper acute or acuminate: slender peduncles 1 to 4 inches long: flowers short-pedicelled: corolla rotate, purplish, glabrous, 5-parted; the lobes ovate, becoming lanceolate: crown free from the column, membranaceous, 5-parted; the lobes each deeply cleft into a pair of slender subulate processes and before their base each augmented with a similar and rather longer free one, all of them surpassing the stigma and more or less connivent over it: follicles large, ovate, pubescent, tuberculate-muricate. — *Lachnostoma? parviflorum*, Torr. Bot. Mex. Bound. 165. — S. W. Texas, Wright, Schott.

ORDER LXXXIX. LOGANIACEÆ.

Herbs, shrubs, or within the tropics trees, a few climbing, destitute of milky juice; distinguished by having, along with a free 2-celled ovary and axile placenta, opposite (occasionally verticillate) simple leaves, and stipules between their bases, or a stipular line or narrow membrane in their place; the flowers regular and 4-5-merous, with stamens on the tube or throat of the corolla alternate with its lobes; pollen of ordinary loose grains; style one; stigma terminal; amphitropous or anatropous seeds, and embryo rather small in copious albumen. Therefore mainly like *Rubiaceæ*, but with a superior ovary, while they also variously approach *Apocynaceæ*, *Gentianaceæ*, and even *Scrophulariaceæ*. The greater part tropical.

TRIBE I. GELSEMIÆ. Stigmas 4, the apex of the style being twice 2-cleft.

1. **GELSEMIUM**. Calyx 5-parted, imbricated. Corolla open-funnelform, 5-lobed; the lobes broad and imbricated in the bud. Stamens 5, on the tube of corolla: anthers linear or oblong and sagittate. Style filiform; the 4 lobes stigmatose inside. Ovules numerous in each cell, on linear placenta. Capsule elliptical, compressed contrary to the narrow partition, septical; the conduplicate valves at length 2-cleft at the apex. Seeds several or numerous in each cell, winged. Embryo straight or slightly curved in fleshy albumen; the ovate flat cotyledons much shorter than the slender radicle.

TRIBE II. LOGANIEÆ. Stigma single, entire or barely 2-lobed. Ovules numerous.

* Corolla valvate in the bud, 5-lobed: capsule didymous or 2-lobed: herbs.

2. **SPIGELIA**. Calyx 5-parted; the lobes narrow, usually very slender. Corolla tubular-funnelform or salverform, 15-nerved. Stamens 5: anthers linear or oblong, 2-lobed at base. Style filiform, articulated near or below the middle, the upper part often hollow, above puberulent or pubescent. Ovules numerous in each cell, on a peltate stipitate placenta. Capsule didymous, somewhat compressed contrary to the partition, circumscissile above the cupule-like persistent base, and 2-cocccous, the carpels soon loculicidally 2-valved. Seeds few, peltate, angled by mutual pressure, closely packed on the placenta into a globular mass. Embryo short and straight in fleshy or cartilaginous albumen.

3. **MITREOLA.** Calyx 5-parted; the lobes lanceolate. Corolla small, urceolate, bearded in the throat. Stamens 5, short; anthers cordate. Ovary 2-celled and with a broad tip: style short, early dividing into two from the base, united by a common stigma, soon wholly separate and divergent. Capsule divaricately 2-lobed or 2-horned at summit, dehiscent by the ventral suture of each lobe. Seeds numerous, small, on stipitate placenta. Embryo linear, nearly the length of the fleshy albumen.

* * Corolla imbricated in the bud, 4-lobed, sometimes 5-lobed: embryo small and straight in fleshy albumen. Pentamerous flowers occasionally occur.

+ Calyx deeply 4-5-parted: capsule loculicidal: annual herb.

4. **POLYPREMUM.** Corolla campanulate, bearded in the throat, shorter than the subulate foliaceous sepals. Stamens 4, inserted low on the tube of the corolla, included: anthers ovate. Style short: stigma capitate, entire or obscurely 2-lobed. Capsule globular-ovoid but slightly compressed contrary to the partition and didymous, loculicidally 2-valved and at length somewhat septicidal. Seeds numerous on oblong placenta ascending from near the base of the partition, minute, smooth.

+ + Calyx 4-toothed or 4-cleft: capsule septicidal, globose or oblong; valves mostly 2-cleft at apex and separating from the united placenta: shrubs, with leaves often dentate!

5. **BUDDLEIA.** Calyx campanulate. Corolla rotate-campanulate (or sometimes salverform); the lobes ovate or orbicular. Anthers 4, sessile or almost so in the throat or tube of the corolla, ovate or oblong-cordate.

6. **EMORYA.** Calyx oblong, 4-cleft; the lobes linear-subulate. Corolla salverform, with tube somewhat enlarged above; the short lobes ovate. Stamens exserted: filaments filiform and elongated, inserted on the middle of the tube: anthers cordate-oblong. Style very long and filiform.

1. **GELSÉMIUM**, Juss. "YELLOW JESSAMINE" of S. States. (*Gelsemino*, an Italian name of the Jessamine.) — Twining and glabrous shrubby plants, with a mere line marking the place of the minute glandular caducous stipules, connecting the bases of the opposite or sometimes ternate entire leaves; the flowers showy, in ours heterogone-dimorphous, fragrant, produced in spring. — Two E. Asian species and the following.

G. sempervirens, Ait. Stems slender, climbing high: leaves evergreen, thin-coriaceous, shining, oblong- or ovate-lanceolate ($1\frac{1}{2}$ to $2\frac{1}{2}$ inches long): peduncles very short, axillary, scaly-bracteolate, cymosely 1-3-flowered: corolla deep yellow, over an inch long: stigmas of one form and anthers of the other protruding: capsule deeply sulcate down the flat sides, cuspidate-pointed. — *Gelsemium* seu *Jasminum lateum odoratum*, etc., Catesb. Car. i. 53, t. 53. *Bignonia sempervirens*, L. Spec. ii. 623. *Anonymos sempervirens*, Walt. Car. 99. *Gelsemium nitidum*, Michx. Fl. i. 120. *G. lucidum*, Poir. "Herb. Amat. 3, t. 169." — Woods and low grounds, E. Virginia to Florida and Texas. (Mex.)

2. **SPIGÉLIA**, L. PINK-ROOT. (*Adrian Spiegel*, latinized *Spigellius*, a Dutch botanist of the 17th century.) — Herbs, rarely suffruticose (all American), usually low; with membranaceous and more or less pinnately veined entire leaves, and small interpetiolar stipules or a transverse membranous line. Upper portion of the style usually, but not always, furnished with pollen-collecting hairs: the stigma terminal, usually emarginate or 2-lobed: lower part or base of the style persistent. — Our species glabrous, or merely scabrous-puberulent on the veins, &c.: stems 4-angled: flowering in early summer.

§ 1. Flowers showy, unilateral-spicate on the single or sometimes geminate or umbellate and naked terminal peduncles of a scorpioid inflorescence: bracts minute and subulate or wanting: corolla red or pink, elongated-tubular, not plicate and the edges of the lobes slightly or not at all turned outward in the bud: anthers and especially the summit of the style exserted; the articulation of the latter low down: root perennial, fibrose.

S. Marilándica, L. INDIAN PINK, &c. Stem a foot or two high: leaves from ovate-lanceolate to ovate and acuminate, 2 to 4 inches long, closely sessile by a rounded base, one or two pairs of veins basal: inflorescence 1-2-spicate, short-pedunculate: corolla scarlet outside, yellow within, an inch and a half long; the tube somewhat clavate, four times the length of ovate-lanceolate lobes. — Mant. 338; Bot. Mag. t. 80; Lodd. Cab. t. 930; Bigel. Med. ii. t. 14. (Catesb. Car. ii. t. 78.) *Lonicera Marilandica*, L. Spec. — Woodlands, New Jersey to Wisconsin and Texas.

§ 2. Flowers smaller, naked spicate as in the preceding: corolla white or purplish, funnelform; the limb more or less plicate in the bud with the edges of the lobes turned outward: anthers and style included.

S. gentianoides, Chapm. Stem a span to a foot high from a perennial root, roughish: leaves ovate and the lower roundish, an inch or more long: spike few-flowered: corolla an inch long; the ovate-lanceolate lobes rather erect. — A.DC. Prodr. ix. 5; Chapm. Fl. 182. — Light soil, W. Florida, *Chapman*.

§ 3. Flowers small, terminal and in the forks of leafy branches, mostly short-peduncled: corolla nearly salverform, white or nearly so; the limb plicate in the bud and the edges turned outward: anthers and style included; the latter articulated in the middle, its tubular upper portion beset with collecting hairs fully half way down: root annual? — *Cælostylis*, Torr. & Gray.

S. loganioides, A.DC. A span or more high, ascending: leaves oval, sessile (half to three-fourths inch long): sepals narrowly linear and with the scarios margins denticulate: corolla 4 or 5 lines long, somewhat funnelform: capsule with minutely granulate surface (not lineolate): seeds smoothish. — Prodr. ix. 4. *Cælostylis loganioides*, Torr. & Gray in Endl. Iconogr. t. 101 (heard on the style represented too short), & Fl. N. Am. ii. 44. — E. Florida, near Fort King, &c., *Dr. Burrows, Rugel, Buckley*.

S. Lindheimeri. A span high, diffusely much branched from the base, puberulent-scabrous: leaves from ovate-oblong to lanceolate (an inch or less long), acutish at base, the lower somewhat petioled: sepals linear and the scarios margins conspicuously denticulate: corolla salverform, 4 lines long: capsule minutely lineolate: seeds at maturity tuberculate-rugose as well as minutely pitted. — Prairies of W. Texas, *Lindheimer, Wright*.

S. Texána, A.DC. l. c. About a foot high, nearly smooth and glabrous: leaves ovate-to lanceolate-oblong, thinner and larger (one or two inches long), mostly acute at both ends, the lower somewhat petioled: sepals setaceous-subulate, only one-nerved; the margins very obscurely serrulate-scabrous: corolla salverform, half inch long: capsule smooth, not lineolate: seeds minutely rugulose and punctate. — *Cælostylis Texana*, Torr. & Gray, l. c. — E. Texas, *Drummond, Lindheimer, Wright, &c.*

3. MITRÉOLA, L. (Diminutive of *mitra*, a turban or mitre, from the shape of the capsule.) — Glabrous low herbs (E. American, Asiatic and Australian), ours annuals; with entire leaves, small entire stipules between them, and very small white flowers unilaterally spicate on the naked branches of the terminal cyme: fl. summer. — *Cynoctonum*, Gmelin.

M. petioláta, Torr. & Gray. A foot or two high: leaves membranaceous, from oblong-lanceolate to ovate (1 to 3 inches long), acute, narrowed at base into more or less of a petiole. — Fl. N. Am. ii. 45; A.DC. Prodr. ix. 8; Progel in Mart. Fl. Bras. vi. t. 82, fig. 1. *Ophiorhiza Mitreola*, L. Spec. i. 150; Swartz, Obs. t. 3. *O. lanceolata*, Ell. Sk. i. 238. *Anonymos petiolata*, Walt. Car. 108. *Cynoctonum petiolatum*, Gmel. Syst. 4. *Mitreola ophiorhizoides*, A. Rich. Mém. Soc. Nat. Hist. Par. i. 63, t. 3, includes both our species. — Wet grounds, E. Virginia to Texas. (Mex., W. Ind., &c.)

M. sessilifolia, Torr. & Gray, l. c. Stems more simple and virgate: leaves thicker and firmer in texture (half inch or more long, and veins more prominent), roughish-margined, from round-oval to oblong, sessile: flowers and fruit smaller and more crowded. — *Anonymos sessilifolia*, Walt. l. c. *Cynoctonum sessilifolium*, Gmelin, l. c. *Ophiorhiza Mitreola*,

Michx. Fl. i. 148. *O. ovalifolia*, Muhl. Cat. *O. Croomii*, Curtis in Bost. Jour. Nat. Hist. i. 128. Var. *angustifolia*, Torr. & Gray, l. c., is a depauperate state of the narrower-leaved form. — Moist ground, N. Carolina to Florida and Louisiana.

4. POLYPRÉMUM, L. (Name altered from *πολύπρεμος*, with many trunks, from the diffuse branching next the ground.) — Single species, an insignificant weed: fl. late summer.

P. procumbens, L. A span or more high, much branched from an annual (sometimes almost ligneous) root, glabrous; the rigid stems erect or ascending rather than procumbent, 4-angled, repeatedly branching; leaves narrowly linear or almost acerose, half inch or more long, the uppermost gradually reduced to bracts, their margins obscurely scabrous, their bases united by a membranous stipular line: flowers sessile in the forks or somewhat cymose at the summit of the branches: inconspicuous corolla barely a line long, white. — Act. Ups. 1741, t. 78; Lam. III. t. 71. *P. Linnei*, Michx. Fl. i. 83. — Sandy soil, Penn. (adventive), Maryland to Texas. (Mex., W. Ind.)

5. BUDDLEIA, Houston. (*Adam Buddle*, an early English botanist, who corresponded with Ray.) — Shrubs, or some arborescent, a few herbaceous (mainly tropical), usually canescent or tomentose with floccose or furfuraceous stellate down; the leaves sometimes dentate, the petioles connected by a transverse stipular line, or by more evident stipules. Flowers commonly small, and crowded into capitate clusters or cymules, which are variously disposed; rarely some are 5-merous; the corolla in our few (chiefly Mexican) species very short.

* Flowers in comparatively loose and very numerous clusters, disposed in an ample and naked terminal panicle.

B. Humboldtiana, Rœm. & Schult. Minutely ferrugineous-tomentose: leaves oblong- or ovate-lanceolate, acuminate, denticulate, 3 inches long, rounded at base, rather long-petioled, copiously pinnately-veined, in age glabrate above: flowers a line and a half long. — Benth. in DC. Prodr. x. 433. *B. acuminata*, HBK. Nov. Gen. & Spec. ii. 349, t. 187, not Poir. — Mexican borders of S. W. Texas and New Mexico, *Thurber*, &c. (Mex.)

B. lanceolata, Benth., with smaller and narrower leaves tapering to base, and simpler contracted inflorescence, also inhabits Northern Mexico, and may reach the boundary. *B. crotonoides*, Gray, Proc. Am. Acad. v. 165, is from Lower California, under the tropic.

* * Flowers in numerous and small dense pedunculate heads, disposed in a virgate raceme.

B. racemosa, Torr. Stems 1 to 3 feet high, loosely branching, nearly glabrous: leaves from ovate-oblong to oblong-lanceolate with a truncate or obscurely hastate base, irregularly crenate-dentate, mostly obtuse, thinnish, 2 to 4 inches long, short-petioled, green and glabrous above, puberulent-canescant beneath: raceme of heads a span to a foot long: heads about a quarter inch in diameter, on shorter or longer peduncles: corolla little exceeding the tomentulose calyx. — Bot. Mex. Bound. 121. — Rocky banks, W. Texas. *Lindheimer*, *Riddell*, *Wright*, &c.

Var. incana, Torr. l. c. Leaves barely an inch long, fulvous-canescant-tomentose beneath. — San Pedro River, W. Texas, *Wright*.

* * * Flowers in solitary or geminate heads or capitate clusters: leaves, branches, and heads densely soft-tomentose throughout.

B. marrubifolia, Benth. l. c. Much branched, canescent or ferrugineous: leaves ovate or oval with cuneate base, areolate, about half inch long, short-petioled, the dense tomentum somewhat velvety: flowers in a globose terminal head (half inch in diameter) on a short peduncle, "odorous: corolla golden yellow turning orange red." — Torr. Bot. Mex. Bound. 121. — S. Texas on the Rio Grande. (Mex.)

B. scordioides, HBK. Much branched, ferrugineous-tomentose: leaves narrowly oblong or cuneate-linear, nearly sessile, obtuse, coarsely crenate, rugose, an inch or less long: dense clusters of flowers sessile in the axils of all the upper leaves, the pair combined around the stem into a globular head. — Nov. Gen. & Spec. l. c. t. 183; Torr. l. c. — S. E. Texas to Arizona. (Mex.)

6. **EMÓRYA**, Torr. (In honor of Major, now General, *W. H. Emory*, the U. S. Commissioner of the Mexican Boundary Survey in which the plant was discovered.) — Single known species.

E. suavéolens, Torr. Shrub 3 to 6 feet high, much branched, somewhat pulverulent or puberulent: the leaves canescent beneath, somewhat deltoid or hastate, sinuate-dentate with a few coarse teeth, obtuse, petioled, half inch or more long: inflorescence a narrow and pedunculate thyrsus or panicle: flowers pedicellate, loose and rather few, sweet-scented: corolla over an inch long, "greenish-white or yellowish;" the roundish lobes only a line or two long. — Bot. Mex. Bound. 121, t. 36; Benth. & Hook. Gen. ii. 794. — Cañons of the Rio Grande, Texas, below Presidio, *Perry*.

ORDER XC. GENTIANACEÆ.

Herbs, with bitter colorless juice, and (the *Menyantheæ* excepted) with opposite or rarely verticillate simple and entire sessile leaves, no stipules, perfect and regular flowers, persistent calyx and often marcescent corolla, the latter (with one or two exceptions) dextrorsely convolute in the bud, a one-celled free ovary with 2 parietal many-ovuled placenta, or the whole parieties ovuliferous, single style and usually 2-lobed or 2-lamellate stigma, and the capsule dehiscient through the placenta. Seeds indefinitely numerous, or rarely few, anatropous, commonly small, and with a minute embryo in fleshy albumen. Stamens, as in all the related orders, borne on the tube or base of the corolla, as many as its lobes and alternate with them: anthers in our genera 2-celled and opening longitudinally. Style rarely cleft, at least the divisions stigmatose down the inner face of the lobes. Plants almost all glabrous and smooth throughout, and the flowers cymose or simply terminal. Ovary in all our genera one-celled, or half two-celled by introflexion of the placenta (in some exotic genera 2-celled). The *Menyantheæ* differ almost ordinarily in the foliage and æstivation. *Obolaria* and *Burtonia* are remarkable for the imbricated æstivation of the corolla: the sepals of the latter are reduced to two: their lower leaves or scales are often alternate.

SUBORDER I. GENTIANEÆ. Leaves always simple and entire, sessile (except some radical ones), never alternate, except in one *Sivertia*. Æstivation of the corolla never valvate.

* Lobes of the corolla convolute in the bud.

+ Style filiform, usually deciduous from the capsule: stigma bilamellar or bicurval, but the divisions at first often connivent as if united, the flowers being proterandrous: seeds numerous, with a close and reticulated or foveolate coat.

++ Calyx 4-toothed and 4-angled: anthers cordate-ovate and unchanged in age.

1. **MICROCALA.** Corolla short-salverform, bearing the 4 short stamens in its throat. Stigma as if compressed-capitate, but of 2 flabelliform lobes which at length separate.

++ ++ Calyx 5-12- (or in *Erythraea* sometimes 4-) cleft or parted: anthers oblong to linear, mostly twisting or curving in age: placenta more or less intruded.

2. **ERYTHRÆA.** Parts of the flower 5 or sometimes 4. Calyx-lobes narrow and carinate. Corolla salverform with either a short or rather long tube. Filaments slender: anthers oblong or linear, commonly exerted, twisting spirally in one or two turns after anthesis. Style filiform: stigmas from oblong to flabelliform. Capsule from oblong-ovate to fusiform.

3. **SABBATIA.** Parts of the flower 5 to 12. Corolla rotate. Filaments filiform, rather short: anthers linear or elongated-oblong, soon arcuate, recurved, or revolute. Style 2-cleft or 2-parted; the lobes filiform, compressed-clavate or spatulate, introrsely stigmatose for most of their length. Capsule globose or ovoid, thick-coriaceous or at first fleshy.

4. **EUSTOMA**. Parts of the flower 5, rarely 6. Calyx-lobes long-acuminate, the midrib carinate. Corolla campanulate-funnelform. Filaments filiform-subulate: anthers oblong, versatile, straight or recurving in age. Style filiform, nearly persistent: stigma of 2 broad oblong or oval lamellæ. Capsule oval or oblong.
- + + Style short or subulate and persistent, or none: anthers remaining straight.
- + + Corolla without nectariferous pits or large glands: flowers usually 4-5-merous.
5. **GENTIANA**. Calyx commonly with a membranous or spathaceous tube. Corolla funnelform, campanulate, or salverform (or some rotate); the sinuses with or without plaits or appendages. Stamens inserted on the tube of the corolla. Style very short or none: stigma of 2 spreading (rarely united) lamellæ, persistent. Seeds very numerous, not rarely covering the whole parieties of the thin capsule.
6. **PLEUROGYNE**. Calyx deeply 4-5-parted. Corolla rotate, 4-5-parted; the divisions acute, a pair of scale-like appendages on their base. Stamens on the base of the corolla: anthers introrse, versatile. Style none: stigmas decurrent down the sutures. Capsule lanceolate or oblong, not stipitate. Seeds extremely numerous, near the two sutures.
- + + Corolla with one or two nectariferous pits, spots (glands), or an adnate scale to each lobe: calyx 4-5-parted: seeds comparatively large.
7. **SWERTIA**. Corolla rotate, 5- (rarely 4-) parted; the lobes dextrorsely convolute in the bud. Style none, or very short: stigma 2-lamellate or 2-lobed. Capsule ovate; the placenta not intruded. Leaves sometimes alternate.
8. **FRASERA**. Corolla rotate, 4-parted; the lobes dextrorsely convolute in the bud, bearing a single or double fringed gland, and sometimes a fimbriate crown at base. Stamens on the very base of the corolla: filaments subulate, often monadelphous at base, occasionally with some interposed small bristles or scales. Ovary ovate, tapering into a distinct and often slender (but sometimes very short) persistent style: stigma small, 2-lobed or nearly entire. Capsule coriaceous, commonly flattened; the placenta or edges of the valves not intruded. Seeds comparatively few, compressed, commonly smooth and margined. Leaves verticillate or opposite.
9. **HALENIA**. Corolla campanulate, 4-5-cleft; the lobes sinistrorsely convolute, mostly erect; underneath each a hollow nectariferous spur or gibbous projection, which is glandular at bottom (sometimes obsolete): no fringes nor crown. Filaments slender, inserted on the tube of the corolla. Ovary and capsule ovate-oblong; the placenta more or less introflexed: style very short or none: stigmas 2. Ovules and close-coated seeds oval or globular, in a single series on the margin of the valves.
- * * Lobes of the corolla imbricated in the bud, i.e. 4, two exterior and two interior: no appendages: ovules and extremely numerous minute close-coated seeds covering the whole parieties of the ovary and capsule: stamens inserted in or little below the sinuses of the corolla: anthers ovate-sagittate: foliage hardly any or discolored.
10. **BARTONIA**. Calyx deeply 4-parted; the sepals lanceolate-subulate, carinate. Corolla deeply 4-cleft, somewhat campanulate. Filaments slender, much longer than the anthers. Stigma nearly sessile, of 2 erect or closed short lobes. Capsule oblong, acute, 2-valved.
11. **OBOLARIA**. Calyx of 2 foliaceous spatulate sepals! Corolla oblong-campanulate, 4-cleft; the lobes oval-oblong or in age spatulate. Filaments not longer than the anthers. Ovary rather thick-walled, and with four thicker equidistant projections, making the cavity cruciform: style distinct: stigma bilamellar. Capsule membranaceous, 2-valved or rupturing irregularly.

SUBORDER II. MENYANTHEÆ. Leaves all alternate and mostly petioled, sometimes trifoliate, or crenate. Estivation of the corolla induplicate-valvate. Seed-coat crustaceous. Marsh or aquatic perennials: flowers heterogonous.

12. **MENYANTHES**. Calyx 5-parted. Corolla somewhat funnelform or campanulate, 5-cleft; the lobes widely spreading, fimbriate-bearded or crested on the face. Stamens on the tube of the corolla: anthers sagittate, versatile. Hypogynous glands 5. Ovary surmounted by a long style: stigma bilamellate, 2-lobed. Capsule globular, tardily 2-valved or irregularly bursting across the top. Seeds rather few and large, orbicular and compressed; the close crustaceous coat smooth and shining. Flowers on a scape.
13. **LIMNANTHEMUM**. Calyx 5-parted. Corolla almost rotate and deeply 5-cleft; the lobes naked on the face (but sometimes fimbriate on the broadly induplicate margins). Stamens inserted on the base of the corolla. Style short or none. Capsule ovoid or oblong, indehiscent or irregularly bursting. Flowers (in ours) as if borne on a filiform petiole.

1. **MICRÓCALA**, Link. Compounded of *μῖζρός*, small, and *κίλι* or *καλός*, beautiful: should have been *Microcalia*, but that proper form of the name was preoccupied. — One European species and the following: fl. in spring.

M. quadranguláris, Griseb. A little annual, with simple or branching filiform stem, 2 or 3 inches high: branches or peduncles 1-flowered: leaves 2 or 3 pairs, oval or oblong, 2 or 3 lines long: calyx at first oblong-campanulate; in fruit broader, truncate at top and bottom, strongly 4-angled; the teeth short and subulate: corolla saffron-yellow, 3 lines long. — DC. Prodr. ix. 63; Progel in Mart. Fl. Bras. vi. 213, t. 58, fig. 3; Gray, Bot. Calif. i. 480. *Eracum quadrangulare*, Willd. Spec. i. 636. *E. inflatum*, Hook. & Arn. in Jour. Bot. i. 283. *Cicendia quadrangularis*, Griseb. Gent. 157. — Open moist ground, coast of California, from Mendocino Co., southward. (S. Amer.)

2. **ERYTHRÆA**, Renealm. **CENTAURY**, **CANCHALAGUA**. (From *ἐρυθρός*, red, the flowers being mostly red or rose-color.) — Low herbs (of various parts of the world), mainly annuals and biennials; the flowers small or middle-sized, but commonly numerous, in summer. Corolla-lobes becoming narrower with age.

E. CHIRONIODES and **E. SPECIOSA**, Gray, Bot. Calif. i. 479, are Mexican species, not yet found near our borders, forming a section (the genus *Gyandra* of Grisebach) with tube of the corolla rather shorter than the ample lobes, and an oval capsule. All our species have a longer and narrower capsule (elongated-oblong or cylindraceous), and a longer tube to the corolla. Our *E. venusta*, as to the corolla, is the connecting form.

* Flowers spicately disposed along the rather simple branches and sessile in the few forks.

E. SPICÁTA, Pers. Strictly erect, a foot or less high: leaves oblong: tube of the rose-colored corolla hardly longer than the calyx-lobes, twice the length of the rather narrow lobes. — *E. Pickeringii*, Oakes in Hovey Mag. *Chironia spicata*, Smith, Fl. Græc. t. 238. — Coast at Nantucket, Mass. (*Oakes*), and Portsmouth, Virginia (*Rugel*). (Nat. from Eu.)

* * Flowers cymose or paniculately scattered; ours all rose-red, and with broad stigmas.

+ European species sparingly naturalized in the Atlantic United States: stigmas broadly oval or obovate: lobes of the corolla oblong, obtuse.

E. CENTAURIUM, Pers. Strictly erect, a span to a foot high: leaves oblong, the lowest forming a rosulate tuft at the root: flowers cymose-clustered, at least the middle ones sessile: lobes of the corolla $2\frac{1}{2}$ or 3 lines long. — Waste grounds, shores of Lake Ontario (Oswego, New York) and Lake Michigan, *Babcock*: rare. (Nat. from Eu.)

E. RAMOSÍSSIMA, Pers. Lower, more slender, diffusely branched: leaves from oval to lanceolate, the lowest not rosulate: flowers effusely cymose, pedicelled: lobes of the corolla only 2 lines long. — *E. pulchella*, Fries, Novit. ii. 31 (Grisebach's var. *pulchella*, merely a small form). *E. Muhlenbergii*, Griseb. in DC. Prodr. ix. 60, as to pl. N. Y. and Penn. *Eracum pulchellum*, Pursh, Fl. i. 100? *Chironia pulchella*, Muhl. Cat. 23. — E. Pennsylvania, New Jersey, &c.: rare. (Nat. from Eu.)

+ + Species indigenous from Texas to California: stigmas cuneate or flabelliform and truncate: no rosulate tuft of radical leaves.

++ Flowers small: lobes of the corolla only $1\frac{1}{2}$ to $2\frac{1}{2}$ lines long, much shorter than the tube: anthers oblong.

E. Texénsis, Griseb. Slender, diffusely much branched above into a loose paniculate-corymbose cyme: leaves linear or the lowest lanceolate and the uppermost reduced to subulate bracts: flowers all slender-pedicelled: corolla (apparently light rose-color) with very slender tube (4 or 5 lines long), and lanceolate-oblong lobes (2 lines long), which become lanceolate-linear, longer, and acute: seeds globose-ovoid. — DC. l. c. 98. — Texas, common on rocks and hills.

E. floribúnda, Benth. Almost a foot high, corymbose-cymose at summit, rather strict and closely flowered: leaves oblong or the upper lanceolate: flowers short-pedicelled or in the forks nearly sessile: lobes of the light rose-colored corolla oblong and becoming lanceolate, at most 2 lines long and 3 or 4 times shorter than the tube: anthers short-oblong (shorter than in any other of this section and the stigmas smaller): seeds globular-ovoid. — Pl. Hartw. 322; Gray, Bot. Calif. i. 480. — California, on the Sacramento and its tributaries, *Hartweg*, &c.

E. Muhlenbérghii, Griseb. A span or less high, at length fastigiately branched from the base, cymosely flowered at summit: leaves oblong, obtuse; the floral lanceolate: ped-

icels short or hardly any in the forks; the lateral often as long as the flower, but 2-bracteolate at summit: lobes of the rose-red corolla oval, very obtuse or retuse, in age merely oblong, 2 or almost 3 lines long: seeds short-oval. — DC. l. c. 60, as to California plant only; Benth. Pl. Hartw. 322; Gray, Bot. Calif. i. 480. — Western part of California, and south-east to the Mohave.

E. Douglásii, Gray. Slender, a span to a foot high, loosely and paniculately branched, usually sparsely flowered: leaves from oblong to linear, mostly acute: flowers all on strict and slender peduncles or pedicels: lobes of the pink corolla oblong, obtuse, at most 2 lines long, nearly half the length of the tube: seeds globular. — Bot. Calif. i. 480. *E. Nuttallii*, Watson, Bot. King, 276, partly; Gray, Proc. Am. Acad. viii. 398. *Cicendia exaltata*, Griseb. in Hook. Fl. ii. 69, t. 157, wrongly described. — Oregon and California to Utah and Wyoming.

E. Nuttállii, Watson. Like the preceding: lobes of the rather larger corolla more ovate, acutish, sometimes nearly 3 lines long: seeds fewer, and much larger (a third of a line long), oblong. — Bot. King, 276, t. 29, mainly. — Nevada, Idaho, and Utah, *Nuttall, H. Engelmann, Watson.*

++ ++ Flowers larger: corolla-lobes $3\frac{1}{2}$ to 6 lines long, but more or less shorter than the tube: anthers linear.

= Corolla-lobes narrow, in age by involution becoming acuminate: branching and inflorescence fastigate-cymose: filaments and style very slender.

E. trichántha, Griseb. A span or less high: leaves from oblong-oval to lanceolate: flowers in dense cymes, those in the forks all sessile or nearly so: corolla-lobes oblong-lanceolate becoming linear-lanceolate, $3\frac{1}{2}$ or 4 lines long: stigmas small: seeds oval-oblong. — DC. l. c. 60 (excl. var.); Gray, Bot. Calif. i. 479. — Dry ground, W. California.

E. Beyrichii, Torr. & Gray. A span to a foot high, slender, at length fastigiately much branched: leaves linear (an inch or more long, a line or much less in width), the uppermost nearly filiform: flowers very numerous and all pedicellate: corolla-lobes linear-oblong and becoming linear, 5 lines long: seeds globular. — Torr. in Macey Rep. 291, t. 13. *E. trichantha*, var. *angustifolia*, Griseb. in DC. l. c. — Arkansas, *Beyrich, Macey*. Texas, *Wright, Lindheimer.*

= = Corolla-lobes broader and obtuse, little shorter than the tube: inflorescence loose: flowers all pedicellate: seeds globular.

E. calycósa, Buckley. Paniculately or somewhat cymosely branched, a span to 2 feet high: leaves from narrowly oblong to lanceolate or linear: pedicels mostly as long as the calyx or the whole flower: lobes of the corolla oval or oblong, $3\frac{1}{2}$ to 5 lines long; the tube usually equalled by the calyx. — Proc. Acad. Philad. 1862, 7. — W. Texas and New Mexico, *Wright, Buckley, &c.* (Adjacent Mex.)

Var. nána. A span high, with leaves all linear and inflorescence corymbose-cymose: approaching *E. Beyrichii*, but corolla-lobes only 3 or 4 lines long and broadly oblong. — Stony hills, W. Texas, *Wright* (no. 1662), *Woodhouse.*

Var. Arizónica. Stems or branches a foot or so long, lax: inflorescence racemosely paniculate or as if racemose: calyx-lobes mostly shorter than the tube of the corolla. — S. Utah and Arizona, *Wheeler, Palmer, &c.*

E. venústa, Gray. A span or so high: leaves from ovate to oblong-lanceolate: flowers somewhat cymose or paniculate, on short or sometimes long pedicels: lobes of the corolla oval or obovate, becoming oblong, deep pink, 4 to 6 lines long, about the length of the yellowish tube, which is equalled by the calyx. — Bot. Calif. i. 479. *E. trichantha*, Durand in Pacif. R. Rep. v. t. 9, not Griseb. *E. chironioides*, Torr. Bot. Mex. Bound. 156, t. 42, mainly, excl. syn. — Dry hills, California, common from Plumas Co. southward.

3. SABBÁTIA, Adans. (*Liberatus Sabbati*, an early Italian botanist.) — Atlantic North American biennials or annuals; with mostly showy rose-colored or white flowers (in summer and autumn), terminating the branches or in cymes. Calyx in most species deeply parted. Corolla usually with a yellowish or discolored eye. Style closed in early anthesis, and commonly turned to one side of the flower (and sometimes spirally twisted), later erect and its branches or stigmas diverging. Seeds very numerous and small, globular, pitted.

§ 1. Flowers 5-merous (or only occasionally some of them 6-7-merous) : anthers from apically recurved to helicoid.

* Branches all opposite : flowers corymbosely or paniculately cymose, short-pedicelled.

— Calyx very small, merely 5-toothed.

S. macrophylla, Hook. Glaucous : stem simple, terete, 2 or 3 feet high : leaves rather distant, thickish, nearly erect, ovate or ovate-lanceolate with cordate-clasping 3-5-nerved base, acute or mucronate-acuminate (1 to 3 inches long) ; the uppermost reduced to small subulate bracts : cymes flat-topped, naked and in a naked terminal corymb or compound cyme : pedicels short and filiform : teeth of the small calyx subulate and shorter than the tube : corolla white ; the lobes oblong, 3 or 4 lines long : style not cleft to the middle. — Hook. Comp. to Bot. Mag. i. 171 ; Griseb. in DC. l. c. 50 ; Chapm. Fl. 353. — Wet pine barrens, Georgia to Florida and Louisiana.

— Calyx with long and slender or linear lobes : stem more or less 4-angled.

++ Corolla white, fading yellowish : style 2-parted, its divisions spatulate-linear.

S. lanceolata, Torr. & Gray. Stem simple, 2 or 3 feet high, bearing a terminal and naked corymbous cyme : leaves much shorter than the internodes (an inch or so long), from ovate to lanceolate, 3-5-nerved, the floral reduced to subulate bracts : pedicels mostly short but slender : calyx-lobes almost filiform, more than half the length of the corolla : lobes of the latter obovate-oblong, a third to half inch long. — Gray, Man. ed. 1, 356 ; Chapm. Fl. 353. *Chironia lanceolata*, Walt. Car. 95. *C. cymosa*, Lam. Ill. i. 479, therefore *Sabbatia cymosa*, Don, Syst. *C. paniculata*, Michx. Fl. i. 146, partly. *Sabbatia paniculata*, var. *latifolia*, Pursh, Fl. i. 138. *S. corymbosa*, Baldw. in Ell. Sk. i. 283. — Wet pine-barrens, New Jersey to Florida.

S. paniculata, Pursh. Stem a foot or two high, freely branching ; the branches cymosely few-many-flowered and uppermost cymes corymbous : leaves from linear to lanceolate-oblong, obtuse ; the floral mostly linear and acute : pedicels very short to the central flowers : calyx-lobes not more than half the length of the corolla : lobes of the latter spatulate-oblong, 3 lines long. — Fl. l. c. (var. *angustifolia*, & excl. syn. *Swertia difformis*, L.) ; Gray, l. c., not Ell. *Chironia paniculata*, Michx. l. c. partly, and as to char. — Moist or dry ground, Virginia to Florida.

++ ++ Corolla rose-color, varying to white : style cleft to the middle, its lobes slightly clavate.

S. brachiata, Ell. Stem slightly angled, a foot or two high : leaves from lanceolate-oblong to linear, mostly obtuse, obscurely 3-nerved at base : inflorescence thyrsiform-paniculate ; the lateral cymes naked-pedunculate and about 3-flowered : calyx-lobes narrowly linear, shorter than or nearly equalling the light rose-color or nearly white corolla : lobes of the latter obovate-oblong, half inch long. — Sk. i. 284 ; Chapm. l. c. *S. concinna*, Wood, Class-Book, 451. *Chironia angularis*, var. *angustifolia*, Michx. l. c. — Dry or low grounds, Indiana and N. Carolina to Louisiana and Florida.

S. angularis, Pursh. Stem quadrangular with sharp angles, 2 feet high, paniculately branched above ; the branches leafy : leaves cordate-ovate and clasping, 3-5-nerved : numerous and crowded branches few-flowered, pyramidally or somewhat corymbosely cymose : calyx-lobes linear, much shorter than the corolla : lobes of the latter deep rose-color, obovate, fully half-inch long. — Ell. l. c. ; Bigel. Med. t. 57 ; Bart. Med. t. 24 ; Torr. Fl. N. Y. ii. t. 83. *Chironia angularis*, L. ; Michx. l. c., var. *latifolia*. — Rich soil, W. Canada to Florida and Louisiana.

* * Branches alternate or the lower opposite : foliaceous calyx-lobes longer and hardly narrower than the lobes of the corolla : flowers not rarely 6-7-merous : style 2-parted.

S. calycosa, Pursh. Stem a span to a foot long, loosely branching : leaves from oblong to broadly lanceolate, narrowed at base : peduncles scattered, 1-flowered, mostly elongated, occasionally short : calyx-lobes from linear to spatulate, resembling upper leaves, half inch or more long, not rarely double the length of the obovate-spatulate lobes of the rose-colored or almost white corolla. — Bot. Mag. t. 1600. *Chironia dichotoma*, Walt. Car. 93. *C. calycosa*, Michx. l. c. *Gentiana calycina*, Lam. Dict. ii. 638. *Sabbatia gracilis*, var. *Cubensis*, Griseb. Pl. Wright. Cub. ii. 521. — Sea-coast and near it, Virginia to Texas. (Cuba.)

* * * Branches alternate : calyx-lobes slender, seldom exceeding the obovate lobes of the corolla : peduncles more or less elongated and scattered, naked, 1-flowered.

+ Calyx-tube prominently 5-costate, nearly or quite enclosing the retuse capsule: corolla $1\frac{1}{2}$ to 2 inches in diameter.

S. campéstris, Nutt. A span or two high, divergently branched above: leaves ovate with subcordate clasping base, somewhat 3-5-nerved, one-half to an inch long, those of the branches lanceolate: peduncles about 2 inches long: calyx-lobes narrowly linear-lanceolate, acute, half to three-fourths inch long, equalling the broad lobes of the lilac-colored corolla; angles of its campanulate tube below the sinuses acute and wing-like in flower, thickened in fruit: style very deeply 2-cleft. — Trans. Am. Phil. Soc. n. ser. v. 197; Hook. Bot. Mag. t. 5015. *S. formosa*, Buckley in Proc. Acad. Philad. 1862, 7. — Prairies of Arkansas and Texas. Very showy.

+ + Calyx-tube very short, girdling the base of the capsule, not conspicuously costate: plants loosely paniculate-branching: corolla bright rose-color or pink, with white varieties, or the last white.

S. stelláris, Pursh. Leaves rather fleshy, from oblong to lanceolate and the uppermost narrowly linear: calyx-lobes subulate-linear, from half to nearly the full length of the corolla-lobes: eye or star of the corolla conspicuous: style nearly 2-parted. — Fl. i. 137. *S. gracilis*, Ell. l. c., not Salisb. *Chironia stellata*, Muhl. Cat. — Brackish marshes, coast of Massachusetts to Florida. Appears to pass into the next.

S. grácilis, Salisb. Stems more slender: branches and peduncles filiform: leaves linear and the uppermost filiform or setaceous: calyx-lobes very slender and as long as those of the corolla (6 to 9 lines long): style 2-cleft to the middle. — Parad. Lond. t. 32; Pursh, l. c.; Griseb. in DC. l. c. 49; Chapm. Fl. 354. *Chironia gracilis*, Michx. l. c. *C. campanulata*, L. Spec. 190 $\frac{1}{2}$, but not from "Canada." — Brackish marshes and river banks, Nantucket (an ambiguous form), and New Jersey to Florida and Louisiana, extending inland to the mountains of Georgia. (Cuba.)

Var. grandiflóra. Stem more rigid and erect: lower leaves fleshy: flower much larger; the corolla-lobes from three-fourths to nearly a full inch long. — Coast of E. Florida, *Leavenworth, Buckley, Palmer, &c.*

S. Ellióttii, Steud. Effusely and paniculately much branched, a foot or two high: leaves small; the lower cauline (half inch or less long) thickish, from obovate to lanceolate; upper narrowly linear and rather longer; those of the filiform flowering branches setaceous-subulate: flowers numerous: lobes of the calyx slender-subulate, about twice the length of the tube, very much shorter than the spatulate-oblong or oblanceolate lobes of the (apparently always white) corolla; the corolla-lobes only 5 or 6 lines long: style 2-parted. — Chapm. Fl. 534. *S. paniculata*, Ell. Sk. i. 282 (ex char.), not Pursh. *Suertia difformis*, L. Spec. i. 226 ? — Pine barrens on the coast (S. Virginia ?) S. Carolina to Florida. (Bahamas.)

§ 2. Flowers 8-12-merous, most commonly 9-11-merous, large and showy,

* Solitary on naked somewhat paniculate peduncles: anthers at length coiled into a helix.

S. chloróides, Pursh. Stem a foot or two high, loosely and sparingly branched above: leaves oblong-lanceolate, or the lowest oblong-spatulate and the uppermost linear: calyx-lobes subulate-linear, about half the length the spatulate-obovate lobes of the (rose-purple or sometimes white) corolla: divisions of the deeply-cleft style linear-clavate. — Torr. Fl. N. Y. ii. t. 84. *Chironia dodecandra*, L. Spec. i. 190; Walt. l. c. *Chlora dodecandra*, L. Syst. *Chironia chloroides*, Michx. Fl. i. 147. — Margin of pine-barren ponds along the coast, Massachusetts to Florida and Alabama. Corolla about 2 inches in diameter.

Var. stricta. Stem more rigid, 1-few-flowered: leaves all linear. — *Chironia decandra*, Walt. l. c. ? — S. Carolina ? Alabama, and Florida.

* Capitulate-clustered or sometimes solitary flowers sessile and leafy-bracted: calyx-tube turbinate: anthers of firm texture, slightly curved. — *Lapitheæ*, Griseb.

S. gentianoídes, Ell. Stem strict, a foot or two high: radical leaves in a rosulate tuft, obovate or oblong: cauline very narrowly linear, $1\frac{1}{2}$ to 3 inches long, a line or two wide; the uppermost involucreting the terminal cluster of 3 to 5 or sometimes one or two nearly sessile flowers; occasionally one or two in lower axils: calyx-lobes lanceolate-subulate, very much shorter than the spatulate corolla-lobes, these 6 to 10 lines long: style 2-cleft at the apex, the lobes spatulate. — Sk. i. 286; Chapm. Fl. 354. *S. oligophylla*, Featherman in Univ. Mississip. Rep. 1871. *Lapitheæ gentianoides*, Griseb. in DC. l. c. 48. — Margin of pine-barren ponds, Georgia and Florida to Texas.

S. Boykini, Gray. A foot high, nearly simple: cauline leaves lanceolate-oblong or the lower elliptical, 3-nerved (an inch or two long); the uppermost lanceolate: flowers 1 to 7 in the cluster; the bracts oval or oblong: calyx-lobes lanceolate, much shorter than the corolla; lobes of the latter oblong-obovate, half inch long. — Chapm. Fl. 354. — Middle or Upper Georgia, *Boykin* (in herb. Torr.); also in herb. Muhl. Little known.

S. simplex, Bertol. Misc. x. t. 3, is *Rhexia stricta*.

4. EÚSTOMA, Salisb. (From *εὖ*, *στόμα*, good mouth, i.e. mouth of good size, alluding to the open-mouthed corolla.) — Glaucous and large-flowered annuals; with more or less clasping and connate thickish leaves, slender terminal and more or less paniculate one-flowered peduncles, and bluish purple corolla varying to white; the lobes commonly erose-denticulate. — Only the following species.

E. exaltátum, Griseb. Lower than the next species: leaves oblong: lobes of the corolla nearly oblong (barely an inch in length), twice the length of the tube: style little longer than the stigmas: capsule elliptical-oblong, very obtuse. — DC. Prodr. ix. 51; Lindl. Bot. Reg. xxxi. t. 13; Gray, Bot. Calif. i. 621. *Gentiana exaltata*, L. Spec. ed. 2, 331; Descourt, Ant. t. 15. *Lisianthus exaltatus*, Lam. Ill. i. 478. *L. glaucifolius*, Jacq. Ic. Rar. t. 33. *Eustoma silenifolium*, Salisb. Parad. Lond. t. 34; Don, Syst. iv. 211, excl. syn. Nutt. *Urananthus glaucifolius*, Benth. Pl. Hartw. 46. — Southern borders of the United States, from Florida and Texas to California. (Mex., W. Ind.)

E. Russellianum, Griseb. l. c. A foot or two high: leaves from ovate- to lanceolate-oblong: lobes of the ample lavender-purple corolla obovate (inch and a half long), 4 times longer than the tube: style elongated: capsule oblong, usually pointed: anthers hardly curving in age. — *Lisianthus glaucifolius*, Nutt. in Trans. Am. Phil. Soc. n. ser. v. 197, not Jacq. *L. Russellianus*, Hook. Bot. Mag. t. 3626. — Nebraska to Texas. Very showy.

Var. grácile. Smaller: leaves lanceolate: capsule not pointed. — *E. gracile*, Engelm. in Fl. Calif. l. c. — S. Texas, *Berlandier*, &c. (Mex.)

5. GENTIÁNA, Tourn. GENTIAN. (*Gentius*, king of Illyria.) — Erect herbs (of the cooler parts of the world); with chiefly sessile leaves, and conspicuous flowers of various colors, produced in summer or autumn; commonly expanding only in sunshine or at mid-day. Seeds in most of our species exceedingly numerous and borne over the whole inner surface of the capsule (as first remarked by the late Prof. H. J. Clark, in Gray, Man. ed. 2, 1856, 345). Herbage and especially the roots very bitter.

§ 1. GENTIANÉLLA. Corolla (not rotate) destitute of extended plaits or lobes or teeth at the sinuses: anthers usually versatile (introrse, at length retrorsely reversed): stigmas distinct or only casually united: root annual in all ours except in *G. barbellata*. — *Gentianella*, &c., Borkhausen.

* (FRINGED GENTIANS.) Flowers large or middle-sized, solitary, mostly 4-merous: corolla campanulate-funnelform, its lobes usually fimbriate or erose, not crowned: a row of glands between the bases of the filaments. — § *Crossopetalum*, Frelich, Grisebach.

† Flower on a naked and usually long peduncle terminating the stem or branches, not bracteate at base: filaments naked: root annual: calyx (except in *G. simplex*) ovate-acuminate in the bud and with acutely carinate lobes, the two exterior longer as well as narrower and more acuminate, the tube sharply angled by the decurrent keels.

‡ Corolla enclosed in the ventricose wing-angled calyx?

G. ventricósa, Griseb. A foot high: leaves ovate-oblong: calyx ovoid and 4-wing-angled; the two external lobes much acuminate; the two internal barely acute, rather longer than the campanulate deeply 4-cleft corolla: ovate-oblong lobes of the latter regularly "crenate-fimbriate" (or in the figures sharply serrate): ovary not stipitate. — Gent. 259, in Hook. Fl. ii. 65, t. 152, & DC. Prodr. ix. 102. — Grand Rapids of the Saskatchewan, between Cumberland House and Hudson's Bay, *Drummond*. Little known and not since collected: apparently described and figured from undeveloped specimens, perhaps nearly related to *G. crinita*.

++ ++ Corolla (sky-blue, occasionally white) conspicuously longer than the wingless calyx: autumn-flowering.

G. crinita, Frœl. A foot or two high, often paniculate-corymbose, leafy: leaves lanceolate or ovate-lanceolate from a rounded or subcordate partly clasping base: salient narrow keels of the calyx-lobes conspicuously decurrent on the tube: corolla 2 inches long; its lobes cuneate-obovate, strongly fimbriate around the summit, less or hardly so down the narrowing sides: capsule fusiform, conspicuously stipitate: seeds squamulose-roughened. — *Gent.* 112; *Bot. Mag.* t. 2031; *Bart. Fl. Am. Sept.* iii. t. 80. *G. ciliata Americana*, L. *G. fimbriata*, Andr. *Bot. Rep.* t. 509. *Gentianella crinita*, Don, *Syst.* iv. 179. — Low grounds, Canada to Dakotah and southward to the mountains of Georgia.

G. serrata, Gunner. Stem 3 to 18 inches high: leaves linear or lanceolate-linear: corolla an inch to an inch and a half long; its lobes oblong or spatulate-obovate, erosely fimbriate or toothed around the summit and sides, or sometimes either part nearly bare: capsule short-stipitate: seeds and calyx nearly as in *G. crinita*. — *Fl. Norveg.* 10 (also under *G. ciliata*, 88, t. 2), & *Fl. Dan.* t. 317; *Fries, Summ. Scand.* 190; *Gray, Bot. Calif.* i. 481. *G. detonsa*, Rottb. *Aet. Hafn.* x. 254, t. 1; *Griseb.* l. c.; *Torr. Fl. N. Y.* ii. t. 82. *G. ciliata*, Pall. *Fl. Ross.* ii. t. 92, not L. *G. barbata*, Frœl. *Gent.* 114. *G. brachypetala*, Bunge, *Consp. Gent. in Mem. Mosq.* 1824, 225, t. 1. — Wet grounds, Newfoundland, Canada, and N. W. New York to Saskatchewan and northward, and west to Colorado and W. Nevada, mainly the larger and most fimbriate form, *G. detonsa*, var. *barbata*, *Griseb.*, &c. (Siberia to Norway and Greenland.)

Var. grândis, a form with stem 2 feet high or more, and corolla 2 inches long, a portion only of the sides of the lobes coarsely fimbriate. — *G. detonsa*, *Torr. Bot. Mex. Bound.* 157. — S. E. Arizona, between Barbacomori and Santa Cruz, *Thurber, Wright*. (Perhaps *G. crinita*, var. *Cervantesii*, *Griseb.* in *DC.* l. c. Mexico.)

Var. holopétala, Gray, a small or slender form, 2 to 16 inches high, with comparatively long peduncles: corolla an inch or more long, its lobes entire or merely erose-denticulate round the summit. — *Bot. Calif.* i. 481. — Sierra Nevada, California, at 5,000 to 10,000 feet, and Oregon.

G. simplex, Gray. Stem 2 to 10 inches high, simple, bearing 2 to 4 pairs of lanceolate or linear-oblong leaves (3 to 9 lines long) and a single slender-pedunculate flower: calyx-tube and lobes hardly at all angled or carinate; the latter nearly equal and similar: corolla an inch long; its oblong-spatulate lobes entire or erose-dentate and sometimes a fringe of a few bristly teeth low down on the sides: capsule stipitate: seeds smooth but longitudinally striate, narrow, wingless when mature, except a cellular appendage at both ends. — *Pacif. R. Rep.* v. 87, t. 16, & *Bot. Calif.* i. c. — Higher parts of the Sierra Nevada, California, to adjacent portion of Oregon.

+ + Flower 2-bracteate under or near the calyx: filaments ciliate-bearded below the middle: calyx hardly at all angled or carinate: root perennial.

G. barbellata, Engelm. Stems single or in pairs from the slender fusiform root or caudex, 2 to 5 inches high: leaves rather thick and fleshy, obtuse, with roughish callous margins; the radical spatulate (an inch or two long) or slender-petioled; the 2 or 3 cauline pairs spatulate-linear, or the uppermost narrowly linear and connate at base: flowers one to three, sessile or nearly so between the involucrete foliaceous bracts: calyx-lobes subulate-triangular: corolla bright blue, an inch to an inch and a half long, about twice the length of the calyx, deeply 4-cleft; the lobes oblong, erose-denticulate above, conspicuously fimbriate along the middle: capsule short and not stipitate: seeds squamulose-roughened. — *Trans. Acad. St. Louis*, ii. 216, t. 2. — Alpine region of the Rocky Mountains in Colorado, *Parry*, &c. Related to *G. ciliata* of Europe.

* * Flowers smaller, 4-5-merous: corolla somewhat funnelform or salverform when expanded: the lobes entire (rarely with a few denticulations), their base sometimes crowned with setaceous filaments: capsule seldom stipitate: seeds with a very close thin and smooth coat. — *Endotricha*, etc., Frœl. § *Amarella*, *Aretophila*, &c., *Griseb.*

+ Peduncles elongated and naked from a very short stem, 1-flowered: throat of corolla crowned; no glands at its base: edges of leaves and sepals smooth.

G. tenella, Rottb. An inch to a span high: leaves (2 to 6 lines long) oblong or the lowest spatulate: calyx deeply 5- (sometimes 4-) parted; the lobes foliaceous, oblong to ovate, usually unequal: corolla 2½ to 4 lines long, double the length of the calyx (more lengthened in fruit), blue; its lobes ovate-oblong, rather obtuse, little shorter than the

tube : fimbriate crown conspicuous at the throat. — Act. Hafn. x. 436, t. 2, fig. 6 ; Frœl. l. c. 96 ; Reichenb. Ic. Germ. t. 1045. *G. glacialis*, A. Thomas in Vill. Delph. ii. 532. *G. Koenigii*, Gunner, Fl. Norv. 102. *G. dichotoma*, Pall. Fl. Ross. ii. 116. *G. borealis*, Bunge, Gent. l. c. 251, t. 10, fig. 2. — High alpine region of the Rocky Mountains in Colorado (Parry), Utah (L. Ward), and Idaho, Nuttall. Unalashka and Kotzebue Sound, &c. (Kamtschatka to Greenland.)

+ + Peduncles short or none, terminal and lateral on a comparatively elongated stem, the angles of which are acute or wing-margined.

++ Setaceous-fimbriate crown on the base of the corolla-lobes usually conspicuous and rather copious, sometimes reduced to a few setæ, or rarely evanescent : glands at the base of corolla obscure or wanting : margins of the leaves and of the conspicuous foliaceous calyx-lobes minutely scabrous.

G. auriculata, Pall. A span or two high : leaves oblong-lanceolate or the upper ovate : calyx-tube turbinate, longer than the 5 (or rarely 4) lobes ; these nearly equal and similar, cordate-ovate, or the inner merely ovate : corolla violet-blue, 9 or 10 lines long ; its lobes ovate. — Fl. Ross. ii. 102, t. 92, fig. 1 ; Griseb. l. c. — Islands between N. E. Asia and America, and even on the N. W. American coast, according to Pallas ; but not since found. (Kamtschatka, E. Siberia, &c.)

G. heterosépala, Engelm. A span or two high, rather simple and racemously few-flowered : leaves ovate-lanceolate or oblong : calyx very unequally 5-parted ; two of the lobes large and foliaceous, ovate, acute, equalling the tube of the pale blue corolla (4 to 6 lines long) ; the other 3 linear-subulate and shorter : setæ of the crown copious, united below into a membrane on the base of each corolla-lobe : capsule sessile. — Trans. Acad. St. Louis, ii. 215, t. 8 ; Watson, Bot. King, 278. — Utah, in Uinta and Wahsatch Mountains, H. Engelmann, Watson. New Mexico in the Sandia Mountains, Bigelow.

G. Wrightii. Nearly 2 feet high : stem virgate, simple, with strict racemiform inflorescence : leaves thickish, ovate-oblong or elliptical (less than an inch long), erect, most of the (about 12) pairs below the flowering portion nearly equalling the internodes, connate at base : flowers rather numerous, 10 lines long : calyx very deeply 5-cleft ; its short tube 10-costate (the ribs answering to the sinuses stronger) ; the lobes somewhat unequal and with strongly scabrous margins, all lanceolate, rather shorter than the tube of the campanulate-funnelform white corolla : the latter not glandular at base ; its lobes ovate, one-third the length of the tube, each with a crown of about 15 long and distinct setæ : capsule short-stipitate. — Accidentally named *G. quinqueflora* in Torr. Bot. Mex. Bound. 157. — S. E. Arizona, in springy ground near Santa Cruz, Wright.

G. Amarélla, L. From 2 to 20 inches high : leaves from lanceolate to narrowly oblong, or the lowest obovate-spatulate : inflorescence disposed to be racemiform : calyx 5-cleft (or rarely 4-cleft) below the middle ; the lobes lanceolate or linear, equal or one or two of them longer, all shorter than the mostly blue corolla : the latter half inch or more long ; its lobes oblong, obtuse, or becoming acute : capsule sessile. — Fl. Dan. t. 328 ; Reichenb. Ic. Germ. t. 1046 ; Griseb. l. c. ; Herder in Radde, iv. 145. *G. pratensis*, Frœl. l. c. (Eu., Asia.)

Var. acuta, Hook. f. Calyx almost 5-parted : crown usually of fewer and sometimes very few setæ. — Engelm. l. c. ; Herder, l. c. *G. acuta*, Michx. Fl. i. 177 ; Griseb. l. c. ; Engelm. l. c. 214, t. 9, fig. 6 (var. *nana*, a depauperate high alpine form). *G. Amarella*, Richards. App. Frankl. Journ. ; Watson, Bot. King, l. c. *G. plebeja*, Cham. in Bunge, Gent. l. c. 250, t. 9, fig. 5. — Labrador and Lower Canada to Alaska, and south along the Rocky Mountains to New Mexico, in the Sierra Nevada of California, and thence far northward. (N. Asia, &c. Mex.)

Var. stricta, Watson, l. c. Stem (sometimes 2 to 4 feet high) and branches strict, remotely leafy : leaves thickish, the cauline lanceolate-linear : flowers numerous, commonly 4-merous, smaller : calyx rather less deeply cleft : corolla 3 to barely 5 lines long, whitish, little longer than the unequal calyx ; setæ of the crown sometimes very few or even wanting ; glands at base of the tube not rarely evident : seeds smaller. — *G. acuta*, var. *stricta*, Griseb. in Hook. Fl. & DC. l. c. *G. arctophila*, var. *densiflora*, Torr. in Frem. Rep. 94, not Griseb. — Mountains of Nevada, Idaho, and Wyoming. (Mex.)

Var. tenuis. Same as var. *stricta*, but calyx very deeply parted, according to figure and description of *G. tenuis*, Griseb. Gent. & in Hook. Fl. l. c. 63, t. 151. — Mackenzie River and Bear Lake, Richardson. Not since found. Setæ of the crown 3 to each lobe and conspicuous, or wanting.

++ ++ Setaceous-fimbriate crown, &c., as in the preceding subdivision; but glands on the base of the corolla more or less manifest: calyx-lobes very small and short on the truncate spathaceous tube.

G. Wislizeni, Engelm. A foot or less high, with the habit and many-flowered thyrsoid-paniculate inflorescence of *G. quinqueflora*, but smaller in all its parts: leaves from lanceolate to ovate (an inch or less long), with obtuse or subcordate base: calyx barely half the length of the tube of the corolla; its scarious tube ($1\frac{1}{2}$ lines long) split down one side, in age sometimes dejected, much longer than the 5 unequal linear herbaceous teeth: corolla nearly salverform, pale purplish, 4 or 5 lines long; its lobes oblong-ovate, copiously fringed above the base: capsule sessile: seeds globose. — Trans. Acad. St. Louis, ii. 215, t. 7. — Sierra Blanca, S. Arizona, *Rothrock*, a broad leaved form, the glands less evident. (Adjacent Mex., *Wislizenus*.)

++ ++ No crown to the corolla; but its lobes tipped with a setiform point or sharp acumination and the glands at bottom of the tube manifest. — § *Arctophila*, Griseb.

= Dwarf species of high northern or alpine regions: cauline leaves only 2 to 4 rather distant pairs: calyx 4-5-parted.

G. aurea, L. Leaves ovate, 5-7-nerved; the margins and those of the spatulate-lanceolate calyx-lobes smooth: corolla yellow, violet, or commonly white, 4 lines long, little surpassing the calyx; its lobes almost as long as the campanulate tube. — Fl. Dan. t. 344; Herder, l. c. 155. *G. involocrata*, Rottb. in Act. Hafn. x. 344, t. 1, fig. 2. *G. Aleutica*, Cham. & Schlecht. in Linn. i. 175, fide Herder. *G. Unalaschkensis*, Cham. in Bunge, l. c. 240, t. 9, fig. 2. — Unalaschka, &c. Also Sitka, according to Herder. (High northern Siberia to Lapland, Iceland, and Greenland.)

G. propinqua, Richards. Stem slender, 2 to 7 inches high, mostly branched from the base: leaves from oblong to lanceolate and the lowest spatulate, obscurely 3-nerved, the edges and those of the calyx smooth: flowers chiefly 4-merous and rather slender-pedicelled: lobes of the calyx unequal; two of them ovate or oblong, the others linear-lanceolate, the larger rather shorter than the tube of the corolla: the latter bluish, narrow, 4 to 9 lines long, its lobes ovate or in age lanceolate, sometimes erose-denticulate. — App. Frankl. Journ. 734; Griseb. l. c.; Hook. Fl. t. 150; Herder, l. c. *G. Rurikiana*, Cham. & Schlecht. in Linn. i. 176. *G. setiflora*, Bunge, l. c. t. 9, fig. 4. — Labrador to Bear Lake, the northern Rocky Mountains, Kotzebue Sound, &c. (Adjacent Asia.)

Var. densiflora, Griseb, l. c., in alpine swamps of the Rocky Mountains (*Drummond*), a more condensed and leafy plant, occurring with the ordinary form, is said to differ from the preceding species only in the inequality of the calyx-lobes.

G. arctophila, Griseb. Stem an inch to a span high: leaves ovate-oblong or the lowest obovate; the edges and especially those of the calyx-lobes scabrous: corolla 7 to 10 lines long; the round-ovate lobes more acuminate-cuspidate: otherwise very like large-flowered *G. propinqua* (to which Herder refers it). — Gent. 251, & in Hook. Fl. ii. 61, t. 149, with a var. *densiflora*, having cordate-ovate leaves, and two of the calyx-lobes unusually large. — Arctic sea-coast, *Richardson*. The variety in the alpine region of the northern Rocky Mountains, *Drummond*.

= = Taller and leafy: calyx 5-cleft: capsule slender-stipitate.

G. quinqueflora, Lam. A foot or two high; the larger plants branching: leaves ovate-lanceolate, with subcordate partly clasping base, 3-7-nerved, the upper acute or cuspidate-acuminate: inflorescence thyrsoid-paniculate; the clusters 3-5-flowered: calyx one fifth or fourth the length of the narrow funnelform bright blue corolla; its lobes linear-subulate: corolla half to three fourths inch long; its lobes ovate-triangular, short. — Dict. ii. 643; Frœl. Gent. 51; Griseb. l. c. *G. quinquefolia*, L., doubtless meant for *quinqueflora*. *G. amarelloides*, Pursh, Fl. i. 186. — Moist hills, Canada, Maine to Michigan, and along the Alleghanies to Florida.

Var. occidentalis, Gray. Sometimes 2 or 3 feet high and paniculately much branched: inflorescence more open: calyx-lobes more foliaceous, linear or lanceolate, unequal, reaching to the middle of the broader funnelform corolla. — Man. ed. 1, 359, ed. 5, 387. *G. quinqueflora*, Hook. Bot. Mag. t. 3496, mainly. — Ohio to Minnesota and south to Tennessee and Louisiana.

Var. parviflora, Raf., collected in Virginia, Kentucky, &c. (Griseb. in DC. l. c. 100), is a depauperate and small-flowered state of the preceding variety, and is *G. amarelloides*, Michx. Fl. i. 175.

§ 2. PNEUMONANTHE. Corolla (funnelform or salverform) plicate at the sinuses, the plaits more or less extended into thin-membranaceous teeth or lobes: no crown nor glands: stigmas distinct: flowers almost always 5-merous: capsule more or less stipitate. — *Pneumonanthe*, Necker. § *Pneumonanthe*, *Chondrophylla*, *Cælanthe*, *Tetrorhiza*, &c., Griseb.

* Root annual, and habit of the preceding section: leaves marginless: flowers cymose: calyx short, 5-cleft: anthers oblong-linear, introrse, remaining erect.

G. Douglassiana, Bong. A span high, slender, cymosely branched: leaves ovate; the lowest rosulate; the cauline of few remote pairs and somewhat cordate (2 to 4 lines long): corolla white, a third to half inch long; its lobes oblong, shorter than the funnelform tube, not double the length of the conspicuous and equally broad 2-cleft accessory lobes in the sinuses: capsule stipitate, obovate, ancipital above: seeds proportionally large (a line long), elongated-oblong, with a close coat, apiculate at both ends. — Veg. Sitka, 38, t. 6; Griseb. in Hook. Fl. ii. 60, t. 148. — Alaska to Oregon.

* * Root annual or biennial in our species: dwarf and small plants: leaves small and with white cartilaginous or scarious margins: flowers solitary and terminal: calyx narrow, 4-5-toothed: corolla salverform when expanded; the lobes or plaits in the sinuses broad and emarginate: anthers cordate, versatile: seeds oblong, with a close coat. — § *Chondrophylla*, Bunge, Griseb.

G. humilis, Stev. Stems single or numerous from the slender root, 1 to 5 inches long, erect or ascending: leaves glaucescent and broadly white-margined; the radical orbicular or ovate and rosulate (a quarter to half inch long); cauline linear-oblong, erect, connate-sheathing, 2 or 3 lines long: corolla whitish or dull-colored; its tube little exceeding the calyx; the limb half inch in diameter: capsule clavate-obovate, at length exserted on a long and stout stipe much beyond the flower. — Act. Mosq. iii. 258; Griseb. l. c.; Engelm. in Trans. Acad. St. Louis, ii. 217, t. 9, fig. 1-5. *G. aquatica*, Pall. Fl. Ross. ii. t. 97, fig. 2, not L. *G. Fremontii*, Torr. in Frem. Rep. 94. — Grassy banks of streams in the Rocky Mountains, Wyoming to Colorado. (Asia.)

G. prostrata, Hænke. Stems weaker than in the preceding and when elongated the lateral ones often procumbent: leaves ovate, less erect, greener, and less white-margined: flower (in the American plant always? and in the European sometimes) 4-merous: corolla azure-blue, in fruit enclosing the linear-oblong rather short-stipitate capsule. — Jacq. Coll. ii. 66, t. 17, fig. 2; Griseb. l. c.; Engelm. l. c. t. 9, fig. 9-14. (var. *Americana*); Herder, l. c. *G. nutans*, Bunge, l. c. t. 11, fig. 2. — Alpine regions of the Rocky Mountains, from Colorado northward, and to Kotzebue Sound, Aleutian Islands, &c. (N. E. Asia to Tyrolese Alps. Antarc. Amer.)

* * * Root perennial: flowers comparatively large, mostly short-peduncled or sessile: anthers linear or oblong, more or less extrorse, remaining erect: usually a pair of bracts under the flower. — § *Pneumonanthe*, Griseb.

+ Rocky-Mountain and Pacific species: anthers unconnected, seldom connivent.

++ Dwarf, 1-5-flowered: cauline leaves only 2 to 4 pairs.

G. glauca, Pall. Stem 2 to 4 inches high: leaves oval, glaucous, 3 to 5 lines long: calyx campanulate; its teeth shorter than the tube: corolla blue, half inch or more long; its tube cylindraceous, and ovate obtuse lobes short; the short lobes of the plaits ovate and entire: seeds oval, irregularly 3-4-wing-crested. — Fl. Ross. ii. 104, t. 93, fig. 2; Griseb. in Hook. Fl. ii. 58, t. 147. — Higher and northern Rocky Mountains to Kotzebue Sound. (Kamts. to Siberia.)

G. frigida, Hænke. Stems 1 to 5 inches high, 1-3-flowered: leaves linear, varying to lanceolate or spatulate, thickish, 1 to 3 inches long, the pairs connate-sheathing at base: calyx-tube obconical, longer than the oblong-linear lobes: corolla funnelform, an inch and a half long, yellowish-white or tinged with blue, purplish-dotted; the lobes short and broad; the plaits entire and broad but slightly extended at summit: seeds with a loose cellular coat extended into crested longitudinal ridges. — Jacq. Coll. ii. 13; Fræcl. Gent. 39, t. 1; Griseb. in DC. l. c., with var. *algida*. *G. algida*, Pall. Fl. Ross. ii. 107, t. 95, a large form. *G. Romanzovii*, Ledeb. in Bunge, l. c. t. 11, fig. 1. — Alpine region of the Rocky Mountains in Colorado and Utah, Parry, &c. St. Paul and Shumagin Islands, *Harrington*, *Elliott*, &c. (Kamts. to Carpathian Mts.)

G. Newberryi, Gray. Stems 1-flowered, 2 to 4 inches long, and ascending from the axils of the rosulate-radical leaves: these obovate or spatulate, an inch or more long;

cauline leaves much smaller, connate-sheathing; the lowest obovate, the uppermost lanceolate: calyx-lobes lanceolate or oblong, nearly the length of the oblong-campanulate tube: corolla broadly funnelform, inch and a half long, pale blue, white within, greenish dotted; its lobes ovate, mucronate; the interposed appendages 2-cleft or laciniate, subulate-tipped: seeds round-oval, smooth, broadly winged. — Proc. Am. Acad. xi. 84, & Bot. Calif. i. 482. *G. calycosa*? Gray in Pacif. R. Rep. vi. 86. — Sierra Nevada, California, in or near the alpine region, from Mariposa Co. north to S. Oregon, *Newberry, Brewer, &c.*

++ ++ Low: stems several from the same caudex: cauline leaves 6 to 16 pairs, more or less connate or even sheathing at base; the uppermost involucrate around the sessile terminal flower or 3-5-flowered cluster: corolla campanulate-funnelform, blue, $1\frac{1}{4}$ to $1\frac{1}{2}$ inches long; the lobes broadly ovate, and the appendages at the sinuses 2-cleft or lacerate.

G. setigera, Gray. Stems stout, about a foot long, decumbent: leaves thick and pale, oval or the upper oblong, very obtuse, an inch or less long; the pairs all with a connate-sheathing base, the two uppermost involucrate around and covering the base of the solitary flower: calyx-lobes oval, about the length of the tube: corolla almost campanulate; the appendages of the plaits small and short, produced into 2 or 3 capillary bristles which nearly equal the lobes: forming seeds orbicular, winged. — Proc. Am. Acad. xi. 84, & Bot. Calif. l. c. — California, on Red Mountain, Mendocino Co., in damp soil, *Bolander*.

G. calycosa, Griseb. Stems erect, a span to a foot high: leaves ovate (6 to 15 lines long), commonly equalling or exceeding the internodes; the lowest pairs usually smaller and with connate-sheathing base, the upper hardly so; the involucrate uppermost leaves somewhat exceeding the calyx of the commonly solitary flower: calyx-lobes ovate or oblong, or even subcordate, about the length of the turbinate tube: corolla oblong-funnelform, its appendages in the sinuses triangular-subulate, laciniate, or 2-cleft at the tip, shorter than the broadly ovate lobes: seeds lanceolate, acuminate, wingless. — Gent. l. c. & Hook. Fl. t. 146; Gray, Bot. Calif. l. c. — Varies with stems only 2 to 4 inches high, and small leaves crowded (var. *striata*, Griseb. l. c.); also with taller and more slender stem 2-3-flowered, occasionally with one or two axillary conspicuously pedunculate flowers subtended by a pair of smaller bracts. — California (Sierra Nevada, *Bridges, Brewer, Lemmon*), Oregon (*Tolmie*), and Rocky Mountains, lat. 42°-49°, *Porter, Lyall*.

G. Parryi, Engelm. A span or more high: leaves glaucous, thickish, ovate, varying to oblong-lanceolate, three-fourths to inch and a half long, most of the pairs with somewhat sheathing base; the upper 2 or 3 involucreting the 1 to 5 flowers, concealing the calyx and sometimes almost equalling the (bright purple-blue) corolla: lobes of the calyx short-linear, small, moderately or much shorter than the campanulate (sometimes spathaceous-cleft) tube: appendages at the sinuses of the corolla narrow, deeply 2-cleft, little shorter than the obovate lobes: seeds lanceolate, wingless, obtuse or less acute than in *G. calycosa*, which the broad-leaved forms of this much resemble. — Trans. Acad. St. Louis, ii. 218, t. 10; Watson, Bot. King, 279. *G. calycosa*, var. *Parryi*, Herder, l. c. 178. — Alpine and subalpine regions in the Rocky Mountains, New Mexico, Colorado, Utah, and N. E. Nevada, *Parry, &c.*

++ ++ ++ Stems either tall or low, many-leaved: flowers not involucrate: style manifest.

== Corolla (blue or bluish) oblong-campanulate, with broadly ovate lobes more or less narrowed at base, and the intervening plaits or lobes entire: calyx-lobes usually from ovate to lanceolate, equalling or longer than the tube: seeds wingless.

G. platypétala, Griseb. Stems a span high, ascending, densely leafy above, bearing a single sessile flower: leaves ovate-roundish, recurved-spreading: lobes of the 5-parted calyx ovate, acute: campanulate tube of the blue corolla twice the length of the calyx; its short lobes somewhat reniform, mucronate (2 lines long and 3 wide), double the length of the triangular acute and entire plaits. — Gent. 191, & in Hook. l. c.; DC. l. c. — "Sitka, *Kotzebue*." The char. from Grisebach. Referred to *G. calycosa* by Herder, and it must resemble its smaller form; but the sinus-plaits are said to be entire.

G. Menziesii, Griseb. l. c. Stems a foot or less high, slender: leaves from narrowly oblong to lanceolate (inch and a half or less long), somewhat 3-nerved: flowers one or two, short peduncled or sessile: calyx according to Grisebach spathaceous and the lobes obsolete, in our specimens with oblong-lanceolate foliaceous lobes (5 lines long) equalling the turbinate-oblong tube: corolla an inch long; its lobes 3 lines long and wide; its plaits truncate and obscurely 2-3-crenate: seeds ovate-lanceolate or oblong, barely acute or both

ends obtuse. — *G. sceptrum*, var. *humilis*, Engelm.; Gray, Bot. Calif. i. 483. — Bogs, W. Oregon (*Menzies, E. Hall*) to Mendocino Co., California, *Bolander*.

- G. sceptrum, Griseb.** l. c. Stem erect, 2 to 4 feet high, simple or short-branched above, few-several-flowered: leaves from ovate to oblong-lanceolate ($1\frac{1}{2}$ to 3 inches long), indistinctly 3-7-nerved: calyx-lobes unequal, lanceolate to ovate-oblong: corolla $1\frac{1}{4}$ to 2 inches long, sometimes greenish-dotted; its lobes nearly 4 lines long and wide; its plaits truncate or with barely rounded entire summit: seeds narrowly lanceolate and with scarious acumination. — Hook. Fl. t. 145; Gray, Bot. Calif., excl. var. — W. Oregon to Brit. Columbia.
- == Corolla (blue or bluish) funnelform, with ovate lobes not narrowed at base; the plaits extended into conspicuous laciniate-toothed or cleft appendages, which sometimes almost equal the lobes; margins of the leaves scabrous: seeds surrounded by a distinct and rather broad wing, ovate or oblong.

- G. Oregána, Engelm.** Stems erect and rather stout, a foot or two high, sometimes more slender and ascending: leaves ovate, sometimes ovate-oblong (1 to $1\frac{1}{2}$ inches long): flowers few at the summit, or occasionally several and racemose-scattered: bracts oblong or ovate: calyx-lobes from oblong- to ovate-lanceolate, as long as the tube: corolla broadly funnelform, over an inch long; its short lobes roundish. — Engelm. in herb. *G. affinis*, var. *ovata*, Gray, Bot. Calif. i. 483. — Brit. Columbia and W. Idaho (*Lyll, Spalding*) to Oregon (*Nevin, &c.*) and W. California. Foliage and corolla somewhat as in *G. calycosa*, but the smaller forms nearly approaching *G. affinis*.

- G. affinis, Griseb.** Stems clustered, a span to a foot high, mostly ascending: leaves from oblong or lanceolate to linear: flowers from numerous and thyrsoid-racemose to few or rarely almost solitary: bracts lanceolate or linear: calyx-lobes linear or subulate, unequal and variable, the longest rarely equalling the tube, the shorter sometimes minute: corolla an inch or less long, rather narrowly funnelform; its lobes ovate, acutish or mucronulate-pointed, spreading. — Gent. l. c. & DC. l. c. 114; Watson, Bot. King, 279; Gray, l. c., excl. var. — Rocky Mountains from New Mexico and Colorado, and from the Sierra Nevada, California, to British Columbia, thence east to the Saskatchewan.

+ + Upper Mississippi-valley species: flowers almost sessile, 2-bracteate under the calyx: corolla open-funnelform with conspicuously spreading lobes: anthers merely connivent, soon separate: seeds conspicuously winged, oblong, all attached at or near the sutures.

- G. pubérula, Michx.** About a foot high, mostly single-stemmed from the root, very leafy, at least the upper part of the stem, with the margins and midrib of leaves and sepals minutely puberulent-scabrous: leaves rigid, from oblong-lanceolate (or the lower oblong) to lanceolate-linear, an inch or two long: flowers solitary or several and clustered: calyx-lobes linear-lanceolate or subulate-linear, about the length of the tube: corolla bright blue, $1\frac{1}{2}$ to 2 inches long; the ovate lobes (a fourth to even half inch long) widely spreading in anthesis, twice the length of the 2-cleft and sometimes laciniate-toothed appendages. — Fl. i. 176 (descr. not good as to corolla); Gray, Man. ed. 2, 347, ed. 5, 389. (*G. Saponaria*, var. *puberula*, ed. 1.) — Dry prairies and barrens, Ohio, Kentucky, and Kansas to Wisconsin and Minnesota.

+ + + Atlantic U. S. species (one or two crossing the Mississippi): seeds covering the whole parieties of the capsule: style manifest, in most conspicuous.

++ Corolla campanulate-funnelform, with the short lobes little if at all spreading in anthesis: anthers cohering in a ring or short tube: stem usually several-flowered: flowers sessile or very short-peduncled and 2-bracteate under the calyx, clustered at summit and often in upper axils.

= Calyx-lobes and bracts ciliolate-scabrous: seeds winged or appendaged.

- G. Ellióttii, Chapm.** Puberulent-roughish in the manner of the preceding, a span to a foot or more high, slender: leaves from lanceolate to ovate-lanceolate, or the lower ovate, an inch or less long, the broadest subcordate: flowers 1 to 3 terminal, and sometimes also in the axils, sessile, leafy-bracted: calyx-lobes lanceolate or broader, foliaceous, twice or thrice the length of the tube, ciliolate-scabrous: corolla bright blue, 1 to $1\frac{1}{2}$ inches long; the broadly ovate obtuse lobes (3 lines long) hardly twice the length of the broad and 2-cleft erose-dentate or somewhat fimbriate appendages: seeds conspicuously winged, ovate- or oblong-lanceolate in outline. — Fl. 356, specially the var. *parvifolia*, "*G. Catesbeii*, Ell. not Walt." according to Chapman. Perhaps an extreme form of the next; but the Florida plant appears to be quite distinct. — S. Carolina ? to Florida.

- G. Saponária, L.** Stem a foot or two high, smooth, or somewhat scabrous above: leaves from ovate-lanceolate or oblong to broadly lanceolate, 2 or 3 inches long, more or less nar-

rowed at base: calyx-lobes from linear to spatulate or oblong, mostly equalling and sometimes exceeding the tube: corolla light blue, an inch or more long, its broad and roundish short lobes erect, little and often not at all longer than the 2-cleft and many-toothed intervening appendages: seeds nearly as in the preceding. —Spec. i. 228 (Moris. Hist. iii. 484, sect. 12, t. 5, fig. 4; Catesb. Car. i. t. 70); Griseb. l. c. (excl. var.) *G. Catesbæi*, Walt. Car. 109; Bot. Mag. t. 1039. *G. Elliottii*, var.? *latifolia*, Chapm. l. c. — Moist woods, W. Canada and New York to Florida and Louisiana. A somewhat polymorphous species.

G. Andréwsii, Griseb. Stems stout, a foot or two high, smooth: leaves from ovate to broadly lanceolate, gradually acuminate, contracted at base, 2 to 4 inches long: calyx-lobes lanceolate to ovate, usually spreading or recurved, shorter than the tube: corolla as the preceding but more oblong and the lobes obliterated or obsolete, the truncate and usually almost closed border mainly consisting of the prominent fimbriate-dentate intervening appendages: seeds with a conspicuous wing, oblong in outline. —Gent. 287, & in Hook. Fl. ii. 55 (with var. *linearis*, which is merely a narrower-leaved state); Gray, Man. l. c. *G. Saponaria*, Frœl. Gent. 32; Ell. l. c.; Bart. Fl. Am. Sept. iii. t. 79. *G. Catesbæi*, Andr. Bot. Rep. t. 418. — Moist ground, New England and Canada to Saskatchewan, and south to the upper parts of Georgia. Corolla from bright to pale blue, with white plaits, sometimes all white.

== Calyx-lobes and bracts (also leaves) smooth and naked on the margins (or sometimes very minutely ciliate-scabrous under a lens, especially the lower part of the bracts): seeds distinctly winged: flowers in a leafy-involucrate capitate cluster, and often solitary or clustered in upper axils.

G. alba, Muhl. Smooth throughout: stem stout, 2 feet high: leaves ovate-lanceolate or oblong-lanceolate and gradually acuminate from a cordate-clasping base, 2 to 4 inches long: flowers usually rather numerous in the compact terminal cluster: calyx-lobes ovate or subcordate, acute, reflexed-spreading, shorter than the tube: corolla dull white and commonly tinged with yellowish or greenish, often an inch and a half long, like that of *G. Saponaria*, but more campanulate and open; its ovate lobes twice the length of the broad and erose-toothed appendages. —Cat. ed. 2, 29, & Fl. Lancast. ined.; Nutt. Gen. i. 172; Gray, Man. ed. 1, 360, ed. 5, 388. *G. ochroleuca*, Sims, Bot. Mag. t. 1551; Griseb. in DC. l. c., in part; Torr. Fl. N. Y. l. c., not Frœl. *G. flavida*, Gray in Am. Jour. Sci. ser. 2, i. 80. — Low grounds and mountain meadows, W. Canada and Lake Superior, south to Illinois, Kentucky, and the mountains of Virginia, east to Penn. and New York? Begins to flower early in August.

G. lineáris, Frœl. Smooth throughout: stem slender and strict, a foot or two high: leaves linear or narrowly lanceolate, $1\frac{1}{2}$ to 3 inches long, 2 to 5 lines wide, and with somewhat narrowed base: flowers 1 to 5 in the terminal involucrate cluster, and often solitary in one or two axils below: calyx-lobes linear or lanceolate, shorter than the tube: corolla blue, an inch or more long, narrow-funneliform; the erect lobes roundish-ovate and obtuse, 2 lines long, a little longer than the triangular acute and entire or slightly 1-2-toothed appendages. —Gent. 37; Pursh, Fl. i. 186, excl. syn. Michx. *G. Pneumonanthe*, Michx. Fl. i. 176; Bigel. Bost. ed. 2, 105, not L. *G. Pseudo-pneumonanthe*, Rœm. & Sch. Syst. vi. 146. *G. Saponaria*, var. *linearis*, Griseb. l. c. (excl. syn. *G. Catesbæi*, Ell., & *G. puberula*, Michx., & char. foliis margine scabris); Torr. Fl. N. Y. ii. 106, t. 81; Gray, Man. ed. 5, 389. *G. Saponaria*, var. *Frœlichii*, Gray, Man. ed. 1, 360. — Bogs, along the Alleghanies of Maryland and Penn. to northern New York and New England, New Brunswick (*Fowler*), and towards Hudson's Bay (*Michaux*). Distinctly different from *G. Pneumonanthe* of the Old World in inflorescence, corolla, and distinctly winged seeds.

Var. lanceolata. Leaves lanceolate, or the upper and involucrate ones almost ovate-lanceolate (1 or 2 inches long and even half inch wide): appendages of the sinuses of the corolla sometimes very short and broad. — *G. rubricaulis*, Schwein. in Keating, Narr. Long Exped. Mississipp. — Minnesota and along Lake Superior. Also Herkimer Co., New York, *Paine*. Approaches narrow-leaved forms of *G. alba*.

== Calyx-lobes and bracts with smooth or nearly smooth margins: seeds oval and completely wingless, even marginless.

G. ochroleúca, Frœl. Smooth, rather stout, a span to a foot high, often branching: leaves obovate or the upper oblong, all conspicuously narrowed at base, 1 to 3 inches long, pale: flowers sessile or nearly so in terminal and sometimes lateral leafy clusters: calyx-lobes linear, unequal, longer than the tube; the longer little exceeded by the somewhat

open-funnelform greenish-white corolla, which is greenish-veiny and often purplish-striped (and $1\frac{1}{2}$ inches long); its lobes triangular-ovate and acute, much exceeding the triangular oblique and entire or sparingly toothed appendages. — *Gent.* 35; Pursh, l. c.; Ell. Sk. i. 340; Griseb. l. c. partly; Gray, Man. l. c. *G. Virginiana* etc., Pluk. Alm. t. 186 (poor). *G. villosa*, L. Spec., i. c. pl. Gronov., but it is glabrous. *G. Saponaria*, Walt. Car. 109, not L. *G. incarnata*, Sims, Bot. Mag. t. 1856. *G. intermedia*, Sims, Bot. Mag. t. 2303. *G. serpentaria*, Raf. Ann. Nat. 13? — Dry or damp grounds, Pennsylvania to Florida and Louisiana.

++ ++ Corolla more funnelform and with longer spreading lobes: anthers connivent but not connected: flowers solitary on the stem or occasional branches, commonly peduncled and naked.

G. angustifolia, Michx. Smooth: stems scattered, a span or two long, slender, ascending, commonly simple: leaves narrowly linear, thickish, an inch or two long, a line or two wide; the lower narrowed downward; the uppermost smaller and sometimes forming bracts to the flower: calyx-lobes resembling the uppermost narrow leaves, longer than the tube: corolla 2 inches long, deep and brilliant azure-blue, somewhat brown-dotted within (also a snow-white variety with a greenish hue outside); the lobes ovate, half inch long, widely spreading in anthesis, much longer than the broad and conspicuous laciniate appendages: seeds slender, wingless. — Fl. i. 177; Ell. l. c.; Chapm. Fl. 356. *G. purpurea*, Walt. Car. 109, not L. *G. porphyris*, Gmelin. *G. frigida*, var. *Drummondii*, Griseb. in DC. l. c. 111, the white-flowered variety from Florida. — Low pine-barrens, New Jersey (not "Canada") to Florida. A most beautiful species.

6. PLEURÓGYNE, Eschsch. (Formed of *πλευρόν*, rib or side, and *γυνή*, female; from the remarkable stigmas, which, instead of terminating the ovary, occupy the greater part of the length of the two sutures below its apex.) — Small annuals of cold regions in the northern hemisphere, of three or four nearly related species. Genus more related to *Sivertia* than to *Gentiana*, the appendages to the corolla, as in the former, aduate and apparently glandular at base. Linnæa, i. 188 (1826). *Lomatogonium*, Braun in Flora, 1830, 221.

P. rotata, Griseb. Stems 2 to 10 inches high, the smaller simpler and 1-flowered; the larger either simple and racemously several-flowered or fastigiately much branched: leaves linear or lanceolate, or the radical ones short and spatulate: sepals similar to the upper leaves, in ours mostly narrowly linear; the longer equalling the blue or whitish corolla: lobes of the latter ovate becoming oblong-lanceolate, 4 or 5 lines long, bearing at base a pair of glandular and scale-like processes: ovary and capsule linear-oblong or lanceolate, nearly marginless. — Griseb. *Gent.* 309, & Hook. Fl. ii. 65; DC. Prodr. ix. 122; Herder, l. c. 181. *Sivertia rotata*, L.; Pall. Fl. Ross. ii. t. 89, fig. 1, 2. *Gentiana sulcata*, Willd. Spec. i. 1351. *G. rotata*, Frœl., Bunge, &c. — Labrador and Hudson's Bay to the high north-west coast, Kotzebue Sound, &c., and Rocky Mountains south to lat. 39°: in the latter always the slender-leaved form, var. *tennifolia*, Griseb. (Kamts. to Greenland.)

P. Carinthiaca, Griseb. Low, few-flowered: leaves shorter and usually ovate: sepals from ovate to oblong-lanceolate, much shorter than the corolla: ovary and capsule oblong-ovate, distinctly margined. (Alps of Eu., east to N. E. Asia.)

Var. pusilla. Leaves lanceolate or spatulate: sepals oblong-lanceolate, after anthesis becoming as long as the ovate corolla-lobes and the oblong-ovate capsule. — (Near var. *Stelleriana*, Griseb., *G. Stelleriana*, Cham., *Sivertia rotata*, Pall. l. c. as to fig. 3; but leaves not ovate, &c.) *Sivertia pusilla*, Pursh, Fl. i. 101. *Pleurogyne Purshii*, Steud. Nom. — Labrador and alpine region of the White Mountains of New Hampshire, according to Pursh, the latter station very doubtful. Rivière du Loup, E. Canada, Dr. Thomas. (Himalayas, Lapland.)

7. SWÉRTIA, L. (*Emanuel Sweet*, a German herbalist.) — The genuine species are simple-stemmed perennials, occasionally with alternate leaves, the lower tapering at base into a margined petiole; the inflorescence thyrsoid; the flowers blue, varying to white, in summer. Seeds flat, commonly margined.

S. perennis, L. A span to foot or more high: lowest leaves oblong or obovate-spatulate (2 to 4 inches long), tapering into a long petiole; upper cauline few and narrower,

sessile; some commonly alternate: inflorescence racemiform or narrowly paniculate, few-many-flowered: flowers 5-merous: sepals narrowly lanceolate: lobes of the corolla (4 to 6 lines long) oblong-ovate becoming lanceolate, the base bearing a pair of nectariferous pits which are crested with a fringe. — Engl. Bot. t. 1041; Fl. Dan. t. 2047; Jacq. Fl. Austr. iii. t. 243. — Ours the var. *obtus*a, Griseb. (*S. obtusa*, Ledeb.), with obtuser lower leaves and corolla-lobes, but passing into the other and European form. — Rocky Mountains in Colorado, Utah, &c., and Alaska. (N. E. Asia to Eu.)

8. FRASERA, Walt. (*John Fraser*, of Great Britain, made collections in this country 1785–96, published Walter's *Flora Caroliniana*.) — Large and stout herbs, or some smaller and more slender; with single erect stem from a mostly biennial and thick bitter root, verticillate or opposite leaves, the broader ones commonly somewhat nervose, thyrsoïd or paniculate-cymose inflorescence, and copious flowers, produced in summer. Calyx-lobes from linear to ovate. Corolla dull white, yellowish, or bluish, and commonly dark-dotted, mostly of firm texture, not "deciduous" but marcescent. Flowers seldom, if ever, 5-merous. Species all N. American, and all but one western; the genus mostly well marked in aspect, but in floral character distinguished from *Swertia* only by the distinct style; and this is very short in *F. Parryi* and *F. thyrsoïflora*.

* Leaves marginless: a single round gland upon each corolla-lobe: no crown at base: capsule (as far as known) strongly flattened parallel with the valves: seeds orbicular, wing-margined: stem large and stout: sepals narrow, almost the length of the corolla.

F. thyrsoïflora, Hook. Stem 2 or 3 feet high: leaves in pairs or threes, oblong or spatulate-obovate, the cauline 3 or 4 inches long: flowers in a dense interrupted thyrsoïd: sepals subulate-linear (4 lines long): lobes of the pale blue corolla ovate-oblong, thin, bearing the gland near the base: style short and conical, in some flowers hardly any! — Kew Jour. Bot. iii. 288, where the flowers are said to be 5-merous! *F. Carolinensis*, Hook. Fl. ii. 66. *Swertia fastigiata*, Pursh, Fl. i. 101. — Idaho and interior of Oregon, on the tributaries of the Columbia, *Lewis, Douglas, Geyer, Spalding*. Rare and little known. Pursh's plant seen in herb. Lambert, where the true station is recorded: "in moist and wet places on the Quamash flats, June 4, 1806," at which date Lewis and Clarke were on the Kooskooskie (now Salmon) River, near which the species was collected by Spalding: the flowers in both 4-merous. Douglas's and Geyer's specimens not seen.

F. Carolinensis, Walt. Stem 3 to 8 feet high: leaves mostly in fours, 12 to 4 inches long; the radical and lowest spatulate-oblong; uppermost lanceolate; those of the ample and open thyrsoïd-paniculate inflorescence often only opposite and small or reduced to bracts: flowers mostly slender-pedicelled: sepals narrowly lanceolate: corolla ochroleucous and with brownish-purple dots; its broadly oblong lobes bearing the large and long-fringed gland below the middle: style slender-subulate: stigma of 2 oval lobes. — Car. 87; Torr. Fl. 187, & Fl. N. Y. ii. 89. *F. Walteri*, Michx. Fl. i. 97; Bart. Med. ii. t. 35. *Swertia difformis*, L. herb., not Spec. — Rich dry soil, W. New York to Wisconsin and Georgia. Thick bitter root has been used as a tonic, under the name of *American Columbo*.

* * Leaves marginless: a pair of oblong glands on each corolla-lobe and a separate crown below them: capsule compressed contrary to the deep-boat-shaped or almost conduplicate valves: seeds oblong, flat, margined: sepals narrow-linear, equalling the corolla.

F. speciosa, Dougl. Stem stout, 2 to 5 feet high, very leafy: leaves in fours and sixes, nervose; the radical and lowest cauline obovate or oblong, 6 to 10 inches long; the upper lanceolate and at length linear: flowers very numerous in a long leafy thyrsoïd: the slender pedicels and peduncles at length strict: lobes of the greenish-white or barely bluish and dark-dotted corolla oval-oblong, acutish, half inch long, bearing the pair of contiguous and densely long-fringed glands about the middle, and a distant transversely inserted and setaceous multifid scalelike crown near the base: usually some minute setæ between the bases of the filaments: style subulate, shorter than the ovary. — Griseb. Gent. 329, in Hook. Fl. ii. 66, t. 153, & DC. l. c. 131; Watson, Bot. King, 279; Gray, Bot. Calif. i. 484. *Tessaranthium radiatum*, Kellogg, Proc. Acad. Calif. ii. 142. — In the mountains, Wyoming to Oregon, and south to New Mexico and the Sierra Nevada of California.

* * * Leaves with cartilaginous white margins, thickish, lanceolate or linear: glands on the corolla-lobes solitary, but sometimes 2-lobed.

+ Capsule turgid; its valves strongly convex: seeds elongated-oblong, thickish, scabrous, marginless: corolla-lobes with a double longitudinally adnate crown confluent with the gland: inflorescence loosely paniculate.

F. paniculata, Torr. Stem 2 or 3 feet high: cauline leaves linear, opposite (about 3 pairs): flowers in a loose and ample panicle, slender-pedicelled: sepals ovate, barely half the length of the whitish corolla: lobes of the latter oblong, obtuse, 2 or 3 lines long, bearing a plane and roundish discolored gland about the middle, which is lightly fringed round the border, its base confluent with a pair of coronal crests, which are adnate down the lobe, bilamellate and strongly ciliate fimbriate above, tapering and tubular below: filaments distinct to the base: style slender-subulate: stigma very small. — Pacif. R. Rep. iv. 126. — N. Arizona, sand bluffs at Inscription Rock in the Zuñi country, *Bigelow*. Habit of the two following species. What was described as a pair of glands rather belongs to the crown.

+ Capsule compressed parallel with the flat or flattish valves: seeds as far as known flat, smooth, and acute-margined.

++ Inflorescence ample and effusely paniculate; the pedicels longer than the flowers: corolla white or yellowish with scattered dark dots, of rather firm texture and enduring; the lobes acuminate or mucronate, longer than the ovate-lanceolate sepals.

F. Parryi, Torr. Stem stout, 2 or 3 feet high, including the large and very compound pyramidal or corymbose panicle: leaves in pairs or occasionally in threes, lanceolate, or the radical oblong, 3-nerved, 3 or 4 inches long; the upper becoming much shorter, often ovate-lanceolate, and soon reduced to small bracts: lobes of the white corolla ovate, becoming oblong, half inch long, bearing a large and lunate-obcordate conspicuously fringed gland about the middle, the base naked and destitute of a crown: some very minute setæ at the base of the filaments: style distinct, but only one fourth the length of the ovary: stigma small. — Bot. Mex. Bound. 156, & Pacif. R. Rep. iv. 126; Gray, Bot. Calif. i. 484. Southern and eastern part of San Diego Co., California, to the borders of Arizona, *Coulter, Parry, Palmer*.

F. albomarginata, Watson. Stem more slender, 1 to 3 feet high, including the ample and very compound broad cymose panicle: leaves in fours and sometimes opposite, linear, or the lower and radical oblanceolate, and the uppermost reduced to subulate bracts subtending the long branches of the panicle: lobes of the greenish-yellow corolla ovate, becoming oblong, cuspidate-acuminate, 3 or 4 lines long, twice the length of the sepals, bearing the obcordate moderately villous-fringed gland about on its middle, this decurrent into a longitudinally adnate crown with fringed free margins and a somewhat hooded base: style slender: stigma small. — Bot. King, l. c.; Gray, Bot. Calif. l. c. — S. Utah and S. Nevada, *Palmer, Miss Searls, Parry*. Leaves with conspicuous silvery-white and commonly undulate border.

++ ++ Inflorescence a virgate interrupted thyrsus of 3 to 5 pairs of sessile (or the lower short-peduncled) dense cymes, forming a series of glomerate clusters: pedicels very short: leaves narrow and gramineous, merely opposite; the cauline only 3 to 5 pairs: corolla lavender-blue, of thin texture: the lobes ovate or oblong becoming narrower, 3 or 4 lines long, rather longer than the subulate-lanceolate sepals; the fringed gland elongated, extending from the base to near the middle, saccate and with a longer and coarser fringe at base: crown staminal, consisting of a conspicuously laciniately parted or nearly entire scale between each filament: style slender, twice the length of the ovary: stigma entire: capsule flat, few-seeded.

F. nitida, Benth. Completely glabrous, a foot or more high, slender: leaves linear-lanceolate (2 to 4 lines wide, the upper 2, and the radical 6 or 8, inches long), those subtending the upper flower-clusters reduced to small bracts: corolla sometimes greenish-spotted; the lobes barely acute, bearing an elongated oblong obtuse gland: thin scales between the filaments ovate or oblong-linear, entire or sparingly laciniate, longer than the ovary. — Pl. Hartw. 322; Torr. Pacif. R. Rep. iv. 126; Gray, Bot. Calif. l. c. — Foothills of the Sierra Nevada, California, to the Dalles in Oregon.

F. albicaulis, Dougl. Very minutely pruinose-puberulent: sepals rather longer and narrower: corolla-lobes ovate-lanceolate and acuminate; the gland oblong-linear: scales between the filaments more or less dissected into setiform processes: otherwise as the preceding. — Griseb. l. c., & Hook. Fl. ii. 67, t. 164. — Interior of Oregon and Idaho, on the eastern waters of the Columbia, *Douglas, Geyer, Spalding*.

9. **HALÉNIA**, Borkh. (*John Halen*, who wrote of Kamtschatka plants.) — Low herbs (of N. Asia and America); with opposite leaves, and small terminal and axillary often paniced cymes of usually 4-merous flowers; the corolla whitish, bluish, or yellowish. Occasionally or in some flowers the spurs or nectariferous gibbosities are wanting or nearly so.

H. defléxa, Griseb. Annual, 6 to 18 inches high: radical leaves obovate or spatulate and petioled; cauline oblong-lanceolate to ovate, acute, 3-5-nerved (an inch or so long): sepals lanceolate or spatulate and acuminate: corolla dull whitish or purplish, 3 or 4 lines long; the lobes triangular-ovate and acute; spurs deflexed or obliquely descending, thickish, considerably shorter than the corolla. — *Gent.* 324; *Hook.* Fl. ii. 67, t. 155. *Sweetia corniculata*, Michx. Fl. i. 97, not L. *S. defléxa*, Smith in Rees. Cycl. *S. Michauriana*, Rœm. & Sch. Syst. vi. 130. — Damp and cool woods, N. Maine and New York to Lake Superior and northern Rocky Mountains, Labrador, &c.

Var. Brentoniána, a depressed form, with rather shorter and thicker spurs. — *H. Brentoniána*, Griseb. l. c.; *Hook.* l. c. t. 156. — Newfoundland and Labrador. *H. heterantha*, Griseb. l. c., & *Hook.* l. c. t. 156, also Newfoundland, appears to be nearly the same, with some corollas spurless.

H. Rothróckii, Gray. Annual, a span or two high, loosely flowered: leaves linear: pedicels slender: sepals linear-lanceolate: corolla bright yellow, 4 or 5 lines long; the lobes ovate; spurs divaricate and slightly ascending, shorter than the corolla. — *Proc. Am. Acad.* xi. 84; *Rothrock* in *Wheeler Rep.* t. 21. — Arizona, on Mount Graham, *Rothrock*.

10. **BARTÓNIA**, Muhl. (*Prof. Benjamin Smith Barton*, of Philadelphia, one of the earliest teachers of botany in the U. S.) — Small and filiform annuals or biennials, of Atlantic U. S.; with fibrous root, simple or paniculately branching stems, leaves reduced to subulate appressed scales or bracts, and small pedunculate scattered flowers with white corolla. — *Willd.* in *N. Schrift.* Berl. iii. 144 (1801); *Torr.* Fl. 185; *Benth. & Hook.* Gen. ii. 818. *Centaurella*, Michx. Fl. i. 97, 1803. *Andrewsia*, Spreng. Syst. i. 428.

B. tenélla, Muhl. A span to a foot high, rather rigid: flowers racemose or racemose-panicled, barely 2 lines long: lobes of the yellowish-white corolla oblong, little longer than the calyx (sometimes twice as long): ovary 4-angled and the cell somewhat cruciform. — *Willd.* l. c.; *Gray*, *Man.* ed. 5, 389. *Sagina Virginica*, L. *Centaurella paniculata*, Michx. l. c. t. 12, fig. 1. *C. autumnalis*, Pursh, Fl. i. 100; *Griseb.* l. c. *Centaurium autumnale*, Pers. Syn. i. 137. *Andrewsia autumnalis*, Spreng. l. c. *Centaurella Moseri*, Steud. Nom.; *Griseb.* in *DC. Prodr.* ix. 121, an occasional form, with leaves or scales and branches mostly alternate. — Open woods, Newfoundland to Wisconsin and Louisiana; flowering late.

B. vérna, Muhl. A span high or less, somewhat corymbosely 1-few-flowered, the stem weaker or less rigid: lobes of the white corolla obovate-spatulate, 3 or 4 lines long, very obtuse, thrice the length of the calyx: ovary compressed. — *Centaurella verna*, Michx. l. c. fig. 2; *Griseb.* l. c. *C. vernalis* & *C. æstivalis*, Pursh, l. c. *Centaurium vernum*, Pers. l. c. *Andrewsia verna*, Spreng. l. c. — Bogs, S. Virginia to Florida and Louisiana; flowering in early spring.

11. **OBOLÁRIA**, L. (Ὀβολός, a small Greek coin, from the rounded leaves.) — *Gray*, *Chloris*, 21, t. 3. — Single species.

O. Virgínica, L. Herb a span or less in height from a tufted fibrous perennial root, of dull purplish-green hue and rather fleshy texture, simple or sparingly branched above: lower leaves reduced to obtuse loose scales; upper ones cuneate-obovate, about half inch long and wide: flowers usually in threes and nearly sessile in the axils and terminating the stem and branches, white or purplish, 4 lines long, produced in spring. — *Spec.* ii. 632 (*Gronov. Virg.*); *Darl.* Fl. Cest. ed. 1, 21, t. 2; *Bart.* Fl. Am. Sept. iii. t. 90; *Reuter* in *DC. Prodr.* xi. 45; *Gray*, l. c., & *Man.* ed. 5, 390. *Orobanche Virginiana*, etc., *Moris.* Hist. iii. 504, sect. 12, t. 16, fig. 23; *Pluk.* Alm. t. 209, fig. 6. — Moist woods, New Jersey to Illinois and south to Georgia and Texas.

12. **MENYÁNTHES**, Tourn. BUCKBEAN. (Ancient name, from μήν, month, and ἄθος, flower, some say from its flowering for about that time.) — Bog-perennials (of the cooler parts of the northern hemisphere); with long and thickish creeping rootstocks, bearing either trifoliate or reniform leaves on long petioles, with scarious sheathing base, and a naked erect several-many-flowered scape; fl. in spring or early summer. — Benth. & Hook. Gen. ii. 819.

M. trifoliáta, L. Petioles and scape a span or two high, stout: leaf divided into 3 oval or oblong-obovate pinnately veined entire or repand leaflets: flowers racemose: corolla white or tinged with rose; the tube longer than the calyx; the upper surface of the lobes copiously fimbriate-bearded. — Lam. Ill. t. 100; Fl. Dan. t. 541; Bigel. Med. t. 46; Reichenb. Ic. Germ. t. 1043. — Bogs, Newfoundland and Labrador to Penn., Ohio, and northward: also Rocky Mountains to California and Aleutian Islands. (Japan to Eu. and Greenland.)

M. Crista-gállí, Menzies. Petioles and scape at length slender and a foot or two high: leaf reniform and sometimes emarginate, crenate! (2 to 4 inches wide): flowers in a simple or 1-2-forked cyme: corolla white; its tube not longer than the calyx; the lobes naked but with a medial crest. — Hook. Bot. Misc. i. 45, t. 24. *Villarsia Crista-gállí*, Griseb. l. c. — Marshy ground, coast of Br. Columbia to Alaska, Menzies, Mertens, &c.

13. **LIMNÁNTHEMUM**, Gmelin. FLOATING HEART. (From λίμνη, marsh or pool, and ἄνθος, blossom.) — Perennial fibrous-rooted water-plants (of temperate and tropical regions); with proliferous or stoloniferous growth; the leaves orbicular or ovate and deeply cordate, entire or repand, floating; the flowers in our species as if umbellate-fascicled on the petiole, produced all summer, sometimes polygamous. Stolons sometimes tuberiferous.

L. lacunósum, Griseb. Petioles and stolons filiform, much elongated: leaves orbicular-cordate, an inch or two long, mostly quite entire: umbel of flowers borne near to the base of the leaf, often accompanied by a fascicle of thickened and short spur-like rootlets: corolla white, a third to half inch in diameter; its broadly oval lobes naked (except a crest-like yellowish gland at base), twice the length of the lanceolate calyx-lobes: style none: seeds numerous, smooth and even. — Gent. 347, & in DC. Prodr. ix. 141, in part; Gray, Man. ed. 1, 363, ed. 5, 390. *Villarsia lacunosa*, Vent. Choix, 9; Pursh, Fl. i. 139, excl. syn. *V. cordata*, Ell. Sk. i. 230, a fitter name. — Shallow ponds, &c., Canada to Florida and Louisiana.

L. trachyspérnum, Gray, l. c. Larger: petioles, &c., stouter: leaves cordate-orbicular, 2 to 6 inches in diameter, with margins sometimes repand, of thick texture, the discolored lower surface reticulate-veined, spongy and pitted: umbel usually destitute of thickened rootlets: expanded corolla three-fourths inch wide: style none: seeds roughened. — *L. lacunosum*, var. *australe*, Griseb. Gent. l. c. *Anonymos aquatica*, Walt. Car. 109. *Villarsia aquatica*, Gmel. Syst. i. 447. *V. trachysperma*, Ell. l. c. *Menyanthes trachysperma*, Michx. Fl. i. 126. — Ponds and streams, Maryland (*Canby*) and Virginia to Florida and Texas.

ORDER XCI. POLEMONIACEÆ.

Herbaceous or rarely shrubby plants, with bland colorless juice, simple or divided leaves and no stipules, perfect and regular 5-merous flowers except that the free ovary is trimerous (3-celled with placentæ in the axis); the persistent calyx imbricated, and the corolla dextrorsely convolute (and not plicate) in the bud; the fruit a 3-celled loculicidal capsule, usually with a thick placental axis; the few or many seeds small, amphitropous or nearly anatropous, with a thin or soft coat, commonly developing mucilage when wetted; the embryo straight and rather large in the axis of a fleshy or harder albumen, the cotyledons flat or flattish and rather broad. Stamens on the corolla alternate with its lobes, distinct.

Style one, 3-lobed or cleft; the introrse stigmas (or lobes of the style stigmatic down the inner face) slender. Hypogynous disk generally manifest. Almost exclusively American, and remarkable among the hypogynous gamopetalous orders for the 3-merous pistil, but in 2 or 3 species of *Gilia* 2-merous. The corolla is not always perfectly regular, and the 5 stamens are very commonly unequal in length or insertion. *Cobaea*, common in cultivation, is very exceptional in the order, climbing by tendrils belonging to pinnate leaves, and its capsule septicidal. — Gray, Proc. Am. Acad. viii. 247; Benth. & Hook. Gen. ii. 820.

* Stamens unequally inserted on the tube of the corolla, not declined.

1. **PHLOX**. Corolla strictly salverform, with slender tube and narrow orifice. Filaments very short and unequally inserted: anthers mostly included. Ovules solitary or few in each cell. Seed unaltered when wetted. Leaves opposite and entire.
2. **COLLOMIA**. Corolla tubular-funnelform or salverform, with an open orifice, from which the unequally inserted filaments commonly protrude. Ovules solitary or numerous. Seed-coat developing mucilage and projecting uncoiling spiral threads (spiracles) when wetted, except in one species. Leaves mostly alternate, and pinnately incised or divided.
- * * Stamens equally inserted in or below the throat or sinuses of the corolla.
3. **LÆSELIA**. Corolla tubular or funnelform, somewhat irregular, the limb being more or less unequally cleft; the naked filaments declined. Otherwise as *Gilia*.
4. **GILIA**. Corolla from campanulate to funnelform and salverform, regular. Filaments not declined, naked (rarely pubescent) at base. Ovules and seeds from solitary to numerous. Leaves various.
5. **POLEMONIUM**. Corolla from funnelform to nearly rotate, regular. Filaments more or less declined and usually pilose-appendaged at base, slender. Ovules and seeds few or several in each cell. Calyx herbaceous, not scarious below the sinuses nor the lobes costate, accrescent. Leaves all alternate, pinnate or pinnately parted.

1. **PHLOX**, L. (Ancient Greek name of *Lychnis*, from *φλόξ*, flame.) — N. American herbs, or a few suffrutescent, chiefly perennials, many cultivated for their ornamental blossoms. Cauline leaves sessile and opposite, or some of the upper varying to alternate. Flowers cymose, showy, from blue-purple or lilac to crimson and white; the calyx narrow, and the corolla strongly convolute in the bud. Most species with long filiform style about equalling or surpassing the corolla-tube, but some with short included style, perhaps by dimorphism; but only in *P. subulata* have both forms been found in the same species.

§ 1. Perennial herbs of the Atlantic States, with flat (broad or narrow) leaves, and solitary ovules.

* Stem strictly erect (smooth or sometimes rough); cymes compact, numerous, in a pyramidal or corymbose panicle or elongated thyrsus: pedicels very short: corolla with entire rounded lobes: fl. summer.

P. paniculata, L. Stem stout, 2 to 4 feet high: leaves oblong-lanceolate and ovate-lanceolate, acuminate, tapering at base, or the uppermost more or less cordate: panicle ample, pyramidal-corymbose: calyx-teeth subulate-setaceous: corolla pink-purple varying to white. — Spec. i. 151; Lam. Ill. t. 103; Gray, l. c. 249. *P. undulata*, Ait. Kew. i. 205. *P. cordata*, Ell.; Sweet, Brit. Fl. Gard. ser. 2, t. 13. *P. acuminata*, Pursh; Bot. Mag. t. 1880. *P. corymbosa*, Sweet, l. c. t. 114. *P. scabra*, Sweet, Brit. Fl. Gard. t. 248. *P. Sickmanni*, Lehm. in Act. Nat. Cur. xiv. t. 46. *P. decussata*, Hortul. (Some of the above smooth, others rough or hairy forms.) — Open woods, Penn. to Illinois, Louisiana, and Florida.

P. maculata, L. Stem more slender, $1\frac{1}{2}$ to 2 feet high, commonly purple-spotted: leaves very smooth, thickish; the lower lanceolate and the upper nearly ovate-lanceolate from a rounded or cordate base: panicle narrow and usually long: calyx-teeth triangular-lanceolate, short: corolla pink-purple. — Spec. i. 152; Lam. Ill. t. 108; Jacq. Vind. t. 127. *P. pyramidalis*, Smith, Exot. ii. t. 87; Sweet, Brit. Fl. Gard. t. 233, with *P. reflexa*, Sweet, l. c. t. 232, & *P. penduliflora*, Sweet, Brit. Fl. Gard. ser. 2, t. 46, robust cultivated forms. — Rich woodlands and along streams, N. Penn. to Iowa and Florida.

Var. cándida, Michx., is a white-flowered form, commonly with spotless stem.—*P. snaveolens*, Ait. l. c., fide Benth. *P. tardiflora*, Penny, fide Benth. *P. longiflora*, Sweet, l. c. ser. 2, t. 31. With the ordinary form.

* * Stems, at least the flowering ones, ascending or erect; cymes corymbed or sometimes simple: flowers chiefly pedicelled: lobes of the corolla broad, obovate or obcordate.

+ Calyx-teeth lanceolate or triangular-subulate: whole plant glabrous or nearly so, never viscid: stems ascending or erect: pedicels equalling or shorter than the calyx: lobes of the pink or rose-red corolla rounded and entire: fl. early summer.

P. ováta, L. Stems rather low, ascending from a decumbent or creeping base: leaves ovate or oblong-lanceolate, the uppermost often subcordate and the lowest tapering into a margined petiole: calyx-teeth short and broad, ovate or triangular-lanceolate, acute.—Bot. Mag. t. 528; Gray, l. c. *P. Carolina*, L. Spec. ed. 2, i. 216; Bot. Mag. t. 1344; a taller form, with narrower more tapering leaves and pointed calyx-teeth, approaching the next species. *P. latifolia*, Michx. Fl. i. 143. *P. triflora*, Sweet, Brit. Fl. Gard. t. 29.—Open woods, from Alabama northward in the mountain region to Pennsylvania.

P. glabérrima, L. Stems taller and erect: leaves lanceolate or linear-lanceolate, or the uppermost narrowly ovate-lanceolate, tapering gradually to an acute point, firm in texture, almost veinless, bright green and glossy above, often with revolute margins: calyx-teeth triangular- or lanceolate-subulate, very sharp-pointed.—Spec. l. c. 152; Sweet, Brit. Fl. Gard. ser. 2, t. 36; Benth. in DC. l. c. *P. revoluta*, Aikin in Eaton, Man.—Prairies and open woodlands, N. Virginia and Ohio to Wisconsin and south to Florida.

Var. suffruticósa, a form with more rigid stems, either smooth or scabrous, or the inflorescence strongly rough-puberulent, and the upper leaves broadly lanceolate, verging to narrow-leaved forms of the preceding species.—*P. suffruticosa*, Willd. Enum. 200; Bot. Reg. t. 68. *P. nitida*, Pursh, Fl. ii. 730. *P. Carolina*, Sims, Bot. Mag. t. 1344; Sweet, Brit. Fl. Gard. t. 190, not L. *P. triflora*, Michx. Fl. i. 143? *P. carnea*, Sims, Bot. Mag. t. 2155, smooth form. *P. Carolina*, var. *nitida* & var. *puberula*, Benth. in DC. l. c.—Georgia and Tennessee to Florida and Louisiana.

+ + Calyx-teeth long and slender: flowering stems erect, ascending, or sometimes spreading, at least the summit and the calyx more or less hairy or glandular-pubescent: fl. in spring.

+ + No runners or prostrate sterile shoots.

P. Floridána, Benth. Stems erect and strict, a foot or two high, slightly hairy or nearly glabrous below, as are the lanceolate-linear or broadly linear rather rigid leaves, the summit and the corymb glandular: teeth of the glandular-pubescent calyx lanceolate-setaceous: lobes of the light purple corolla roundish-obovate, entire.—Prodr. l. c. 304; Chapm. Fl. 309.—Dry open woods, Florida, *Chapman, Rugel*. Foliage, &c., nearly as in the preceding, the calyx approaching the following.

P. pilósa, L. Villous-hairy, pubescent, or sometimes glabrate: stems erect, slender (a foot or two high): leaves linear or lanceolate, usually tapering gradually from near the sessile base to the acute point: corymb at length loose: teeth of the hairy more or less viscous calyx subulate-setaceous or awn-like: lobes of the (pink, purple, rose, or sometimes white) corolla obovate and entire.—Sims, Bot. Mag. t. 1307; Lodd. Cab. t. 1251. *P. aristata*, Michx.; Lodd. Cab. t. 1731; Torr. Fl. N. Y. ii. t. 80. *P. cuspidata*, Scheele in Lin. n. xxiii. 139.—Dry or sandy woods, prairies, &c., from New Jersey to Iowa and Saskatchewan, and south to Florida and Texas. Very variable as to foliage and pubescence. Slender southern forms pass into

Var. detónsa, Gray. Smoother or almost glabrous, but corymb and calyx more or less pubescent: except in the calyx nearly approaches narrow-leaved forms of *P. glaberrima*.—Proc. Am. Acad. l. c. *P. aristata*, Benth., partly.—Alabama and Florida to Texas.

P. amóna, Sims. Softly villous-pubescent, or sometimes hirsute: stems ascending, simple (a span or two high): leaves erectish, short, oblong-lanceolate or nearly linear, seldom acute, the uppermost subtending or involucreting the compact cymose cluster: calyx-teeth narrow-subulate, very acute, but not awn-tipped: lobes of the (purple or pink, seldom white) corolla (half inch long) almost equalling the tube, obovate, entire, or rarely emarginate.—Bot. Mag. t. 1308; Gray, Proc. Am. Acad. l. c. 251. *P. pilosa*, Walt., Michx., &c., not L. *P. pilosa*, var. *Walteri*, Gray, Man. ed. 2. *P. Walteri*, Chapm. Fl. l. c. *P. procumbens*, Gray, Man. ed. 5, 372, not Lehm. *P. involucrata*, Wood, Classbook, 1861, 568.—Hills and dry barrens, Virginia and Kentucky to Florida.

++ ++ Sterile shoots from the base creeping or decumbent: leaves comparatively broad, and with the stems and calyx softly more or less viscid-pubescent: pedicels rather slender.

P. divaricata, L. Stems diffuse or ascending, the sterile shoots decumbent or somewhat creeping and bearing ovate sessile leaves: cauline leaves oblong- or ovate-lanceolate, rather acute: cyme open: calyx-teeth slenderly linear-subulate: lobes of the bluish or lavender-colored (1 to 1½ inches wide) corolla cuneate-obcordate or barely emarginate (Bot. Mag. t. 163, & *P. Canadensis*, Sweet, Brit. Fl. Gard. t. 221), or not rarely quite entire (var. *Laphamii*, Wood. *P. glutinosa*, Buckley in Am. Jour. Sci. xlv. 177, as to specimens, but flowers not "red or scarlet.") — Damp woods, W. Canada and New York to Iowa, Florida and Arkansas. Corolla with the sinuses open. Style (always?) very short.

P. réptans, Michx. Stems weak and slender; the sterile long and prostrate or creeping, runner-like, bearing obovate or roundish leaves with narrowed base; the flowering erect, a span or more high, bearing 3 or 4 pairs of oval or oblong mostly obtuse leaves: cyme simple, few-flowered: calyx-teeth linear-subulate: lobes of the purple or violet corolla roundish, mostly entire, about half the length of the tube. — Vent. Malm. t. 107. *P. stolonifera*, Sims, Bot. Mag. t. 563; Sweet, Brit. Fl. Gard. ser. 2, t. 293. — Damp woods of the Alleghany region and near it, Pennsylvania to Kentucky and Georgia. Corolla-tube an inch long; style long, the stigmas and some of the stamens often more or less projecting.

* * * Stems diffuse and branching, slender, low (a span high): flowers scattered or barely cymulose, peduncled; the peduncles often elongated: lobes of the corolla narrowly cuneate and bifid: calyx-lobes subulate-lanceolate: fl. spring.

P. bifida, Beck. Minutely pubescent: leaves linear (an inch or two long, a line or two wide), glabrate: lobes of the pale violet-purple corolla 2- (rarely 3-) cleft to or below the middle into oblong or nearly linear diverging segments. — Am. Jour. Sci. xi. 167; Gray, Man. ed. 5, 373. — Prairies of Illinois and Missouri.

P. Stellária, Gray. Very glabrous: leaves barely somewhat ciliate at base, linear (an inch or two long, a line or more wide), acute, rather rigid: flowers scattered, mostly long-peduncled: lobes of the "pale blue or almost white" corolla bifid at the apex into barely oblong lobes. — Proc. Am. Acad. l. c. 252. — Cliffs of Kentucky River (above Lexington?), in fissures of the most precipitous rocks, *Short*. S. Illinois, *G. H. French*, &c. Bases of the filiform and tufted or creeping stems rigid and persistent.

§ 2. Suffruticulose and creeping-cespitose, evergreen, east of the Mississippi, with mostly crowded and fascicled subulate and rigid leaves: lobes of the corolla at most obcordate: fl. early spring.

P. subulata, L. (GROUND or MOSS PINK.) Depressed, forming broad mats, pubescent, when old glabrate; leaves squarrose-spreading, ciliate, varying from lanceolate- or subulate-linear to almost acrose, 4 to 10 lines long: flowers mostly slender-pedicelled: calyx-lobes subulate: lobes of the (pink, purple, or white) corolla obcordate or rarely entire: ovules solitary or in pairs (or rarely 3) in each cell. (Style generally long and ovules solitary.) — Jacq. Fragn. t. 44; Bot. Mag. t. 411, & t. 415 (as *setacea*). *P. setacea*, L., form with slender leaves. *P. nivalis*, Lodd. Bot. Cab. t. 780; Sweet, Brit. Fl. Gard. t. 185: style short; and ovules commonly (but not always) 2 or rarely 3 in each cell, and corolla white. *P. Hentzii*, Nutt., a state of the last with lobes of the corolla entire or nearly so. *P. aristata*, Lodd. l. c. t. 1731, a white-flowered variety. — Rocky bare hills and sandy banks, S. New York to Michigan, Kentucky and Florida. Very variable species.

P. PROCUMBENS, Lehm. (Ind. Sem. Hamb. 1828; Sweet, Brit. Fl. Gard. ser. 2, t. 7; Lodd. Cab. t. 1722; *P. subulata*, var. *latifolia*, Benth. in DC. l. c.), is unknown as a wild plant, and is apparently a hybrid between *P. subulata* and *P. amœna*.

§ 3. Suffruticulose or suffrutescent, rarely herbaceous to the ground, natives of the Rocky Mountain region and westward, chiefly with narrow or minute and thickish-margined leaves, and branches or peduncles mostly one-flowered, in spring and summer. (Species most difficult, passing into one another.)

* Densely caespitose and depressed, mostly forming cushion-like evergreen mats or tufts; the short leaves (1¼ to 5 lines long) crowded up to the solitary and sessile (or in the last species short-peduncled) flowers, and also fascicled, scarious-connate at base, the old ones marcescent: ovules solitary in each cell. The earlier species of the series most depressed, pulvinate, and imbricate-leaved; the last looser, longer-leaved and approaching the next subsection.

+ Leaves more or less beset or ciliate with cobweb-like or woolly hairs,

++ Very short, broadish or scale-like, soft, barely mucronate, appressed-imbricated: plants very depressed, moss-like, forming pulvinate tufts: lobes of the corolla entire.

P. Richardsónii, Hook. Rather loosely tufted: leaves oblong-lanceolate, 3 lines long, sparsely lanate above, and with thickened reflexed margins; the marcescent older ones lax and spreading: tube of the "brilliant lilac" corolla nearly twice the length of the calyx, the broadly cuneate-obovate lobes 3 lines long. — Hook. Fl. ii. 73, t. 160. — Arctic sea-coast, *Richardson, Pullen*.

P. bryoides, Nutt. Habit somewhat of *Selaginella rupestris*, copiously lanate: leaves (even the marcescent ones) very densely appressed-imbricated in 4 strict ranks on the loosely tufted branches, scale-like, ovate- or triangular-lanceolate, minute (only $1\frac{1}{2}$ lines long), with rather inflexed margins: tube of the corolla considerably longer than the calyx, its cuneate lobes barely a line and a half long. — Pl. Gamb. 153. — High Rocky Mountains in Wyoming, lat. 42° – 45° , *Nuttall, Parry*.

P. muscoides, Nutt. Like the preceding, more resembling some canescent moss; the branches much tufted, very short; leaves less strictly quadrifarious and less lanate, ovate-lanceolate, mucronulate: tube of the corolla not surpassing the calyx. — Jour. Acad. Philad. vii. 42, t. 6, fig. 2. — Rocky Mountains, at the sources of the Missouri, *W. yeth*.

++ ++ Leaves subulate or acerose, somewhat rigid, less appressed: plants forming broad mats, 2 to 4 inches high.

P. Hoodii, Richards. Sparsely or loosely lanate, becoming glabrate; leaves subulate, rather rigid, erect, somewhat loosely imbricated: tube of the (white?) corolla not exceeding the calyx; its lobes obovate, entire, 2 to $2\frac{1}{2}$ lines long. — Frankl. Journ. Appx. t. 28. — Sandy plains and hills of the Saskatchewan, &c., from lat. 54° , and along the Rocky Mountains down to the south-west part of Wyoming.

P. canescens, Torr. & Gray. More lanate and canescent: leaves subulate, imbricated, soon recurved-spreading above the appressed base (3 to 5 lines long); tube of the white corolla at length exceeding (often about twice the length of) the calyx; the obovate lobes entire or emarginate, 3 or 4 lines long. — Pacif. R. Rep. ii. 8, t. 6; Watson, Bot. King, 259. — Rocky Mountains of Wyoming and Colorado to the Sierra Nevada in California and New Mexico. Apparently passes into the preceding.

+ + Leaves rigid (one third to half inch long), destitute of woolly or cobwebby hairs, the margins naked or ciliate with rigid or rather soft hairs: plants either densely or loosely tufted; the leaves mostly less crowded.

P. cæspitosa, Nutt. Leaves linear-subulate or oblong-linear, commonly much crowded, hispid-ciliate, otherwise glabrous or with some short glandular-tipped rigid hairs: corolla with tube somewhat exceeding the calyx; its lobes obovate, entire, 3 lines long. — Jour. Acad. Philad. vii. 41, t. 6, fig. 1. — Var. *rigida*, Gray, in Proc. Am. Acad. l. c. 254, is a depressed form, with acerose-subulate at length recurved-spreading rigid leaves. *P. rigida*, Benth. in DC. — Var. *condensata*, Gray, l. c., is a very dwarf, pulvinate-tufted form, with short and erect closely imbricated leaves, only 2 or 3 lines long; and is *P. Hoodii*, Gray, Enum. Pl. Parry (298) in Am. Jour. Sci. — Rocky Mountains of Colorado, Montana, &c., to Oregon and the high Sierra in California. Laxer narrow-leaved forms pass into the next.

P. Douglásii, Hook. Less densely tufted, either pubescent or nearly glabrous: leaves acerose or narrowly linear-subulate, less rigid and usually less crowded, often spreading, their margins hirsutely-ciliate next the base or naked: flowers subsessile or short-peduncled: corolla (purple, lilac, or white) with tube more or less exceeding the calyx, and obovate entire lobes about 3 lines long. — Hook. Fl. ii. 73, t. 158; Gray, Proc. Am. Acad. l. c. — Eastern and western sides of the Rocky Mountains, from Montana to Utah, west to Oregon and the borders of California. Passes into the subjoined forms.

Var. diffusa, Gray, l. c., with more loosely spreading or cespitose-decumbent stems, and lax spreading leaves, growing in moister places. — *P. diffusa*, Benth. Pl. Hartw. 325. — Western slope of the Sierra Nevada and Cascade Mountains, California to British Columbia.

Var. longifolia, Gray, l. c., a rigid form, of more arid regions, and long and narrow less fascicled leaves (linear-filiform or acerose, 5 to 8 lines long, either ascending or spreading), approaching *P. longifolia*. — W. Nebraska to Oregon and N. E. California.

* Loosely tufted or many-stemmed from a merely woody-persistent base, or wholly herbaceous, with linear or lanceolate (or rarely ovate) spreading (approximate or sometimes distant) leaves, which are little if at all fascicled in the axils: flowers slender-peduncled, solitary or somewhat cymulose.

+ Style long and slender, often equalling or almost equalling the tube of the corolla.

++ Arctic, with rather flaccid leaves and stems.

P. Sibírica, L. Mostly villous-pubescent, especially on the margins of the narrow linear leaves, depressed and loosely cespitose, less than a span high: tube of the corolla little longer than its obcordate or emarginate lobes, seldom surpassing the calyx: ovules 2 in each cell. — (Gmel. Fl. Sib. iv. t. 46, fig. 2.) Trautv. Imag. t. 24. — Kotzebue Sound. (N. E. Asia.)

++ ++ Temperate, inhabiting the plains and mountains from the borders of British Columbia southward: leaves and commonly erect or ascending stems more firm or rigid: calyx-tube between the strong ribs scarious, inclined to be membranaceous and more or less replicate, forming intervening angles: the narrowly subulate and mostly rigid teeth shorter than the tube of the rose-colored or sometimes white corolla.

P. linearifolia, Gray. Glabrous, above sometimes minutely hirsute-pubescent, corymbosely much branched from a liginous base, a span or more high: leaves very narrowly linear (an inch or two long, about a line wide): calyx-tube mostly saliently 5-angled from the broader base by the strong replication of the white-membranaceous sinuses; the lobes nearly acerose: tube of the corolla little exceeding the calyx; the obovate-cuneate lobes entire or barely retuse: ovules 2 in each cell. — *P. speciosa*, var. *linearifolia*, Hook. Kew. Jour. Bot. iii. 289, mostly. *P. speciosa*, Lindl. Bot. Reg. t. 1351; Benth. in DC. l. c. — From the Dalles to the upper waters of the Columbia, Douglas, Spalding, Geyer, &c.

P. longifolia, Nutt. Nearly glabrous or pubescent, much branched or many-stemmed from a liginous base, 3 to 8 inches high: calyx more or less angled by the white-membranaceous replicate sinuses: leaves mostly narrowly linear (1 to 2½ inches long): lobes of the corolla obovate- or oblong-cuneate, entire or retuse: ovules almost always solitary in each cell. — Jour. Acad. Philad. vii. 41. *P. speciosa*, var., Hook. Fl. ii. 72. *P. humilis*, Dougl.; Benth. l. c.: a small and short-peduncled form, sometimes apparently passing into *P. Douglasii*, var. *longifolia*. — From the eastern side of the Rocky Mountains, Montana to Colorado, west to Nevada and Oregon, and north to British Columbia or nearly: south-westward passing into

Var. Stansbúryi, Gray, l. c. Conspicuously pubescent throughout, or sometimes glabrate, generally stouter and more open in growth: leaves from linear to linear-lanceolate: pubescence of the branches and calyx viscid or glandular: corolla mostly pink or rose-color, and its tube commonly twice the length of the calyx; the lobes emarginate or erose at the apex: ovules sometimes a pair in one or two of the cells. — *P. speciosa*, var. ? *Stansburyi*, Torr. Bot. Mex. Bound. 143. — Utah and Nevada to New Mexico and Arizona. Passes into

Var. brevifolia, Gray, l. c., a depressed or dwarf form; with leaves 9 to 4 lines long, rigid and with more cartilaginous margins, at least the lower lanceolate or ovate-lanceolate: peduncles either short or none, or elongated. — From Dakotah (Black Hills) to N. California and Arizona.

P. adsurgens, Torr. Glabrous, except the slender peduncles and scarcely replicate-angled calyx, which are glandular-pubescent: stems diffuse and ascending, slender (a span or two long): leaves ovate-lanceolate and ovate, acute, 5 to 10 lines long, all but the lower much shorter than the internodes: tube of the corolla nearly twice the length of the calyx; its lobes obovate, entire (about 5 lines long): ovules solitary in each cell. — Gray, Proc. Am. Acad. viii. 256. — Cascade Mountains, Oregon, Prof. A. Wood, C. W. Cusick.

+ + Style very short, mostly shorter than the ovary and the linear stigmas: calyx-tube cylindraceous, the thin-membranous portion between the ribs not projecting into salient angles.

P. speciosa, Pursh. Above somewhat viscid-puberulent or glandular, below often glabrous, a foot to even a yard high; the branches ascending from a shrubby base: leaves lanceolate or linear (an inch or two long); the upper especially broadest at base: flowers corymbose: corolla rose-pink or nearly white; its tube little exceeding the calyx; its lobes obcordate: ovules solitary. — Gray, Proc. l. c. & Bot. Calif. i. 486. *P. speciosa*, var. *latifolia*, Hook. Kew. Jour. Bot. l. c. *P. divaricata*, Durand. Pl. Pratten., not Michx. *P. occidentalis*, Durand. in Pacif. R. Rep. iv. 125: a broad-leaved form. — Interior plains of

the upper Columbia to the foothills of the Sierra Nevada, California. In the larger Californian specimens, the corolla is an inch or more in diameter.

Var. Sáбини, Gray, l. c. Differs only in the lobes of the corolla being entire or barely retuse (obovate with a narrowed cuneate base). — *P. Sabini*, Dougl. in Hook. l. c.; Benth. l. c. *P. speciosa*, var. *elatior*, Hook. Fl. ii. 72. — Spokane River, Douglas, Lyall.

Var. Woodhousei, Gray, l. c. Small form, a span high, with linear leaves not broadened at base, and a much smaller corolla; its cuneate-obcordate lobes only 4 lines long. — *P. nana*, Torr. in Sitgreaves Rep., not Nutt. — Arizona, near Williams Mountain, Dr. Woodhouse.

P. nána, Nutt. Glandular and roughish-pubescent, loosely and copiously branching from a somewhat ligneous base, a span or more high: leaves linear (an inch or two long), those of the branches often alternate: flowers scattered or somewhat corymbose: corolla rose, "red" or "white," with tube somewhat exceeding the calyx; its ample and broadly cuneate-obovate or roundish lobes entire or nearly so (about half inch long): ovules 2 or often 3 in each cell. — Pl. Gamb. 153; Gray, Proc. l. c. 256. *P. triovulata*, Thurber in Bot. Mex. Bound. 145. — **Var. glabella, Gray, l. c.**, is merely a less pubescent or glabrate form, less branched and more erect, the leaves narrower and all opposite. — New Mexico, especially on the Rio Grande, and adjacent borders of Colorado and Texas.

§ 4. Annuals, all Texan, more or less pubescent with viscid or glandular many-jointed hairs: leaves linear or oblong, most of the upper ones alternate: calyx at length splitting almost to the base, the linear or subulate-lanceolate lobes setaceous-tipped: style shorter or not longer than the stigmas: ovules in each cell 1 to 5: seeds with somewhat wing-like angles.

P. Drummóndii, Hook. Loosely branching, villous and glandular: leaves mostly oblong or lanceolate, mucronate-pointed; the upper commonly half-clasping by a broader somewhat cordate base: flowers mostly in crowded cymose clusters: calyx-lobes lanceolate-subulate, soon recurved: corolla red, varying to rose, purple, or white; the lobes broadly obovate, entire or nearly so (about half inch long); the tube usually pubescent: ovules solitary in the cells. — Bot. Mag. t. 3441; Bot. Reg. t. 1949; Br. Fl. Gard. ser. 2, t. 316. — Texas, especially in the eastern districts, and everywhere familiar in gardens.

Var. villosissima, Gray. A very villous and viscous form, with more scattered flowers of large size, and barely spreading calyx-lobes: lobes of the pale corolla half inch long and broad. — Proc. Am. Acad. l. c. 257. — S. Texas on the Nueces, Wright.

Var. tenuis, Gray, l. c. A small and slender form, much less pubescent; with mostly linear or almost glabrous leaves (about an inch long), rather narrower instead of dilated at the base, and an open cyme of small flowers: lobes of the pink or purple corolla only 2 to 4 lines long. — Common in Eastern Texas, Drummond, Lindheimer, Wright. Seemingly very distinct.

P. Roemeriana, Scheele. Loosely branched from the base, a span or more high, sparsely hirsute or glabrate (except the calyx-tube): leaves lanceolate, or the oblong or spatulate lower ones often glabrous except the margins: flowers solitary or sparse: calyx-lobes linear, merely spreading: corolla pink or rose-colored; the glabrous tube not exceeding the calyx, about half inch long, shorter than the ample roundish-obovate entire lobes: ovules in each cell 4 or 5! — Linnaea, xxi. 752. *P. macrantha*, Buckley, in Proc. Acad. Philad. 1862, 5. — Texas, near San Antonio, &c., on high prairies. Commonly with most of the leaves alternate!

2. **COLLÓMIA, Nutt.** (*Κόλλα, glue or gluten*, the seeds when wetted mucilaginous.) — Annuals or biennials of the western region, some with showy flowers worthy of cultivation. Lower leaves usually opposite. — Nutt. Gen. i. 126; Gray, Proc. Am. Acad. viii. 258.

§ 1. **EUCOLLÓMIA, Gray.** Ovules solitary or in the last species 2 or 3 in each cell: corolla salverform or almost so: annuals, more or less viscid-pubescent or glandular. — *Collomia*, Benth. in DC. Prodr., with one *Navarretia*. (*C. gracilis*

alone wants the spiracles, which are so conspicuous on the seed-coat of the genuine species, in which they were first detected.)

* Calyx obconical: leaves sessile, entire or sometimes sparingly incised.

† Flowers capitate-crowded and leafy-bracted, or a few of them scattered.

C. grandiflora, Dougl. Erect, a foot or two high: leaves linear- or oblong-lanceolate, or uppermost lance-ovate: calyx-lobes broad and obtuse: corolla buff or salmon-color, narrow-funnelform, an inch long, showy. — Lindl. Bot. Reg. t. 1174; Hook. Bot. Mag. t. 2894. — Plains, &c., from the Rocky Mountains, lat. 48°, to Nevada and California. Var. *tenuifolia*, Benth., is a form with more slender corolla.

C. lineáris, Nutt. More branching and in age spreading, a span or two high: calyx-lobes triangular-lanceolate, acute: corolla half inch long, from lilac-purple to nearly white, very slender, little enlarged at the throat; the limb small. — Gen. i. 126; Lindl. Bot. Reg. t. 1166; Hook. Bot. Mag. t. 2983. — Lake Winnipeg and Mackenzie River (and even New Brunswick, on the coast, Fowler, perhaps a chance introduction), west to the Pacific, and south to California and Colorado. Passes into

Var. *subuláta*, Gray, l. c. A low and slender form, diffusely branching from the base: leaves narrow and acute: flowers few in the lower forks: calyx-lobes attenuate-subulate; the tips almost awnlike from a broad base, rather longer than the tube. — *C. tinctoria*, Kellogg, Proc. Acad. Calif. iii. 17, t. 2. — Nevada and adjacent parts of California and Oregon.

+ + Flowers scattered, all solitary in the forks.

C. tenella, Gray. Slender, 3 or 4 inches high, loosely branched, viscid: leaves linear with a long tapering base, obtusish: flowers solitary in all the forks, remote, almost sessile: calyx-lobes rather broadly triangular, acute, shorter than the broadly turbinate tube, about half the length of the narrow purplish corolla, this 3 or 4 lines long. — Proc. l. c.; Watson, Bot. King, 262, & Bot. Calif. i. 488. — Dry hills, Utah and Nevada to eastern and northern parts of California.

* * Calyx rounded at base: leaves sessile, entire, the lower oftener opposite: flowers rather loosely cymose or scattered. The mucilage-cells of the seed-coat wholly destitute of spiral fibres!

C. gracilis, Dougl. At length corymbosely much branched and spreading, 2 to 6 inches high: leaves lanceolate, or linear or the lowest oval or obovate: corolla 5 lines long, purple or violet; the narrow tube yellowish and seldom longer than the subulate-linear lobes of the deeply-cleft calyx. — Benth. in Bot. Reg. no. 1622, & DC. Prodr. ix. 308. *Gilia gracilis*, Hook. Bot. Mag. t. 2924. *Collomia micrantha*, Kellogg, l. c. fig. 3. — Colorado and New Mexico and from Brit. Columbia south to Arizona. (W. S. Amer.)

* * * Calyx obtuse or acute at base: leaves all alternate and mostly incised or pinnately divided, all the lower petioled: corolla pinkish-purple, slender, half inch or less long, twice or thrice the length of the calyx.

C. gilioides, Benth. Stems loosely branching, erect or diffuse, a span to 2 feet long: leaves nearly simply cut or parted into lanceolate or narrowly oblong divisions: flowers loose or scattered: calyx obtuse or rounded at base, deeply cleft; the lobes linear-subulate: stamens moderately unequal in insertion: ovules solitary or rarely in pairs: capsule globular. — Gray, Proc. Am. Acad. l. c. (with var. *glutinosa*) & Bot. Calif. l. c. *G. gilioides* & *G. glutinosa*, Benth. l. c., the latter a more viscid state of this variable species. *Gilia divaricata*, Nutt. Pl. Gamb. 155, a slender form.

C. heterophýlla, Hook. Low, diffuse: leaves thin, mostly pinnatifid with the lobes again incised, or bipinnatifid, some of the uppermost less cut or even entire and bract-like, subtending the more or less capitate or looser clusters of flowers: calyx acute at base, cleft barely to the middle; the lobes ovate-lanceolate: stamens very unequally inserted: ovules 2 or 3 in each cell: capsule ellipsoidal. — Bot. Mag. t. 2895; Bot. Reg. t. 1347. *Courtoisia bipinnatifida*, Reichb. Ic. Exot. t. 208. *Gilia Sessei*, G. Don. *Navarretia heterophylla*, Benth. in DC. l. c. — Brit. Columbia to California: common.

§ 2. PHLOGÁNTHEA, Gray, l. c. Ovules numerous, i. e. 6 to 12 in each cell: filaments unequal as well as unequally inserted, sometimes a little declined: biennials (sometimes perhaps perennials), or annuals, slightly if at all viscid. (Species of *Gilia*, sect. *Ipomopsis*, Benth.)

* Cauline leaves simply pinnately parted into few (3 to 7) narrow-linear or often almost filiform divisions, very numerous, all alternate: inflorescence thyrsiform or panicled: corolla salverform, with tube little if at all dilated upward.

C. Cavanillesiána, Don. Biennial (or perhaps perennial southward) with a somewhat woody base, more or less pubescent, virgately branched: flowers in small clusters in a narrow or raceme-like leafy thyrsus: pedicels very short or none: corolla white, ochroleucous, or tinged with purple, only half inch long; the tube 2 or 3 times the length of the calyx; the sinuses somewhat unequal; lobes oblong: filaments moderately unequally inserted high in the considerably funnellform-expanded throat: anthers roundish: ovules 5 to 7 in the cells. — Syst. iv. 246; Gray, l. c. 260. *Phlox pinnata*, Cav. Ic. t. 528. *Cantua glomeriflora*, Juss. Ann. Mus. Par. ii. 119. *Gilia glomeriflora*, Benth. l. c. *G. multiflora*, Nutt. Pl. Gamb. l. c. — New Mexico and W. Texas to Arizona. (Mex.)

C. Thúrberi, Gray. Resembles the preceding in foliage and growth, but only minutely pubescent: inflorescence more spicate: flowers much larger: corolla blue or lilac, showy, salverform; the tube an inch or rather more in length, very slightly and gradually dilated upwards, 3 or 4 times the length of the calyx and of its orbicular lobes: filaments in the throat: anthers short-oblong: ovules 8 or 9 in each cell. — Proc. Am. Acad. l. c. 261. — New Mexico, near the Santa Rita coppermines, and in Arizona, *Thurber*.

C. longiflóra, Gray, l. c. Annual, glabrous, loosely paniculate-branched: divisions of the leaves long and slender: flowers loosely somewhat corymbose on slender peduncles: corolla white, strictly salverform and Phlox-like, showy; the tube often an inch and a half long, with narrow orifice; lobes orbicular or ovate (sometimes abruptly pointed): filaments very unequally inserted into the upper part of the tube, or 2 or 3 of them in the throat: anthers elongated-oblong: ovules 10 or 12 in each cell. — *Cantua longiflora*, Torr. in Ann. Lye. N. Y. ii. 221. *Gilia longiflora*, Don, Benth., &c. — W. Nebraska and Colorado to borders of Texas, and Arizona; common in pine forests.

* * Leaves mostly entire, narrowly linear, scattered: corolla truly funnellform.

C. leptálea, Gray. Slender annual, 2 to 18 inches high, minutely glandular, otherwise glabrous, branching into an effuse panicle: leaves 6 to 20 lines long, or the uppermost reduced to small subulate bracts, the lower sometimes with 2 or 3 small lobes: peduncles filiform or capillary: calyx small; its lobes subulate: corolla pink-red, 5 to 10 lines long; its slender tube longer than the calyx, and rather abruptly expanded into a wide funnellform throat of about the length of the oval spreading lobes. — Proc. Am. Acad. l. c. & Bot. Calif. i. 488. *Gilia capillaris*, Kellogg in Proc. Calif. Acad. v. 46. — California; common on moist or wet banks in the Sierra Nevada, &c. A delicate species; the corolla in shape like that of *Gilia tenuiflora*.

3. LÆSÉLIA, L. (*John Læsel*, of the 16th century, author of a Flora Prussica, &c.) — Somewhat shrubby or suffrutescent plants (of Mexico and adjacent districts); with more or less rigid and commonly spinulose-toothed or spinulose-ciliate leaves, and the uppermost forming conspicuous bracts to the clustered flowers. But the following species form a section, *GILTIORSIS*, connecting with *Gilia*, having more scattered flowers, hardly any bracts, and very narrow leaves (all alternate), merely with rigidly mucronate tips. Limb of the corolla irregular by one of the lobes being separated by deeper sinuses from the others; the cuneate lobes erosely truncate or 3-denticulate: filaments incurved below the apex. — Gray, Proc. Am. Acad. xi. 86.

L. tenuifólia, Gray. Much branched from a somewhat woody perennial base, a span to a foot high, nearly glabrous: leaves linear-acrosc, entire, or the lower and larger with 2 or 3 spreading subulate lobes: flowers rather crowded at the summit, the branches short-pediceled: calyx-lobes subulate: corolla bright red, narrowly tubular-funnelform, an inch long; the tube 3 or 4 times the length of the lobes: capillary filaments and style conspicuously exerted: ovules 8 or 10 in each cell. — Bot. Calif. i. 500, & Proc. l. c. — Tantillas Mountains, on the lower border of San Diego Co., California, *Mr. Dunn, Palmer*.

L. effúsa, Gray. Diffusely much branched and rigid from an apparently annual root, a foot high, nearly glabrous: leaves all entire and filiform or very narrowly linear, short

(a quarter inch or less long): flowers effusely paniculate: calyx-teeth short and broadly triangular: corolla pink purple, short-funnelform, 5 lines long; its lobes fully as long as the tube, unequal, about equalling the incurved filaments and style. — Proc. Am. Acad. l. c., & Bot. Calif. i. 621. — With or near the preceding species, *Palmer*.

4. *GÍLIA*, Ruiz. & Pav. (Dedicated to *Philip Gil*, who helped Xuares to write a treatise on exotic plants cultivated at Rome.) — North American, chiefly Western, with a few S. American species; several cult. for ornament. Flowers in some species, especially in § 3 and § 9, tending to dimorphism, mainly in the length of the style. A polymorphous genus: most of the sections have been taken for genera, but they lack definiteness. — Gray, Proc. Am. Acad. viii. 261.

SERIES I. Leaves either opposite or palmately divided to the sessile base, usually both; their divisions from narrowly linear to filiform: seed-coat in many species mucilaginous when wetted, but destitute of spiricles.

§ 1. *DACTYLOPHÝLLUM*, Gray, l. c. Corolla campanulate, rotate, or short-funnelform; the lobes obovate: filaments slender: ovules numerous or sometimes few in each cell: seed-coat when wetted developing more or less mucilage-cells from beneath the epidermis: low or slender annuals, loosely and mostly rather small-flowered: leaves opposite or the upper alternate.

* Flowers subsessile or short-pedicelled in the forks of the stem, at length crowded: calyx deeply cleft or parted, the lobes unequal: corolla campanulate with hardly any proper tube (the filaments inserted on its base); lobes entire or nearly so: plants barely 2 inches high, with 3-7-parted leaves.

G. Párryæ, Gray. Pubescent, much branched from the base, forming a tuft: leaves short, 5-7-parted; the divisions linear-acerose (barely quarter inch long): calyx deeply 5-cleft; lobes acerose with broad thin-scarious margins: corolla (white, yellowish or purple, half an inch long) with broadly ovate somewhat pointed lobes as long as the undivided portion; the throat below each crowned as it were by a broad adnate and emarginate or obcordate scale: anthers oblong: capsule oval-oblong, many-seeded: seeds angular, not mucilaginous when wetted. — Proc. Am. Acad. xi. 76. *G. Kennedyi*, Porter in Bot. Gazette, ii. 77. — Desert Plains, S. E. California: near the head of the Mohave, *Lemmon, Parry, Palmer*. Kern Co., *W. L. Kennedy*. Dedicated to *Mrs. Parry*, one of the botanical party which discovered it. A handsome pygmy annual; remarkable for having appendages to the corolla not unlike those of many *Hydrophyllaceæ*.

G. demissa, Gray. Less pubescent, diffusely branching, forming a depressed tuft: leaves 3-parted, or some of them simple (half inch long); the divisions acerose: calyx 5-parted: corolla (white, sometimes purplish, 3 lines long) with obovate obtuse lobes and a naked throat: anthers oval: ovules 6 or 7 in each cell. — Proc. Am. Acad. viii. 263, & Bot. Calif. i. 489; Rothrock in Wheeler Rep. t. 19. — Desert plains, S. E. California and W. Arizona to S. Utah, first collected by *Fremont*, next by *Cooper*.

* * Flowers loose or scattered on slender or capillary pedicels: calyx barely 5-cleft: corolla short-funnelform or approaching rotate, and with entire lobes: the filaments inserted in the throat: anthers oval: leaves 3-7-parted, more or less hispidulous, or rarely glabrous. — *Gilia* § *Dactylophyllum*, Benth. in DC.

G. liniflora, Benth. Erect, at length diffuse, 6 to 18 inches high, nearly glabrous: leaves Spurrey-like; the divisions nearly filiform: flowers paniculate: pedicels 5 to 15 lines long: corolla white or barely flesh-colored, somewhat rotate; its throat pubescent at base of the filaments; the obovate lobes thrice the length of the narrow tube, 3 to 5 lines long in the larger forms: ovules in the cells 6 to 8. — Benth. in Bot. Reg. no. 1622, & DC. l. c. 315; Hook. f. Bot. Mag. t. 5895. — California; rather common; passing freely into

Var. pharnaceoides, Gray, l. c., a smaller form, with capillary diffuse branches and flowers of only half the size. — *G. pharnaceoides*, Benth. l. c.; Hook. Fl. ii. 74, t. 161. — California to Brit. Columbia and eastward to the Rocky Mountains; the smallest states strikingly different from the original *G. liniflora*.

G. pusilla, Benth. l. c. Small, diffuse, 2 to 6 inches high, very slender: divisions of the leaves filiform-subulate or acerose (3 to 5 lines long): capillary pedicels 5 to 10 lines long:

corolla purplish with yellow throat or nearly white, broadly short-funnelform, 2 lines or more long; the obovate lobes equalling or longer than the campanulate throat and short proper tube: filaments nearly glabrous at base, inserted below the sinuses: ovules 3 to 5 in each cell.—Gray, Proc. Am. Acad. 1. c.—The proper species, with corolla barely exceeding the calyx, Guadalupe Island off Lower California, *Palmer*. (Chili.)

Var. Californica, Gray, l. c. Corolla with larger lobes, 2 or 3 lines long, and twice the length of the calyx.—Bot. Calif. i. 490. *G. filipes*, Benth. Pl. Hartw. 325.—California, from the upper Sacramento to Nevada.

G. Bolánderi, Gray, l. c. Like the variety of the foregoing; but the tube of the (blue- or purple-tinged) corolla long and narrow, almost equalling the narrow cylindraceous calyx-tube, rather longer than the oblong lobes along with the very short and slightly dilated throat: filaments inserted just below the sinuses, glabrous: ovules 2 to 5 in each cell.—California, on dry hills, Sonoma Co., to the Sierra Nevada, *Bolander*, *A. Wood*, *Mrs. Austin*, *Mrs. Ames*. Corolla 3 or 4 lines long, but the comparatively small lobes only a line and a half long. Longer pedicels an inch or so in length.

G. aurea, Nutt. Diffusely branched, 2 to 4 inches high: divisions of the hispidulous leaves narrowly linear, barely 3 lines long: pedicels seldom longer than the flower, somewhat cymose: corolla mostly yellow, open and short-funnelform; the rounded obovate widely spreading lobes about as long as the obconical throat and the very short proper tube: filaments inserted just below the sinuses, glabrous at base: ovules about 10 in each cell.—Pl. Gamb. 155, t. 22; Gray, l. c.—From Sta. Barbara, California, to Arizona and New Mexico. Corolla with the limb a third to half inch in diameter when fully expanded, bright or light yellow, sometimes purplish in the throat; or, in

Var. decora, Gray, l. c., white or pale violet, with or without brown-purple in the throat.—California (*Fremont*, *Brewer*, &c.) and through Arizona to New Mexico.

See add

* * * Flowers terminating the branches, rather short-pedicelled: corolla short-funnelform, its ample lobes fringe-toothed or denticulate: leaves all undivided and opposite.—*Fenzlia*, Benth. *Gilia* § *Dianthoides*, Endl.

G. dianthoides, Endl. Branching from the base, 2 to 5 inches high, more or less pubescent: leaves narrow-linear: corolla an inch or more long, lilac or purplish usually with darker or yellowish throat; the slender nearly included glabrous filaments inserted towards its base: ovules 12 to 20 in each cell.—Atakt. t. 29; Hook. Bot. Mag. t. 4876. *Fenzlia dianthiflora*, Benth. in Bot. Reg. l. c. *F. speciosa* (a large-flowered form), & *F. concinna* (a depauperate state), Nutt. Gamb. 157.—California, from Santa Barbara and the islands southward. A showy little plant, varying greatly in the size and hue of the flowers; the corolla-lobes in one form (*Coulter*) only minutely erose-denticulate.

§ 2. **LINANTHUS, Endl., Benth.** Corolla salverform; the narrow tube about equalling the cylindrical tube of the calyx (which is white-scarious, except the ribs, prolonged into acerose-linear teeth); the broadly cuneate-obovate lobes commonly minutely or obsoletely erose or crenulate, strongly convolute in the bud: stamens included in the tube of the corolla: filaments inserted below its middle, slender: ovules 20 to 40 in each cell: capsule cylindraceous or oblong: erect and slender glabrous annuals, about a span high or taller, with leaves all opposite, filiform or nearly so, 3-5-divided, or the lower simple, sometimes nearly all simple, especially in depauperate specimens: flowers mostly showy, white or nearly so, terminal or in the forks and subsessile.—*Linanthus*, Benth., formerly.

G. dichotoma, Benth. Flowers showy; the lobes of the corolla from half to nearly an inch long: anthers linear: seeds roundish, with a very loose arilliform external coat, not developing mucilage when wetted.—DC. l. c. 314; Gray, l. c. *Linanthus dichotomus*, Benth. in Bot. Reg. l. c. *Gilia Linanthus*, Steud. Nom.—California and Arizona; common westward. Leaves all entire only in some depauperate specimens.

G. Bigelovii, Gray. Flowers inconspicuous; the lobes of the corolla not over 2 lines long, hardly surpassing those of the calyx and only half or one-third the length of its tube: anthers oval: seeds oval or oblong, with a close coat, freely developing mucilage when wetted.—Proc. Am. Acad. l. c. 265; Watson, Bot. King, t. 25. *G. dichotoma*, var. *parviflora*, Torr. Bot. Mex. Bound. 147.—W. borders of Texas to E. California.

§ 3. *LEPTÓSIPHON*, Endl., Benth. Corolla salverform, with the tube mostly filiform and elongated; the very short throat commonly abruptly more or less cyathiform-dilated: stamens inserted in the throat or orifice: anthers short: ovules numerous: annuals, mostly low or slender, with opposite narrow leaves, and handsome but commonly small flowers crowded into a capitate leafy-bracted cluster. (Style either very long and more or less exserted, or rather rarely short and included, in different individuals of the same species.) — *Leptosiphon*, Benth.

* Palmately-leaved gemine species, hairy, leafy-stemmed; commonly with leaves fascicled in the axils and all 5-7-parted; their divisions linear-filiform: filaments slender, exserted more or less from the throat of the corolla, shorter than its entire lobes: ovules 6 to 10 in each cell.

+ Large-flowered, and the tube of the corolla only equalling or little exceeding the obovate lobes.

G. densiflora, Benth. Rather stout and large, often strict: numerous divisions of the leaves filiform, somewhat rigid: tube of the lilac or nearly white corolla (half inch long) little if at all exserted beyond the calyx, and villous-hirsute bracts. — Gray, Proc. l. c. *Leptosiphon densiflorus*, Benth. in Hort. Trans. viii. t. 18; Lindl. Bot. Reg. t. 1725; Hook. Bot. Mag. t. 3578. *Gilia Leptosiphon*, Steud. Nom. Varies with corolla-tube a little more exserted, when it is *G. grandiflora*, Steud. & Benth. l. c. and *Leptosiphon grandiflorus*, Benth. in Bot. Reg. — California; common towards the coast.

+ + Slender-flowered; the filiform tube of the corolla 2 to 6 times the length of the lobes; these from 4 to less than 2 lines long, oval or ovate. Species difficult to define.

G. brevicula, Gray. A span high, corymbosely branched, minutely pubescent and above glandular: leaves few and short (quarter of an inch long): tube of the corolla only 5 or 6 lines long, but much exceeding the calyx and bracts, hardly twice the length of the (purple or violet) lobes: otherwise much like the next. — Proc. Am. Acad. xii. 79. — Southeastern California, on the Mohave River, *Palmer*.

G. androsæcea, Steud. A span to a foot high: corolla much exserted beyond the hirsute or villous-ciliate bracts and subtending leaves, lilac, pink, or nearly white with yellow or dark throat; its tube an inch or less long, thrice the length of the lobes (limb 8 to 10 lines in diameter). — Gray, l. c. & Bot. Calif. i. 491. *Leptosiphon androsæceus*, Benth. in Hort. Trans. viii. t. 18; Hook. Bot. Mag. t. 3491; Lindl. Bot. Reg. t. 1710. — California; common west of the Sierra Nevada.

Var. rosæcea, Gray. A dwarf and tufted form, with rose-red corolla, varying however into other hues. — Bot. Calif. l. c. *Leptosiphon parviflorus*, var. *rosaceus*, Hook. f. Bot. Mag. t. 5863. — Near San Francisco, *Kellogg*.

Var. detónsa, Gray, l. c. Slender and almost glabrous form, the bracts and leaves merely hispidulous-ciliate. — Western part of California, *Bridges*, *Brewer*. A less marked form occurs on the borders of Nevada, *Anderson*.

G. micrantha, Steud. Slender, a span or so high: tube of the corolla extremely slender, three-fourths to inch and a half long, 4 to 6 times longer than the lobes; these 2 or 3 lines long: pubescence of the bracts, &c., short and soft, rarely hirsute-ciliate. — Gray, Proc. l. c. excl. syn. var. *rosaceus*, Bot. Mag. *Leptosiphon parviflorus* & *L. luteus*, Benth. in Bot. Reg. *Gilia micrantha* & *G. lutea*, Benth. in DC. l. c. — California; common through the western part of the State. Flower from purplish or lilac to cream-color, sulphur-yellow, and even golden yellow (var. *aurea*, Benth. Pl. Hartw.).

Var. longituba (*G. longituba*, Benth. Pl. Hartw. 324) is one of the larger-flowered forms, apparently passing into *G. androsæcea*. — Monterey, *Hartweg*, &c.

G. tenella, Benth. Mostly depressed, small: tube of the corolla less slender in proportion to the size of the limb (6 to 9 lines long, the lobes only $1\frac{1}{2}$): bracts and leaves hispidulous-ciliate. — Pl. Hartw. 325. *Leptosiphon bicolor*, Nutt. Pl. Gamb., chiefly. — Puget Sound to Santa Barbara, California. Has been confounded with the two foregoing. Corolla dull purple, or pink, with yellow throat.

G. ciliata, Benth. Rigid, rough, 4 to 12 inches high, the taller stems virgate: tube of the corolla slightly or not at all exserted beyond the very hirsute or hispid-ciliate bracts and subtending leaves (6 to 9 lines, and the lobes only $1\frac{1}{2}$ lines long): calyx-lobes acerose. — Pl. Hartw. l. c.; Gray, l. c. — California, reaching into Nevada, &c. Greyish with short pubescence on the stems, and longer both rigid and softer spreading hairs fringing the leaves and bracts. Corolla rose or violet, fading to white.

* * Entire-leaved, wholly glabrous, very dwarf: anthers sessile in the throat of the corolla, the cuneate lobes of which are somewhat undulate-toothed or 1-3-dentate at the broad apex: ovules 10 to 16 in each cell.

G. nudicaulis, Gray. Very glabrous, an inch to a span high, at length branching from the base: stem (a long internode) leafless from the cotyledons up to the inflorescence, which is a close head or glomerule subtended by an involucre of several ovate-lanceolate or lanceolate foliaceous bracts: corolla white, pink, or yellow; the tube 3 or 4 lines long and thrice the length of the calyx, rather longer than the lobes. — Proc. Am. Acad. viii. 266; & Bot. Calif. i. 492. *Collomia nudicaulis*, Hook. & Arn. Bot. Beech. 369. — Sandy plains, in spring, interior of Oregon and Nevada to Colorado.

§ 4. **SIPHONÉLLA, Gray.** Like *Leptosiphon*, but tube of corolla not surpassing the calyx, and its throat more funnelform, ovules only 2 or 4 in each cell, and flowers less glomerate: perennials, more or less woody or suffrutescent at base, cinereous-puberulent or the 3-7-parted leaves glabrate: calyx cylindraceous, firm-herbaceous, soon 5-parted; the abrupt margins of the lanceolate-subulate lobes and the sinuses not at all scarious: corolla white, with yellow throat, obovate lobes (3 or 4 lines long), and tube externally puberulent: filaments short, slightly exserted: anthers short. — *Siphonella*, Nutt. herb.

G. Nuttállii, Gray. Stems or branches a span to a foot high, rather simple, terminated by a dense leafy cluster of flowers: divisions of the leaves narrowly linear (6 to 9 lines long), mucronate: ovules a pair in each cell. — Proc. Am. Acad. viii. 267; Watson, Bot. King, 265, t. 26. — Western side of the Rocky Mountains of Colorado and Utah to Arizona and the Sierra Nevada in California.

G. floribúnda, Gray. Taller and more slender, paniculately or corymbosely branched: the copious flowers in rather loose cymose clusters, often pedicelled: divisions of the leaves very slender, almost acicular or filiform: ovules 4 in each cell. — Proc. Am. Acad. i. c., & Bot. Calif. i. 492. — San Diego Co., California, on the southern borders, and east to Arizona, Coulter, Palmer, &c.

§ 5. **LEPTODACTYLON, Benth.** Corolla salverform, with tube more or less exceeding the calyx; the throat somewhat funnelform-dilated: filaments short, inserted in or below the throat: anthers short, included: ovules numerous in each cell: seeds with a close coat, developing neither spiracles nor mucilage when wetted: perennials or undershrubs, commonly tufted, very leafy: leaves all alternate, except in one species, and much fascicled in the axils, palmately 3-7-parted, acerose or subulate, rigid and pungent: flowers showy (rose, lilac, or white), solitary and sessile or few in a cluster at the summit of short branches or branchlets. — *Leptodactylon*, Hook. & Arn.

* * Leaves all opposite: stems or branches almost herbaceous from a woody base.

G. Watsóni, Gray. Roughish-puberulent and glandular, or at length smoothish: slender branches a span high from the woody caudex: leaves not much fascicled, widely spreading; the slender acerose divisions (6 to 8 lines long) often shorter than the internodes: calyx-lobes barely half the length of the tube: corolla nearly white (with purplish throat); its tube and lobes each half inch long: anthers at the orifice: ovules 10 or more in each cell. — Proc. Am. Acad. i. c.; Watson, Bot. King, 265, t. 26. — Rocky hills, Utah, Watson.

* * Leaves all alternate: stems decidedly woody.

G. Califórnicæ, Benth. Branches and very crowded soon widely spreading leaves tomentose-pubescent, or rather villous when young: corolla (rose or lilac, its ample limb an inch and a half in diameter) with broadly wedge-obovate lobes, their margin often minutely erose: anthers linear-oblong, included in the upper part of the tube: ovules 20 or more in each cell. — DC. Prodr. i. c. *Leptodactylon Californicum*, Hook. & Arn. Bot. Beech. 349, t. 89; Hook. Bot. Mag. t. 4872. — Dry hills, W. California, south to San Bernardino Co.

G. púngens, Benth. Branches and mostly erectish or little-spreading leaves viscid-pubescent, puberulent, or glabrate: corolla rose, white, or "yellow" (Dougl.), the lobes

narrower and only half as large as in the preceding: anthers in the throat, oblong: ovules 8 or 10 in each cell. — Proc. Am. Acad. l. c. *G. pungens* & *G. Hookeri*, Benth. in DC. l. c. — Plains of the Upper Platte and Columbia to Arizona and E. California. Widely variable. The original *Cantua pungens*, Torr. Ann. Lyc. N. Y. ii. 26 (*Egochloa Torreyi*, Don), of the Platte, is a low glabrate form.

Var. *cæspitosa*, Gray, l. c. (*Leptodactylon cæspitosum*, Nutt. Pl. Gamb.), is a low and dense form, imitating *Phlox Douglasii* in growth. — Scott's Bluffs, Wyoming, Nuttall.

Var. *Hookeri*, Gray, l. c. (*Phlox Hookeri*, Dougl. in Hook. Fl. ii. 73, t. 159, & *G. Hookeri*, Benth.), is taller, with sparser more rigid leaves, and viscid-pubescent flowering shoots. — Interior of Oregon, California, &c. Flowers not found to be "yellow."

Var. *squarrósa*, Gray, l. c. A foot or two high, with virgate branches, beset with stouter and more rigid recurved-spreading pungent leaves. — Dry interior region, Nevada to Idaho and Washington Terr.

SERIES II. Leaves alternate and pinnately incised, cleft, or divided, or rarely entire, occasionally some of the lowermost opposite: filaments slender: seed-coat (as in *Collomia*) when wetted mucilaginous and sending out threads containing each a spiral coil (spiricle), except in a few species.

§ 6. **NAVARRÉTIA**, Gray, l. c. Flowers capitate-crowded and densely foliaceous-bracted (in the last species less so): lobes of the calyx and of the mostly (sometimes nearly palmately) multifid bracts rigid and acerose-pungent or spinulose, often lacinate or unequal: corolla slender, tubular-funnelform or almost salverform, and with rather small oval or oblong lobes: filaments inserted in or below the throat: anthers short: stigmas and cells of the ovary sometimes reduced to 2: low and much-branching annuals, sometimes glandular-viscid, never white-woolly; with chiefly 1–2-pinnately divided or cleft leaves, their lobes commonly subulate and pungent. — *Navarretia*, Ruiz & Pav., Benth.

* Leaves and bracts, or some of them, more than once pinnately parted, i. e. their primary divisions incised or parted.

+ Ovules and seeds numerous (8 to 12) in each cell: stamens included in the throat of the corolla, commonly unequal in length and slightly so in insertion: herbage very glandular-viscid and unpleasantly aromatic-scented.

G. *squarrósa*, Hook. & Arn. Rather stout and rigid, often a foot high: upper leaves and bracts spinescent: tube of the small blue (or sometimes whitish) corolla rather shorter than the mostly entire calyx-lobes. — Bot. Beech. 151; Gray, Proc. Am. Acad. l. c. 269. *G. pungens*, Hook. Bot. Mag. t. 2977. *Hoitzia squarrosa*, Esch. *Egochloa pungens*, Benth. in Bot. Reg. l. c. *Navarretia squarrosa*, Hook. & Arn. l. c. 368. *N. pungens*, Hook. Fl. ii. 75. Plains of California and Oregon; a common fetid weed.

+ + Ovules varying from 1 to 2 or 3 to 4 in each cell: stamens exerted out of the throat of the corolla, at length mostly equalling the lobes: herbage less viscid or glandular, in some not at all so.

G. *cotulæfólia*, Steud. Rigid, a span to a foot high, pubescent or below glabrate, above mostly minutely glandular: leaves chiefly 2-pinnately parted; the subulate divisions of the upper and of the bracts spinescent: tube of the violet-blue or white corolla hardly longer than the lobes of the sparsely villous calyx; the throat funnelform: ovules solitary or rarely a pair in each of the (frequently only 2) cells of the ovary. — *Egochloa pubescens* & *cotulæfólia*, Benth. in Bot. Reg. *Navarretia pubescens* & *cotulæfólia*, Hook. & Arn. l. c.; Benth. in DC. l. c. — California; common westward, on dry hills: exhales the odor of *Anthemis Cotula*.

G. *intertéxta*, Steud. Erect or widely branched, low and rather stout, neither viscid nor glandular: stem retrorsely pubescent: leaves mainly glabrous, with divaricate acerose-spinescent divisions sparingly divided or simple: flowers densely glomerate: tube of the calyx and base of the bracts strongly villous with white spreading hairs; its lobes equalling the white corolla: ovules and seeds 3 or 4 in each cell. — *Navarretia intertexta*, Hook. l. c. — Plains of Columbia River to California and the Rocky Mountains. Corolla 3 or 4 lines long, the stamens equalling its lobes.

G. mínima, Gray. Depressed, often forming broad tufts (half inch to 2 inches high), glabrate: leaves acicular and with simpler and fewer divisions than the preceding: tube of the calyx white-hairy in the broad sinuses, as long as the unequal lobes, which equal or exceed the white corolla: ovules 1 to 3 in each cell. — Proc. Am. Acad. l. c.; Watson, Bot. King, 266. *Navarretia minima*, Nutt. Pl. Gamb. 160. — Interior of Oregon and Nevada to Colorado and Dakota, in very arid districts. Corolla a line and a half long; the stamens mostly shorter than its lobes.

G. Bréweri, Gray. Erect or at length much branched and diffusely spreading, an inch to a span high, very minutely glandular-puberulent all over: flowers less glomerate: leaves with mostly simple acicular-subulate divisions: calyx-lobes similar to these, narrowly subulate, about equalling the yellow corolla, 3 or 4 times the length of the tube (which is even shorter than the capsule): ovules 1 or 2 in each cell. — Proc. Am. Acad. l. c. & Bot. Calif. i. 494; Watson, l. c. — Sierra Nevada, California (*Brewer*, &c.), and through the interior to Utah and Wyoming. Corolla 3 or 4 lines long.

G. leucocéphala, Gray, l. c. Slender, a span or less high, seldom rigid, not glandular, glabrous, except some woolly pubescence at the summit of the stem and of the thin calyx-tube: leaves soft; their often simple divisions slender; those of the bracts barely pungent: corolla white, longer than the calyx (4 lines long): stamens considerably exserted: ovules 2 in each cell. — *Navarretia leucocephala*, Benth. Pl. Hartw. 324. — California, on the Sacramento and its tributaries, and Mendocino Co., in low grounds.

* * Leaves simply pinnatifid or incised, or many of them entire.

+ All slender and filiform, except the bracts of the small heads, which are more or less palmately 3-5-cleft: corolla rather slender, 3 or 4 lines long: stems slender, not over a span high, diffusely branched: often with proliferous filiform branches.

G. divaricáta, Torr. Not glandular-viscid, glabrate; the bracts and especially the calyx woolly-pubescent: divisions of the uppermost leaves and the similar bracts acerose: corolla purple or apparently yellowish: ovules 5 to 7 in each cell. — Gray, Proc. Am. Acad. viii. 270, & Bot. Calif. i. 494. — California, from Lake Co. to Mariposa Co., up to 8000 feet in the Sierra Nevada.

G. filicaúlis, Torr. More paniculate, glandular-viscid but not pubescent: upper leaves filiform or setaceous and entire: bracts somewhat euneate and the lobes pungent; the inner shorter than the violet corolla: ovules solitary or at most a pair in each cell. — Gray, l. c. — California, Mariposa Co. to Butte Co.

+ + Leaves broader and rigid, linear or lanceolate, with spinulose lobes; the floral ones dilated at base and often cartilaginous: stems stout, 2 to 8 inches high: flowers densely glomerate: corolla violet or purple, a third to half inch long, about twice the length of the subulate spinescent calyx-lobes.

G. viscidula, Gray, l. c. Viscid-pubescent, at length much branched: cauline leaves slender and lacinate-pinnatifid or parted into setaceous-subulate ascending lobes; the floral and bracts only moderately dilated: ovules 1 to 4 in each cell. — *Navarretia viscidula*, Benth. Pl. Hartw. 325, a small form. — Dry hills, California, from Santa Barbara to the Sacramento and east to the foothills of the Sierra Nevada.

G. atractylóides, Steud. Pubescent and very viscid, also very rigid, especially the leaves and bracts; these lanceolate or the uppermost even ovate, all pinnatifid, and with divaricate subulate-spinescent lobes: flowers less glomerate: ovules 6 or 7 in each cell. — *Egochloa atractylodes*, Benth. in Bot. Reg. l. c. *Navarretia atractylodes*, Hook. & Arn. Bot. Beech. 368; Benth. in DC. Prodr. ix. 310. — California, from Santa Cruz to San Diego Co., in open and dry ground.

+ + Depressed, an inch or two high, at length prostrate, hardly if at all viscid: leaves upwardly dilated: flowers comparatively loose and scattered: corolla half to two thirds inch long, tubular-funneliform, much exceeding the calyx.

G. setosíssima, Gray. Pubescent or glabrate, strikingly setose; the very long white bristles terminating the lobes of the calyx and the 3 to 7 lobes or teeth of the narrowly cuneate or linear leaves, and scattered or sometimes clustered down their sides: corolla white, purple, or mottled; the limb slightly irregular: ovules 3 to 10 in each cell. — Proc. Am. Acad. l. c. 271, & Bot. Calif. 494. *Navarretia setosissima*, Torr. & Gray, Bot. Ives Colorad. 22. *N. Schottii*, Torr. Mex. Bound. 242 (*G. Schottii*, Watson, Bot. King); an early and depauperate form. — Deserts of S. E. California, to W. Arizona and S. Utah, first collected by *Coulter*.

§ 7. *HUGÉLIA*, Gray. Flowers capitate-glomerate and foliaceous-bracted: the 3-5-cleft bracts and calyx densely implexed-woolly; lobes of the latter acerose or subulate and cuspidate or pungent: corolla salverform; the lobes ovate or oblong: filaments filiform, exerted: anthers deeply sagittate: herbage floccose-lanate, at least when young, neither glandular nor viscid: leaves or their simple divisions very narrow and mostly rigid. — *Hugelia*, Benth. in Bot. Reg. l. c. *Gilia* § *Collomioides* & § *Pseudocollomia*, Endl., Benth. in DC.

* Woody-based and rigid perennial: corolla violet-blue: ovules few or several in each cell.

G. densifolia, Benth. Canescent-lanate when young, glabrate with age: tufted stems a span to a foot or more high from a ligneous base, leafy to the top, simple or sparingly branched: leaves rigid, mostly pinnatifid or incisedly lacinate into short-subulate spinulose lobes: flowers densely capitate-glomerate: tube of the corolla (half inch long) twice or thrice the length of the calyx: anthers sagittate-linear. — DC. Prodr. ix. 311; Gray, l. c. (*Hugelia densiflora*, Benth. in Bot. Reg.), a short and stout form, with crowded leaves. *G. elongata*, Steud.; Benth. l. c., a taller and looser form, with cells of the ovary usually only 2-3-ovulate. — California near the coast, from Santa Clara Co. southward, and thence to W. Arizona and S. Nevada.

* * Herbaceous, and the root annual or biennial: leaves or divisions nearly or quite filiform.

+ Corolla violet, blue, or purple, or fading to white: ovules few (but seldom if ever solitary) in the cells.

G. virgata, Steud. White-floccose becoming glabrate: stem slender, either simple and virgate (a span to a foot high) or with virgate branches from the base and paniculately branched above: leaves slender-filiform; the lower mainly entire and the upper rarely more than 3-parted: flowers usually in rather small capitate clusters: corolla blue or lavender; the tube 4 to 6 lines long, surpassing the acerose calyx-lobes: anthers linear-sagittate, a line long. — *Hugelia virgata*, Benth. l. c.; Hook. Ic. t. 200. — California, on dry hills from Monterey southward, and east to Arizona.

Var. floribunda, Gray. A remarkable form, with corymbose branches terminated by much larger and very many-flowered capitate clusters: most of the leaves (even the lower) pinnately 3-7-parted: corolla-lobes 3 or 4 lines long. — Proc. Am. Acad. l. c., & Bot. Calif. i. 495. — Santa Clara Co. to San Diego Co., Wallace, Brewer, Palmer.

G. floccosa, Gray. More branched and generally lower than the foregoing, 2 to 12 inches high, similarly floccose-woolly, at length diffuse or spreading: corolla from violet-blue to whitish; its tube 3 or 4 lines long, surpassing the subulate calyx-lobes: anthers narrowly oblong, fully half a line long. — Proc. Am. Acad. l. c. & Bot. Calif. i. 495, excl. syn. "*Hugelia lutea*, Benth." — Dry plains and desert, southern and eastern portions of California and S. E. Oregon to Utah and Arizona.

G. filifolia, Nutt. Flowers smaller; the lobes of the corolla seldom over a line in length, and its tube hardly if at all exceeding the calyx and bracts: anthers cordate-oval, a quarter or third of a line long: otherwise like small forms of the preceding. — Pl. Gamb. 156; Gray, l. c. — Santa Barbara and San Isabel, California, to the Rio Colorado.

Var. diffusa, Gray, l. c. A diffuse form, barely a span high; the leaves commonly rather shorter and less slender. — Interior of Nevada and Arizona to the western frontier of Texas.

+ + Corolla yellow: ovules solitary in the cells.

G. lutescens, Steud. A span high, closely resembles *G. floccosa* except in the above particulars, and the bright sulphur-yellow corolla only 3 lines long; its tube not exerted and lobes hardly exceeding a line in length: anthers elongated-oblong: capsule oval, 3-seeded. — Benth. in DC. l. c. 311. *Hugelia lutea*, Benth. in Bot. Reg. l. c. — W. California; back of Monterey? Douglas. Back of San Simeon, Palmer, confirming the yellow color of the corolla.

§ 8. *ELAPHÓCERA*, Nutt. Flowers capitate-congested or sometimes more loosely cymose, more or less foliaceous-bracted: bracts and calyx-lobes commonly cuspidate or aristulate (but not pungent), and pubescent or ciliate with long and many-jointed somewhat viscid hairs: corolla (white or barely purplish) salver-

form; the tube little exceeding the calyx; its lobes oval or oblong: stamens shorter than the corolla-lobes, inserted in or near the sinuses: biennials, short-lived perennials, or annuals, low or dwarf, more or less woolly-pubescent when young: leaves simply pinnatifid or entire.

* Leaves all entire, acrosc-subulate or filiform: filaments slender. (Approaches § *Hugelia*.)

G. Wrightii, Gray. Stems rigid, virgate, a foot high from an indurated or woody base or perennial? root, very leafy to the top: leaves rigid, cuspidate-tipped: flowers capitate-crowded: bracts ovate-lanceolate, the larger ones sparingly laciniate, tipped with an awn-like cusp, as are the subulate calyx-lobes; these slightly shorter than the tube of the corolla: ovules 3 or 4 in each cell (4 lines long). — Proc. Am. Acad. viii. 273. — W. Texas, on the Rio Grande 40 to 60 miles below El Paso, *Wright*.

G. Gunnisoni, Torr. & Gray. Annual, a span high, slender, at length almost glabrous, loosely paniculate-branched: leaves scattered, linear-filiform: bracts short, lanceolate, entire, tipped (like the triangular calyx-lobes) with a short cusp: flowers capitellate; the heads terminating slender peduncle-like branches: tube of the corolla slightly longer than the calyx and longer than its lobes: ovules 2 or sometimes 3 in each cell. — Pacif. R. Rep. ii. 129, t. 9. — S. E. Utah, *Kreusfeldt, Newberry, Brandegee*.

* * Leaves all or most of them pinnately parted into few narrow linear divisions, or sometimes all entire: filaments short: tube of the corolla not at all or at length slightly exceeding the calyx: flowers densely capitate-clustered: perennials of short duration or biennials; the base of the simple or clustered stems or root hard and ligneous.

G. spicata, Nutt. Stems rather stout, erect, simple, or several from the fusiform root, a span or two high: capitate flower-clusters crowded in an elongated virgate and spike-like thyrsus: leaves thickish, almost filiform, some about 3-cleft, occasionally all entire, barely mucronate: corolla-lobes oblong-ovate, shorter than the tube: anthers subsessile in the throat: ovules 4 to 6 in the cells. — Benth in Kew Jour. Bot. iii. 290; Gray, l. c. *G. spicata* & *G. trifida*, Nutt. Pl. Gamb. 156. — Rocky Mountains, Wyoming to Colorado and Utah.

Var. capitata, Gray, l. c. A dwarf form: leaves nearly all entire: thyrsus short and capituliform: filaments as long as the anther: approaches the next species. — Alpine region, from Black Hills in Dakota to Colorado.

G. congesta, Hook. Stems erect or spreading (3 to 12 inches high) from a tufted base, bearing single terminal or few and corymbose capituliform cymes: leaves with 3 to 7 mucronate divisions, or some of them entire: lobes of the corolla oval, nearly as long as the tube, which does not exceed the usually aristulate-tipped calyx-lobes: exerted filaments at length as long as the anthers: ovules 2 to 4 in each cell. — Hook. Fl. ii. 75, & Ic. t. 235. — Wyoming and Colorado east of the Rocky Mountains to Oregon and the Sierra Nevada, California. Tube of the white corolla not over 2 lines long.

Var. crebrifolia, Gray, l. c. Depressed; the tufted stems 2 or 3 inches long, crowded with small entire leaves, and terminated by a single capitate cluster. — *G. crebrifolia*, Nutt. l. c. — Mountains of Colorado and Utah. Connected with *G. congesta* by some intermediate forms.

G. iberidifolia, Benth. Leaves more rigid than in the preceding and the lobes cuspidate-tipped, as also the bracts: capitate cymes corymbose: filaments shorter: ovules solitary in each cell. — Hook. Kew Jour. Bot. iii. 290. — Scott's Bluffs and Blackwater, North Platte, Nebraska and Wyoming, *Geyer, H. Engelmann*. Perhaps only a form of *G. congesta*.

* * * Leaves pinnatifid, trifid, or some of them entire: flowers cymulose-glomerate and leafy bracted, or at length loose: low annuals, branching from the base, only a span high: calyx-lobes aristulate-cuspidate.

G. pumila, Nutt. Stems loosely woolly, at least when young, leafy: leaves narrowly linear, entire or most of them 2-4-parted into diverging linear lobes, mucronate: tube of the corolla slender, about thrice the length of its lobes and twice the length of the aristulate-tipped calyx-lobes: filaments slender, inserted in the sinuses, exerted, shorter than the lobes of the corolla: ovules about 6 in each cell. — Pl. Gamb. 156; Gray, l. c. *G. trifida*, Benth. in Kew Jour. Bot. iii. 291. — W. Texas, and New Mexico to W. Nebraska, and west to the Sierra Nevada. Tube of the corolla 3 or nearly 4 lines long; the limb small.

G. polycladon, Torr. Stems puberulent or sparsely pubescent, diffuse, very few-leaved: leaves pinnatifid or incised; the lobes short, oblong, abruptly spinulose-mucronate, those

subtending the cymose cluster longer than the flowers : tube of the corolla hardly exceeding the aristulate-mucronate calyx-lobes : anthers in the throat, on very short filaments : ovules 2 in each cell. — Bot. Mex. Bound. 147 ; Watson, Bot. King, 268. — Western Texas to Utah and W. Nevada. Corolla a line or two long, white with a tinge of rose-color.

§ 9. *Ipomopsis*, Benth., partly. Flowers thyrsoid-paniculate, inconspicuously bracted or ebracteate : corolla scarlet or red, with white varieties, narrowly tubular-funnelform, gradually and regularly enlarging upward, very much surpassing the subulate calyx-lobes and its own ovate or lanceolate spreading or recurving lobes : stamens inserted in the throat or below the sinuses of the corolla, not longer than its lobes : anthers oval or short-oblong : ovules numerous : biennials, not woolly, and usually showy-flowered. — *Ipomopsis*, Michx. *Ipomeria*, Nutt.

* Stem virgate, leafy : leaves pinnately parted into filiform or narrowly linear divisions : inflorescence contracted.

G. coronopifolia, Pers. (STANDING CYPRESS.) Glabrous or barely pubescent : stem 2 to 6 feet high, very leafy throughout : divisions of the leaves and rhaclis nearly filiform, acute and mucronate : flowers very numerous in a long and narrow compact thyrus or panicle, inodorous : calyx-lobes setaceous-subulate, as long as the tube : corolla an inch or an inch and a half long, scarlet (within yellowish and dotted with red) ; the lobes ovate, moderately spreading, barely exceeding the slender filaments : seeds not developing mucilage nor spiral threads when wet, but with a lax reticulate-cellular outer coat! — Lindl. Bot. Reg. t. 1691. *Polemonium rubrum* & *Ipomaea rubra*, L. *Cantua thyrsoides*, Juss. *C. pinnatifida*, Lam. *C. coronopifolia*, Willd. *C. elegans*, Poir. *Ipomopsis elegans*, Michx. ; Smith, Exot. t. 13. *Ipomeria coronopifolia*, Nutt. Gen. i. 124. *Gilia floridana*, Don (*Cantua*, Nutt.), & *G. beyrichiana*, Bouché, are mere forms. — Dry sandy soil, South Carolina and Florida to Arkansas and Texas. Common in gardens.

G. aggregata, Spreng. Somewhat pubescent : stems 2 to 4 feet high, less leafy, sometimes loosely branching : leaves thickish, with narrowly linear mucronulate divisions : thyrsoid narrow panicle loose or interrupted ; the (fragrant) flowers sessile in small mostly short-pedunculate clusters : calyx commonly glandular ; its lobes subulate : corolla from scarlet to pink-red (rarely white), with narrow tube ; the lobes ovate or lanceolate, acute or acuminate, widely spreading, soon recurved : filaments slender : seeds when wetted developing mucilage and spiricles. — Syst. i. 626 ; Don, Brit. Fl. Gard. ser. 2, t. 218 ; Gray, l. c. *Cantua aggregata*, Pursh. (*Ipomeria aggregata*, Nutt.) *C. coronopifolia*? & *C. aggregata*, Torr. Ann. Lyc. N. Y. ii. 220. *Ipomopsis elegans*, Lindl. Bot. Reg. t. 1281. *Gilia pulchella*, Dougl. in Hook. Fl. ii. 74 ; Benth. l. c. — W. Nebraska to W. Texas, New Mexico to Oregon, E. California and Arizona. (Adjacent Mex.) More or less heterogone-dimorphous : both stamens and style included (and the style shorter) in some individuals, both exserted (and the style longer) in most. Varies greatly : the extremes being

Var. attenuata. Corolla-lobes lanceolate, tapering gradually from the very base into a slender acumination : calyx-lobes equally slender. — Colorado, in Middle Park, Parry. A white-flowered form, with stamens and style included.

Var. Bridgésii, Gray, l. c. Stems low (6 to 18 inches) and diffuse or spreading, as if from a perennial root : corolla bright red ; its lobes oblong-ovate and merely acute : calyx-lobes shorter and broader, from subulate-lanceolate to deltoid : lobes of the leaves thicker and obtuse. — California, through the Sierra Nevada.

* * Stem low, loosely paniculate-branched : upper leaves reduced to bracts.

G. subnuda, Torr. Glandular-puberulent, a span or two high : leaves all undivided, mainly crowded at the indurated base, spatulate or oblong and tapering into a margined petiole, sparsely and irregularly dentate ; the few upper linear and entire ; the uppermost subulate and minute : flowers rather crowded in a few small clusters : calyx-lobes subulate, about the length of the campanulate tube : corolla orange or scarlet ; the tube (half inch long) thrice the length of the ovate obtuse lobes : anthers included in the throat on very short filaments : seeds developing mucilage and spiricles. — Gray, Proc. Am. Acad. viii. 276. — Arizona and S. Nevada to New Mexico, *Newberry*, *Stretch*, *Palmer*.

G. Háydénii, Gray. Almost glabrous, above slightly glandular, a span or more high, effusely much branched, somewhat corymbose : radical leaves pinnatifid ; those of the

branches linear and subulate, bract-like, entire: flowers mainly pedicellate: calyx-lobes subulate, shorter than the tube: corolla rose-red, slender; the tube (half inch long) several times longer than the obovate lobes: anthers subsessile in the throat: ovules only 6 in each cell: seeds fewer, neither spirilliferous nor mucilaginous when wetted. — Proc. Am. Acad. xii. 79. — S. W. Colorado or adjacent Utah, on the San Juan, *Brandegee*.

§ 10. *GILIÁNDRA*, Gray. Flowers thyrsoid-paniculate and hardly bracted, rather small: corolla bluish or white, salverform; the tube hardly double the length of the calyx and little longer than its own obovate lobes: these surpassed by the slender and much exerted filaments: anthers short: ovules about 6 in each cell: seeds destitute both of mucilage and spiricles: glandular-puberulent and rather low biennials, with simply pinnatifid leaves, the radical in a dense rosulate tuft: calyx-lobes triangular.

G. stenothýrsa, Gray. Stem simple, virgate, very leafy up to the racemiform narrow thyrsus: leaves pinnately cleft into short oblong lobes: bracts small and entire: stamens moderately exerted: corolla somewhat funnelform, apparently white, nearly half inch long. — Proc. Am. Acad. viii. 276. — Uinta Mountains, Utah, *Fremont*.

G. pinnatifída, Nutt. Stem simple or loosely branching, a span to 2 feet high: inflorescence open-paniculate, often compound: leaves pinnately parted into linear or narrowly oblong lobes; these sometimes again 1-2-lobed; stamens conspicuously exerted (3 lines long, inserted just under the sinuses): corolla strictly salverform, pale blue or violet, or the narrow tube white (this and the lobes 2 or 3 lines long). — Gray, l. c. — Rocky Mountains, common from S. Wyoming through Colorado (and Utah ?) to New Mexico.

§ 11. *MICROGÍLIA*, Benth. Flowers scattered, very small: corolla white, salverform: stamens inserted on and included in the tube: ovules solitary in the cells: much-branched annuals, with filiform or slender-subulate and entire (or sometimes 3-parted) small leaves: calyx short-campanulate, 5-toothed.

G. minutiflóra, Benth. Glabrous, or minutely glandular-puberulent above: stem erect, a foot or two high, with many virgate and rigid slender branches: upper leaves all reduced to minute subulate appressed bracts; the lower longer and some of them 3-parted: flowers terminating and also sparsely spicately disposed along the branchlets, 2 lines long: tube of the corolla about twice the length of the calyx and of its own lobes: filaments slender: capsule oval: seed oblong. — DC. Prodr. ix. 315. *Collomia (Picrocolla) linoides*, Nutt. Pl. Gamb. 159. — Interior of Oregon (or now Idaho, not "California?"), *Douglas*. Wyoming on the Upper Platte, *Nuttall*, *Fremont*.

G. tenérrima, Gray. Minutely and sparsely glandular, low, effusely much branched: branches filiform: leaves entire: flowers loosely panicked, on slender divergent pedicels, minute: capsule globular (barely a line long): seed turgid-oval. — Proc. Am. Acad. viii. 277; *Watson*, Bot. King, 270. — Utah, Bear River Valley, near Evanston (in fruit), *Watson*.

§ 12. *EUGÍLIA*, Benth., Gray. Flowers scattered, crowded, or rarely capitate-glomerate, inconspicuously bracted or ebracteate: corolla from funnelform to nearly rotate: stamens usually inserted in or just below the sinuses of the corolla, not exceeding its lobes (or rarely moderately so): filaments slender: leaves various, all or chiefly alternate.

* Ovules solitary in the cells: corolla funnelform with slender elongated tube and rather abruptly dilated throat (in the manner of § *Nauarretia*, but no pungent or even mucronate tips to calyx-lobes or leaves): sinuses of calyx somewhat replicate: very depressed small perennials, with filiform rootstocks and crowded leaves, among which the violet or purplish flowers are solitary and subsessile in the forks or axils.

G. Lárseni, Gray. Filiform creeping rootstocks elongated: stems rising only an inch or two above ground: leaves pedately 5-7-parted or the upper 3-cleft, rather surpassing the flowers, soft-pubescent: corolla half inch long, with tube slightly exceeding the calyx; its rounded lobes somewhat surpassing the stamens and style. — Proc. Am. Acad. xi. 84, & Bot. Calif. i. 497. — California, on Larsen's Peak, in loose volcanic ashes, *Lemmon*, *John Larsen*.

G. débilis, Watson. An inch or two high, minutely pubescent: leaves oblong, 2-3-lobed or entire, tapering into a short petiole, shorter than the flowers: corolla two thirds inch long; the tube exceeding the calyx: lobes of the latter conspicuously 3-nerved: stamens more or less and the style prominently exerted: "seed without mucilage or spiricles." — Am. Naturalist, viii. 302; Rothrock, in Wheeler Rep. t. 19. — S. Utah, *Wheeler*.

* * Ovules and seeds few or numerous in the cells.

+ Root annual.

++ Corolla more or less funnelliform, having a distinct tube: corolla from blue to purplish or sometimes white: flowers in the first species much crowded and short-pedicelled, in the last scattered.

= Seeds developing mucilage and spiricles when wetted, mostly numerous: leaves once to thrice pinnately divided or cleft: herbage somewhat pubescent or glabrate.

G. capitáta, Dougl. Stem slender, a foot or two high, nearly glabrous: leaves 2-3-pinnately divided into slender or even filiform-linear lobes: flowers numerous in dense capitate clusters terminating long naked peduncles: calyx glabrous or nearly so: corolla light blue (4 or 5 lines long); its tube about the length of the narrowly oblong or lanceolate-linear lobes and the nearly glabrous calyx, only slightly dilated at the throat: stamens inserted in the very sinuses of the corolla. — Hook. Bot. Mag. t. 2698; Lindl. Bot. Reg. t. 1170; Brit. Fl. Gard. t. 287. — W. California and Oregon. Common in gardens.

G. achilleæfólia, Benth. Generally more pubescent and rather stouter than the preceding, and the head-like flower-clusters larger and less compact: flowers larger: calyx more or less woolly; its lobes with short recurved tips: lobes of the violet-blue or lavender-purple corolla obovate or broadly oblong; its throat abruptly and amply dilated. — Bot. Reg. no. 1622, & Prodr. l. c. 311; Hook. Bot. Mag. t. 5939; Gray, Bot. Calif. i. 447. — Common throughout W. California.

G. multicáulis, Benth. l. c. A span to a foot high, at length diffuse: leaves mostly twice pinnately parted into narrow linear lobes: flowers fewer and in a less dense shorter-peduncled cluster than the preceding, some of the pedicels in fruit equalling the calyx: corolla (4 lines long) violet; its proper tube shorter than the calyx, and its obovate or ovate lobes not longer than the funnelliform throat: capsule ovoid. — Gray, Bot. Calif. i. 498. *G. achilleæfólia*, Lindl. Bot. Reg. t. 1682; Hook. Bot. Mag. t. 3440; Brit. Fl. Gard. n. ser. t. 280, not Benth. *G. millefóliata*, Fisch. & Meyer, Ind. Sem. Petrop. 1838, 35, a diffuse and small-flowered form. *G. stricta*, Scheele in Linn. xxi. 755. *Polemonium capitatum*, Eschsch. in Mem. Acad. Petrop. 1826? — California, very common throughout the western part of the State.

Var. ténera, Gray, l. c., a depauperate and attenuated form, in dry and poor soil, with peduncle more loosely 3-5-flowered, or even 1-flowered. — *G. stricta*, Liebm. Ind. Sem. Hafn. 1853? — With the ordinary form.

G. tricolor, Benth. A span to a foot or two high, mostly slender, paniculately branched, at length diffuse: leaves (as of the preceding or more slender) and calyx, &c., usually more viscid-pubescent: flowers few or several and short-pedicelled or subsessile in cymulose rather short-peduncled clusters: corolla (half inch long) twice or thrice the length of the calyx, with very short and yellowish proper tube, ample campanulate-funnelform throat marked with deep brown-purple, and lilac or violet roundish lobes which surpass the stamens. — Hort. Trans. viii. t. 18; Lindl. Bot. Reg. t. 1704; Brit. Fl. Gard. n. ser. t. 264; Hook. Bot. Mag. t. 3463. — California, throughout the western part of the State: common in cultivation.

G. latifóra. A span or two high, effusely paniculate, glabrous, and the inflorescence and calyx sparsely glandular: radical leaves simply pinnatifid, linear-lanceolate (an inch or two long), with short ovate or triangular and cuspidate-tipped lobes; the cauline few and small or minute, all but the lowest entire and subulate: paniculate cyme very loose: pedicels equalling or shorter than the flower: corolla (7 to 11 lines long) purple with yellowish or brownish throat, dilated-funnelform, abruptly contracted below into a narrow tube which slightly exceeds the calyx; its lobes rounded-obovate: capsule ovoid. — *G. tenuiflora*, var. *latiflora*, Gray, Proc. Am. Acad. viii. 278, & Bot. Calif. l. c. — California, San Diego and Los Angeles Co., *Fremont, Wallace, Palmer* (402).

G. tenuiflóra, Benth. A foot or more high, slender, loosely paniculate above: radical and lower leaves bipinnately parted or divided, or simply divided and the narrow divisions

incised, the lobes short; the upper becoming simple, small and entire: branches loosely few-flowered: pedicels shorter than the flower: corolla (7 to 9 lines long) rose-color with violet throat, narrowly funnelform or even trumpet-shaped; its slender tube fully thrice the length of the calyx: capsule ovoid-oblong. — Lindl. Bot. Reg. t. 1888; Gray, l. c., excl. var. — California, from Monterey southward.

G. inconspicua, Dougl. Mostly low, a span to a foot or more high, usually with slight woolly pubescence when young, and viscid glandular, branching from the base: leaves mostly pinnatifid or pinnately parted, or the lowest bipinnatifid, with short mucronate-cuspidate lobes; the uppermost becoming small, subulate, and entire: flowers either somewhat crowded and subsessile or at length loosely paniced and some of them slender-pedicelled: corolla violet or purplish (3 to 5 lines long), narrowly funnelform, with proper tube shorter or slightly longer than the calyx. — Hook. Bot. Mag. t. 2883 (corolla too salverform); Benth. in DC. l. c.; Gray, l. c. *G. parviflora*, Spreng. Syst. i. 626. *Cantua parviflora*, Pursh. Fl. ii. 730. *Ipomopsis inconspicua*, Smith, Exot. t. 14. — Wyoming to the western border of Texas, and west to California and British Columbia. Very variable in size and form of corolla, passing into

Var. sinuata, Gray, l. c. Corolla larger, at least in proportion to the calyx, becoming thrice its length, with tube more exerted and throat and lobes more ample. — *G. sinuata*, Dougl.; Benth. in DC. l. c. *G. arenaria*, Benth. l. c. — Oregon and California to New Mexico. Some forms approaching the two preceding.

== Seeds destitute of mucilage and spiricles when wetted, numerous: leaves nearly all radical, barely pinnatifid or toothed; the cauline mainly reduced to small subulate bracts of the open compound panicle, which is about a span high: some flowers with very short, others with slender pedicels, in the manner of *G. inconspicua* and related species.

G. leptoméria, Gray. Minutely somewhat glandular-viscid: radical leaves oblong or broadly lanceolate (an inch or more long), incisely toothed or sinuate-pinnatifid; the obtuse teeth or lobes minutely mucronate-cuspidate: cymose panicle effuse: flowers inconspicuous: corolla whitish, 2 or 3 lines long, fully twice the length of the calyx, slender-funnelform, and with very small acute lobes: capsule ovoid, equalling or surpassing the triangular acute calyx-teeth. — Proc. l. c. & Bot. Calif. i. 498; Watson, Bot. King, 270, t. 26, fig. 6-11. — Interior desert region, Nevada and Utah, *Watson, Parry, Lemmon*.

G. latifolia, Watson. Viscid-pubescent and above glandular: radical leaves oval or roundish (an inch or two long), distinctly petioled, repand-dentate and the broad short teeth slender-spinescent: panicle loosely many-flowered: corolla pinkish, 2½ lines long, cylindraceous, little longer than the calyx; its lobes acute: capsule oblong, comparatively large (3 lines long), somewhat exceeded by the spinescent-subulate calyx-lobes. — Am. Naturalist, ix. 347. — S. Utah, *Parry*.

++ ++ Corolla campanulate or rotate: pedicels slender or filiform, scattered.

= Western species, diffuse and slender, barely a span high: pedicels becoming horizontal or at length refracted.

G. microméria, Gray, l. c. Nearly glabrous, glandless, effusely much branched: branches filiform: radical and lower leaves pinnatifid, and the lobes obtuse; the upper linear and entire: pedicels capillary, half inch long, axillary or opposite the leaves: flower barely a line long: corolla campanulate, white, a little longer than the 5-cleft calyx: capsule globular: seeds few, not mucilaginous. — Watson, l. c. fig. 12-14. — N. W. Nevada, *Watson, Lemmon*.

G. filifórmis, Parry. Completely glabrous and smooth: stem erect; the branches filiform and spreading: leaves all filiform or nearly so and entire: scattered capillary pedicels (from 1 to 11 lines long) at length refracted: corolla cream-color, very open-campanulate, 2 lines long, deeply 5-cleft, exceeding the 5-parted calyx; its lobes truncate and obscurely crose-denticulate: capsule globular: seeds rather few, mucilaginous but not spirilliferous when wet. — Gray, Proc. Am. Acad. x. 75. — St. George, S. Utah, *Parry*. Perhaps this species belongs to the § *Dactylophyllum*; but all except the lowest leaves are alternate.

G. campanuláta, Gray. Minutely pubescent when young, obscurely viscid, diffusely branched from the base, depressed: leaves lanceolate; the lower sparingly pinnatifid-toothed; the upper small and entire: pedicels not longer than the flower: corolla white, oblong-campanulate, 3 or 4 lines long, twice the length of the 5-parted calyx, moderately

5-lobed: stamens inserted next the base: anthers oblong: ovules about 7 in each cell.—Proc. Am. Acad. viii. 279; Watson, l. c. fig. 16-18.—W. Nevada, on the banks of the Truckee River, *Watson*.

== Texan and Mexican: pedicels erect or ascending, loosely and effusely paniculate: seeds mucilaginous and spirilliferous when wetted, rather numerous.

G. incisa, Benth. Merely puberulent: stems slender and weak, diffusely branched from the base, a foot or two high, leafy: leaves thin; the radical and lower cauline slender-petioled, roundish-ovate or obovate, acutely and incisely toothed or lyrate cleft; the upper lanceolate, sparsely lacinate; uppermost linear, more entire, sessile, and gradually reduced to subulate bracts: pedicels an inch or two long, rigid: corolla rotate, deeply 5-cleft (white or blue, half inch or less in diameter), deeply 5-lobed; the lobes ovate: filaments filiform: anthers oblong-oval.—DC. Prodr. ix. 312. *G. Lindheimeriana*, Scheele in Linn. xxi. 763.—Shady banks and thickets, Texas. (Mex.)

+ Root perennial or base of stems lignescent.

++ Corolla (as far as known) rotate and blue: leaves rigid.

G. rigidula, Benth. Glabrous or viscid-glandular: stems a span or so high, slender and diffusely branched from a stout lignescent base: leaves mostly pinnately (or the uppermost nearly palmately) parted or cleft into few or several lanceolate-linear or subulate lobes: pedicels scattered, an inch or less long: corolla completely rotate ($\frac{3}{4}$ to $1\frac{1}{4}$ inches in diameter), 5-parted; its lobes obovate: filaments filiform: anthers elongated-oblong: ovules and seeds several in each cell.—DC. l. c.; Gray, Proc. Am. Acad. viii. 280. *G. glandulosa*, Scheele, l. c., one of the viscid-glandular forms. (Corolla opening wide in afternoon sunshine, closing at sunset, *Lindheimer*.)—Rocky plains and hills, Texas and New Mexico. (Adjacent Mex.)

Var. acerósa, Gray, l. c. More dwarf, rigid, and suffruticose: branches very leafy: the leaves all with slender-subulate or acerose and somewhat pungent divisions: pedicels short: flower rather smaller: anthers barely oblong.—Northern New Mexico and borders of Texas to Arizona. (Adjacent Mex.)

G. cæspitósa, Gray. Depressed-cespitose, with a stout lignescent caudex: leaves nearly all densely crowded on the very short tufted shoots, viscid-puberulent, spatulate or somewhat lanceolate, entire, thickish, half inch long or less: flowering shoots scape-like, 1 to 3 inches high, 1-5-flowered: flowers short-pedicelled: calyx narrow, 2 lines long, 5-cleft; the lobes slender-subulate: corolla and stamens not seen: ovules few in each cell.—Proc. Am. Acad. xii. 80.—Rabbit Valley, Utah, on barren sandstone cliffs, at 7000 feet, *L. F. Ward*.—Its proper place in the genus quite uncertain, perhaps next *G. subnuda*.

++ ++ Corolla tubular-funnelform: habit and foliage wholly of *Polemonium confertum*, var. *mellitum*, but stamens straight.

G. Brandegéi, Gray. Very viscid with glandular pubescence, pleasantly odoriferous, cespitose: stems a span to near a foot high, simple: leaves all pinnate, elongated-linear in circumscription; the radical crowded and with short dilated and scarious sheathing petiole; the cauline scattered and similar: leaflets very small and numerous, 2 lines long, from oval to oblong-linear, sessile, some simple, others 2-parted and so appearing verticillate: flowers several in a short and racemiform leafy thyrsus: corolla golden yellow, trumpet-shaped, an inch or less long, more than twice the length of the oblong or cylindraceous obtusely 5-lobed calyx; its lobes oval and short: the stamens included in its throat (not declined or curved): anthers roundish: ovules few in each cell.—Proc. Am. Acad. xi. 85.—San Juan Gap, and Waggon-wheel Gap, on the Rio Grande, S. W. Colorado, on the face of high perpendicular cliffs, *T. S. Brandegee*.

Var. Lambórnii. Corolla lurid-yellowish or greenish.—Alpine region of Sierra Blanca, S. Colorado, *R. H. Lamborn*, *A. Gray*.

4. POLEMÓNÍUM, Tourn. GREEK VALERIAN, JACOB'S LADDER. (Ancient name, from *πόλεμος*, war, or more probably from the philosopher *Πολέμων*.)—Herbs, of the cooler parts of the northern hemisphere, and one in the southern; the leaflets or divisions of the pinnate leaves sessile and not serrate. Inflorescence racemiform, thyrsiform, or cymulose-paniculate; the upper pedicels ebracteate. Flowers blue or white, rarely purplish, usually showy, produced in

summer. Anthers commonly oblong in the bud, oval in the blossom. Hypogynous disk fleshy and saucer-shaped, somewhat crenate. Seed-coat developing mucilage and spiracles when wetted. Genus marked rather by habit than character, the first and last sections too near *Gilia*.

§ 1. Corolla strictly or even narrowly funnelform; its tube more or less exceeding the oblong or cylindraceous calyx, prominently longer than the lobes: filaments naked or nearly so and not dilated at base, usually inserted on the middle of the tube, or occasionally adnate higher: leaflets very small and crowded, so as seemingly to be verticillate: inflorescence capitate-congested or spiciform: caespitose perennial. (Transition to *Gilia*.)

P. confertum, Gray. A span or more high from a tufted rootstock, glandular-pubescent and viscid, musky-fragrant: radical petioles conspicuously scarious-dilated and sheathing at base: leaflets 1 to 3 lines long, mostly 2-3-divided, and so appearing as if in fascicles or whorls; the divisions from round-oval to oblong-linear: flowers densely crowded, honey-scented: corolla deep blue, from half to a full inch long; its roundish lobes $2\frac{1}{2}$ or 3 lines long: ovules about 3 in each cell. — Proc. Acad. Philad. 1863, 73, Proc. Am. Acad. vii 280, & Bot. Calif. i 500; Watson, Bot. King, 271; Robinson, Garden, 1876, with a colored plate. *P. viscosum*, Nutt. Pl. Gamb. 154, in small part. — Alpine region of the Rocky Mountains from lat. 49° southward to Colorado, Utah, Nevada, and in the high Sierra Nevada, California.

Var. mellitum, Gray, l. c. Usually a taller form: inflorescence more lax and leafy, becoming spiciform or racemose: corolla pale or sometimes white, fully an inch long, more narrowly funnelform; the lobes only one third or fourth the length of the tube. — With the ordinary form in Wyoming, Colorado, and Utah.

§ 2. Corolla campanulate-funnelform, with tube not surpassing the open campanulate calyx and shorter than the ample spreading limb: filaments usually dilated and pilose-appendaged at base: inflorescence open and with very few bracts: leaflets simple and entire, sometimes confluent: root perennial.

* Low, about a span high from caespitose-branching and mostly thickened rootstocks: flowering stems only 1-3-leaved: flowers cymulose: leaflets seldom half an inch long.

P. viscosum, Nutt. Dwarf and with thick densely tufted rootstocks, viscid-puberulent: leaflets very numerous and crowded or even imbricated, thickish, ovate or roundish, at most a line and a half long: flowers in a rather close cymulose cluster: corolla blue or whitish, barely twice the length of the calyx, its rounded lobes (2 lines long) about the length of the included tube: filaments not appendaged at base. — Pl. Gamb. 154 (mainly, excluding what relates to the "elongated lanceolate segments of the calyx"); Gray, Proc. Am. Acad. l. c. — High Rocky Mountains, towards the sources of the Platte, Nuttall.

P. humile, Willd. More slender, and from somewhat creeping rootstocks, more or less viscid-pubescent: leaflets 15 to 21, from round-oval to oblong, 2 to 6 lines long: flowers rather few in the clusters: corolla blue or purplish; its ampler rounded lobes much longer than the short included tube: filaments pilose at the dilated base: ovules 2 to 4 and seeds 1 or 2 in each cell. — Rœm. & Sch. Syst. iv. 792; Cham. in Linn. vi. 562. A polymorphous or complex species, of which the large-flowered high northern form, with rather long viscid pubescence about the calyx, &c., may be taken as type, after Chamisso, viz. his *P. humile* and his var. *macranthum*. *P. Richardsonii*, Graham in Bot. Mag. t. 2800. *P. lanatum*, Fischer. *P. capitatum*, Benth. in DC. Prodr. ix. 317, mainly (excl. syn. Lindl. Bot. Reg., which belongs rather to *P. ceruleum*; also excluding the original of Esehseholtz, from California, which must be *Gilia multicaulis* or *G. achilleaefolia*). *P. pulchellum*, var. *macranthum*, Ledeb. Fl. Ross. iii. 85. — Arctic coast to St. Paul's and Shumagin Islands. (Kamts. to Spitzbergen.) Lobes of the corolla often 5 lines long.

Var. pulchellum. Viscid pubescence mostly minute, or the leaflets often nearly glabrous and naked: flowers smaller: the lobes of the corolla only 3 or 2 lines long, violet or lavender blue, in some forms nearly white. (Varies in small-flowered forms with style and even stamens exserted.) — *P. pulchellum*, Bunge, in Ledeb. Fl. Alt. i. 233, & Ic. Ross.

t. 20. *P. moschatum*, Wormskjöld. *P. humile*, Lindl. Bot. Reg. t. 1304. *P. pulcherrimum*, Hook. Bot. Mag. t. 2979, a more viscid, lax or diffuse, and small-flowered form; the corolla violet, varying to white, its lobes narrower. — N. W. and Arctic coast, and southward along the Rocky Mountains to Colorado and the Sierra Nevada. (Kamts. & Siberia.)

* * * Taller, from slender rootstocks or roots: leaves and leaflets larger.

+ Ovules 6 to 12 in each cell: stem erect, 1 to 3 feet high: leaflets numerous and mostly approximate, not rarely confluent or the rachis winged: seeds in the same species either wing-angled or marginless: corolla blue, varying to white.

P. cæruleum, L. Either glabrous or viscid-pubescent: stem mostly strict and virgate, 1 to 3 feet high, 5–10-leaved: leaflets from linear-lanceolate to oblong-ovate (9 to 20 lines long): flowers numerous in a naked and narrow thyrsus or panicle: calyx cleft to or beyond the middle: corolla an inch or considerably less in diameter: elongated style usually considerably and stamens often somewhat longer than the corolla. — Fl. Dan. t. 255; Reichenb. Ic. Germ. t. 1334; Gray, Man. ed. 5, 371. — Wet or moist ground; very rare in the N. Atlantic States (in swamps in New York, viz. Schoharie Co., *Dr. Hovee*, Delaware Co., *B. D. Gilbert*, Herkimer Co., *Clinton*, also Warren Co., New Jersey, *Porter*; a form with rather open-panicled inflorescence and broadish leaflets); but common in western wooded mountain districts, viz. from Colorado Rocky Mountains to California, Oregon, and far northward. (N. Asia, Eu.)

Var. acutiflorum, Ledeb., is a high northern and reduced form, a foot to a span high, with few and large flowers, and ovate more or less acute corolla-lobes, which exceed the stamens and sometimes even the style. — *P. acutiflorum*, Willd. in Rœm. & Sch. l. c.; DC. Prodr. l. c. — High N. W. coast and Aleutian Islands, &c. (Siber., N. Eu.)

P. foliosissimum. Very viscid-pubescent throughout and strong-scented: stem a foot or more high, very leafy throughout: leaflets from lanceolate to ovate-lanceolate (seldom an inch long): flowers corymbose-cymose, smaller than those of the preceding: corolla commonly white or cream-color, sometimes violet, twice the length of the calyx, which is 5-cleft to or beyond the middle: style and stamens not protruding. — *P. cæruleum*, var. *pterosperma*, Benth. in DC. Prodr. ix. 317; but the seeds, as in *P. cæruleum*, are either marginless or wing-margined. *P. cæruleum*, var. *foliosissimum*, Gray, Proc. Am. Acad. viii. 281. — Rocky Mountains of New Mexico, Colorado, and Wyoming, and west to Utah and Idaho. Some forms approaching the preceding species; but it is more like *P. Mexicanum*, Cerv., which is loosely branched, and has the violet corolla little exceeding the calyx, the lobes of the latter barely half the length of the tube.

+ + Ovules only 3 or 4 in each cell: stem lax or with diffuse branches and open corymbiform or paniculate inflorescence: leaflets fewer (5 to 15) and rather large, membranaceous, only the ultimate at all confluent: herbage glabrous or slightly pubescent, neither viscid nor glandular: style and stamens rather shorter than the corolla.

P. carneum. A foot or two high, rather stout: leaflets from ovate to oblong-lanceolate (often an inch and a half long): branches somewhat umbellately 3–5-flowered: calyx deeply 5-cleft; the lobes ovate-oblong: corolla salmon-color or flesh-color (fading to purplish), 8 to 12 lines long (the ample limb sometimes 1½ inches in diameter when fully expanded); its lobes rounded-obovate. — In mountain woods, Siskiyou Co., California, *Greene*. Also near San Francisco, *Kellogg*, *G. R. Vasey*.

P. réptans, L. A foot or less high, slender, weak and at length diffuse or spreading (but never creeping): leaflets ovate- or lanceolate-oblong: flowers several and loosely paniculate-cymulose on the branches: calyx with ovate lobes shorter than its tube: corolla light blue, half inch or less in length. — Lam. Ill. t. 106; Bot. Mag. t. 1887. — Open woods, New York to Alabama and west to Minnesota and Missouri.

§ 3. Corolla almost rotate, shorter than the broad and open deeply 5-cleft calyx: filaments almost naked at base: flowers scattered: root annual. (Another transition to *Gilia*.)

P. micranthum, Benth. Much branched from the base, slender, diffuse, more or less viscid-pubescent: stems or branches 3 to 8 inches long: leaflets 5 to 13, obovate or lanceolate (2 to 4 lines long): peduncles mostly solitary opposite the leaves: corolla whitish, a line or two long: ovules 2 or 3 in each cell. — DC. Prodr. ix. 318; Gray, l. c. — Springy ground, British Columbia to California and Nevada: fl. in spring. (S. Chili, *P. antarcticum*, Griseb. ex Benth.)

ORDER XCII. HYDROPHYLLACEÆ.

Herbs, or rarely shrubs, with watery insipid juice, alternate or sometimes opposite leaves, no stipules, mostly a scorpioid inflorescence in the manner of *Borraginaceæ*, regular 5-merous 5-androus flowers, with the stamens borne on the base or lower part of the corolla alternate with its lobes, a 2-merous ovary, and the two styles distinct or partly united (in *Romanzoffia* completely united into one): stigmas terminal. Ovules amphitropous or anatropous, from 4 to very many, pendulous, or when numerous almost horizontal. Hypogynous annular disk at the base of the ovary often conspicuous. Fruit a capsule, one-celled with two parietal placentæ, or incompletely 2-celled by the approximation or meeting of the placentæ (borne on semisepta), or even completely 2-celled by their union in the axis. Seeds with a close and usually reticulated or pitted testa, and a small or slender embryo in cartilaginous or firm-fleshy albumen. Scorpioid cymes sometimes complete, more commonly reduced to geminate or solitary false spikes or racemes (which in description may be termed spikes or racemes); the pedicels bractless. Calyx 5-parted, or of nearly distinct sepals. — Benth. in Linn. Trans. xvii. 267; A.DC. Prodr. ix. 287; Gray, Proc. Am. Acad. ix. 312, & Bot. Calif. i. 501.

TRIBE I. HYDROPHYLLÆ. Ovary and capsule strictly 1-celled, lined with a pair of expanded, at first fleshy, at maturity thin and membranaceous placentæ, which form a lining to the pericarp, and enclose the 4 or more amphitropous ovules and seeds. Calyx sometimes appendaged at the sinuses. Corolla mostly convolute in the bud. Style more or less 2-cleft. Ovary hispid, at least at the apex. Capsule globose, loculicidal, i. e. dehiscent by the dorsal sutures. Seeds by abortion commonly fewer than the ovules, globular, or angled by mutual pressure: albumen cartilaginous.

* Stamens and style mostly conspicuously exerted: calyx nearly unchanged in fruit: root perennial or biennial: leaves alternate.

1. **HYDROPHYLLUM.** Calyx early open, with or without a small appendage at each sinus. Corolla campanulate; the tube within bearing a linear longitudinal appendage opposite each lobe, with infolded edges, forming a nectariferous groove. Filaments and style long and filiform, the former bearded at the middle: anthers linear or oblong, inflexed in the bud. Seeds 1 to 4; the ovules only 4.

* * Stamens shorter than the corolla: calyx accrescent in fruit: root annual: lower and sometimes all the leaves opposite.

2. **NEMOPHILA.** Calyx with a reflexed appendage at each sinus. Corolla rotate or approaching campanulate, usually longer than the calyx; the base within mostly with 10 appendages. Anthers usually sagittate-oblong. Ovules 4 to 20. Seeds commonly with a deciduous or more persistent caruncle.
3. **ELLISIA.** Calyx destitute of appendages at the sinuses, usually much enlarged under the fruit. Corolla campanulate, shorter or little longer than the calyx; the internal appendages minute or obsolete; lobes in aestivation either all convolute, or one exterior, or rarely quincuncial. Anthers oval or oblong. Ovules 4 to 8. Seeds not carunculate.

TRIBE II. PIACELIÆ. Ovary either strictly 1-celled or 2-celled by the meeting of the linear or lanceolate placentæ in the axis; these separating in the loculicidal dehiscence, and borne on the middle of the semiseptiferous valves, or sometimes falling away. Calyx naked at the sinuses, deeply 5-parted. Corolla imbricated in the bud. Style from 2-parted to (rarely) entire; the branches at the apex or the stigmas obscurely if at all thickened. Ovary mostly hispid or pubescent, at least its apex. Albumen cartilaginous or firm-fleshy.

* Leaves all opposite, entire : flowers cymose : style 2-cleft at the apex.

4. **DRAPERIA.** Calyx-lobes or sepals narrow-linear, equal. Corolla tubular-funnelform, with 5 short lobes, not appendaged within. Stamens unequal and somewhat unequally inserted low down on the tube of the corolla, included. Ovary 2-celled, with a pair of collateral ovules pendulous from near the apex of each cell. Style long and filiform. Capsule globose-didymous, membranaceous ; the thin semi-septa commonly adnate to each valve, and the membranaceous central or placental portion falling with the four seeds.

* * Leaves all or all but the lowest alternate : flowers cymose, scorpioid-racemose or spicate, or rarely in the forks.

+ Style 2-cleft, at least at the apex.

5. **PHACELIA.** Calyx-lobes all similar or nearly so. Corolla deciduous, not yellow. Stamens equally inserted low down on the corolla. Inflorescence scorpioid. (Ovules and seeds when reduced to a pair collateral and nearly as long as the cell.)
6. **EMMENANTHE.** Corolla (yellow or yellowish and campanulate) persistent ! Otherwise as *Phacelia*. Seeds several.
7. **CONANTHUS.** Calyx-lobes all similar, narrow. Corolla deciduous, funnelform, not appendaged ; the slender filaments unequally inserted more or less high up on its tube. Stigmas capitate. Seeds with a thin smoothish testa, 10 to 20. Flowers solitary and subsessile in the leafy forks of the stem. Habit of *Nama*.

8. **TRICARDIA.** Calyx-lobes or sepals very dissimilar ; 3 outer large and cordate, 2 inner linear. Corolla broad-campanulate, deciduous. Stamens equally inserted on the base of the corolla. Ovary glabrous : ovules and seeds about 8. Flowers racemose.

+ + Style and even the stigma entire : ovary glabrous.

9. **ROMANZOFFIA.** Calyx-lobes or sepals similar. Corolla funnelform or almost campanulate ; the stamens inserted on the base of its tube, unequal. Style filiform : stigma small. Inflorescence scapiform, loosely racemose. Leaves round-reniform and crenate-lobed.

* * * Leaves (alternate) and 1-flowered peduncles all radical : style 2-cleft at apex.

10. **HESPEROCHIRON.** Calyx 5-(rarely 6-7-)parted ; the lobes linear-lanceolate, occasionally unequal. Corolla campanulate or rotate, deciduous ; the stamens inserted on the base of its tube. Ovary pubescent. Leaves spatulate or oblong, entire.

TRIBE III. NAMELE. Styles 2, distinct to the base ; their tips or stigmas commonly clavate-thickened or capitate. Ovary completely or incompletely 2-celled. Capsule loculicidal ; the valves bearing the (usually placentiferous) half-dissepiments on their middle. Seeds with firm fleshy albumen. Corolla imbricated in the bud, not appendaged within. Leaves simple, alternate, or sometimes imperfectly opposite. (Closely connected with the foregoing tribe through *Draperia* and *Conanthus* on the one hand, and *Lemmonia* on the other.)

* Ovules and seeds only 2 in each cell, one above the other : placenta not transversely dilated or bilamellar.

11. **LEMMONIA.** Corolla short-campanulate. Filaments and styles short and included, subulate : the former equally inserted, abruptly dilated or as it were appendiculate at the very base : anthers cordate-didymous. Stigmas small. Capsule membranaceous, 2-valved. Seeds proportionally large, globular-obovate. Depressed annual.

* * Ovules and seeds numerous or several, on transverse lamelliform placenta, which approximate or cohere in the axis of the ovary, but separate in the loculicidal dehiscence and are borne on the half-dissepiments or half-valves of the capsule.

12. **NAMA.** Corolla funnelform or somewhat salverform. Filaments and styles filiform, more or less included ; the former commonly unequal and often unequally inserted, slightly and gradually if at all dilated at base. Capsule membranaceous ; the valves and placenta undivided. Ovules and usually the seeds numerous. Mainly low herbs or suffrutescent.

13. **ERIODICTYON.** Corolla funnelform or approaching campanulate. Filaments and style more or less included. Capsule crustaceous, 4-valved, i. e. first loculicidal, then septicidal, thus splitting into 4 half-carpels, which are closed on one side, owing to the widely dilated placenta, and partly open on the other. Seeds rather few, pendulous. Shrubby, with leaves mostly dentate.

TRIBE IV. HYDROLEEÆ. Ovary and capsule completely 2-celled, and with large and fleshy inseparable placenta ; the dehiscence septicidally septifragal, or often

irregular, leaving the thin dissepiment with the central placenta. Styles 2. Corolla nearly rotate, imbricated in the bud. Seeds very numerous, with fleshy albumen. Leaves all alternate, simple and entire.

14. HYDROLEA. The only genus.

1. **HYDROPHÝLLUM**, Tourn. WATERLEAF. (Formed of ὕδωρ, water, and φύλλον, leaf, a name of no obvious application.) — North-American herbs; with petioled ample and lobed or divided alternate leaves, and cymose clusters of violet-blue or white flowers, in early summer.

§ 1. **HYDROPHYLLUM** proper. Perennial, with fleshy horizontal rootstocks: calyx naked at the sinuses, except occasionally in the last species.

* Leaves pinnatifid or pinnate: at least the calyx and inflorescence hispid.

+ Peduncles shorter than the petioles, generally shorter than the mostly dense inflorescence: anthers short-oblong.

H. macrophýllum, Nutt. Hispid or rough-hirsute, stout, 2 or 3 feet high: lower leaves commonly a foot long; the divisions oval or oblong, obtuse, 2 or 3 inches long, incisedly toothed; the upper ones confluent: stout peduncles commonly forked: cymes very dense: calyx white-hispid, not deeply parted; its divisions triangular-subulate, tapering gradually from the broad base, loosely spreading: corolla dull white, half an inch long. — Jour. Acad. Philad. vii. 111. — Rich woods, Ohio to Virginia and Alabama, and west to the Mississippi.

H. capitátum, Dougl. Only a span or so in height, tufted: copious fascicled roots fleshy and almost as large as the short rootstocks: leaves longer than the stem, and with blade mostly shorter than the petiole, ovate or roundish in general outline, 2 or 3 inches long, softly hirsute or pubescent, pinnately 5-7-parted or at base divided; the divisions 2-3-lobed or cleft; the lobes oblong, obtuse and mucronate: flowers capitate-cymose: calyx very hispid. — Benth. in Linn. Trans. xvii. 273 (excl. Calif. pl. &c.); A.DC. Prodr. ix. 289; Hook. Kew Jour. Bot. iii. 292 (var. *pumilum*); Watson, Bot. King, 249. — Hillsides, &c., Washington Terr. to the Sierra Nevada, California, and Utah.

Var. alpinum, Watson, l. c. Nearly acaulescent in dense tufts: flowers distinctly pedicellate in a somewhat open cyme close to the ground: calyx densely white-hairy, but less hispid. — Eastern California and Nevada, in the higher Sierra Nevada and Humboldt Mountains.

+ — Peduncle elongated, surpassing the petiole and often surpassing the subtending leaf: anthers oblong-linear.

++ Cauline leaves elongated-oblong in general outline, pinnately parted or divided into 7 to 15 divisions.

H. occidentále, Gray. Pubescent, hirsute, or sparingly hispid, a foot or two high: divisions of the leaves oblong, an inch or two long, mostly incised or few-cleft, obtuse: peduncles rather slender: cymes mostly dense or capitate: calyx deeply parted, its divisions lanceolate and rather obtuse, more erect: corolla violet-purple, varying to white, a third inch long. — Proc. Am. Acad. x. 314, & Bot. Calif. l. c. *H. capitatum*, Torr. Pacif. R. Rep. iv. 125, not Dougl. — Oregon (*Nuttall*) and N. & W. California.

Var. Watsóni, Gray, l. c. Commonly low, sometimes almost stemless, soft-pubescent, especially the lower side of the leaves (which is sometimes canescent), as also the sparsely hispid calyx: cyme sometimes open. — *H. macrophyllum*, var. *occidentale*, Watson, Bot. King, 248, mainly. — Sierra Nevada, California, to Utah, *Anderson, Bolander, Watson, &c.*

Var. Féndleri, Gray, l. c. Pubescence mainly hirsute or hispid, not at all canescent or cinereous: divisions of the leaves inclined to ovate-lanceolate, acute or acuminate, incisedly serrate: peduncle shorter: cyme rather open: corolla white or nearly so. — Shady ravines, Santa Fé, New Mexico, to Colorado, *Fendler, Greene, T. M. Coulter, &c.*

++ ++ Cauline leaves ovate in general outline, 3-5-parted or divided.

H. Virgínicum, L. Stem (a foot or two high) and bright green leaves almost glabrous, or with short scattered hairs: divisions of the leaves (2 to 4 inches long) ovate-lanceolate or rhomboid-ovate, acuminate or acute, coarsely incised-toothed; the lowest commonly 2-cleft and the terminal one often 3-lobed: peduncle usually once or twice forked: cyme

at length open: calyx 5-parted to the very base into narrow linear and spreading hispid-ciliate divisions: corolla nearly white or sometimes deep violet, about a fourth of an inch long. — Lam. Ill. t. 97; Schkuhr, Handb. t. 35; Bot. Reg. t. 331. — Rich woods, Canada to the mountains of Carolina and through the western States northward to Washington Terr. and Alaska (violet-flowered form). — Fleshy rootstock strongly toothed by the persistent bases of former radical petioles.

* * Leaves palmately 5-7-lobed: calyx often bearing minute teeth in the sinuses.

H. Canadense, L. A foot or less high from thickish and scaly-toothed rootstocks, nearly glabrous or very slightly and sparsely hirsute even on the calyx: stems simple and naked below, 1-2-leaved at the summit: leaves bright green, rounded and with a cordate base, 5-7-cleft to near the middle; the larger ones 5 to 7 inches wide; the radical ones on stout petioles as long as the stem, not rarely furnished with several small and distant pinnately arranged lateral divisions: peduncles mostly shorter than the cauline petioles, commonly forked: small cymes rather open: divisions of the deeply 5-parted calyx narrowly lanceolate-linear: corolla open-campanulate, mostly greenish-white: filaments very villous. — Lam. Ill. t. 97; Bot. Reg. t. 242. — Damp woods, Canada to the mountains of Carolina, and west to the Mississippi.

§ 2. **DECÉMIUM, Raf.** Biennial: calyx appendaged with a reflexed lobe at each sinus, and somewhat accrescent under the fruit (in the manner of *Nemophila*, to which genus this approaches): stamens little longer than the open-campanulate corolla. — *Viticella*, Mitch. Nov. Gen. 62.

H. appendiculatum, Michx. A foot or so high, loosely branching, hirsute with long spreading hairs, and above minutely somewhat viscid-pubescent: radical leaves pinnately 5-7-parted or divided; cauline rounded, with truncate or cordate base, palmately 5-7-angulate-lobed or the lower deeper cleft, somewhat dentate; the lobes very acuminate: peduncles exceeding the upper leaves: cymes loosely paniculate: pedicels filiform, equaling or longer than the calyx; the divisions of the latter lanceolate-subulate, spreading, broadening at base under the one-seeded fruit. — Fl. i. 134. *II. (Decemium) trilobum*, Raf. Fl. Ludov. 33. *Decemium hirtum*, Raf. Med. Fl. ii. 215. *Nemophila paniculata*, Spreng. Syst. i. 569; Beck, Bot. 256. — Damp woodlands, Upper Canada to mountains of Carolina, and west to Missouri and Wisconsin.

2. **NEMÓPHILA, Nutt.** (*Némos*, a grove, and *φιλέω*, I love.) — N. American annuals, in California chiefly winter-annuals, diffuse, more or less hirsute, of tender texture; with opposite or alternate and usually pinnatifid leaves, one-flowered terminal or lateral peduncles, in one or two species inclined to be racemose, and white, blue, or violet corolla, which in one species only is shorter than the calyx. — Nutt. in Jour. Acad. Philad. ii. 179; Barton, Fl. Am. Sept. ii. t. 61; Gray, l. c. 314, & Bot. Calif. i. 503. (The larger-flowered species are common ornamental annuals in gardens.)

* Ovules 8 to 24, maturing 5 to 15 seeds: leaves all or almost all opposite, surpassed by the slender peduncle. (All Californian.)

+ Seeds globular, smooth or minutely pruinose, with a very prominent papilleform caruncle.

N. maculata, Benth. Leaves lyrate pinnatifid into 5 to 9 short lobes, or the uppermost somewhat cuneate and 3-lobed: corolla white, with a deep violet blotch at the apex of each of the broad lobes; its very broad scales partly free, hirsute-ciliate with long sparse bristles. — Lindl. in Jour. Hort. Soc. iii. 319, & fig.; Pl. Hartw. 326; Paxt. Mag. xvi. t. 6; Fl. Serres, v. t. 431. — California, valley of the Sacramento to the Sierra Nevada. Corolla varying from 9 to 20 lines in diameter.

+ + Seeds oblong-oval, at maturity usually more or less tuberculate-corrugated or rugose: caruncle more deciduous.

N. insignis, Dougl. Leaves pinnately parted into 7 to 9 oblong and often 2-3-lobed divisions: corolla bright clear blue; the scales within its base short and roundish, partly free, hirsute with short hairs. — Benth. l. c. 275, & Trans. Hort. Soc. i. 479; Bot. Reg.

t. 1713; Bot. Mag. t. 3485. *N. Menziesii*, var., Hook. & Arn. Bot. Beech. 372. — Common nearly throughout California, flowering, like the other species, from early spring onward. Corolla from an inch or more down to little over half an inch in diameter.

N. Menziesii, Hook. & Arn. Mostly smaller than the preceding: leaves pinnatifid into 3 to 9 lobes: rotate corolla from light blue to white, and commonly with dark dots or spots, especially towards the centre, or sometimes with a dark eye; the scales at its base narrow, wholly adherent, their free edge densely hirsute-ciliate: appendages to the calyx usually small. — Bot. Beech. 152, & 372, first form; Gray, l. c. *N. liniflora*, Fisch. & Meyer, Sert. Petrop. fol. & t. 8, a large blue-flowered form, the corolla an inch wide. *N. pedunculata*, Benth. l. c.; Torr. Bot. Mex. Bound. 142 (as to char. & pl. coll. Coulter), a small-flowered form. *N. atomaria*, Fisch. & Meyer, Ind. Petrop. 1835, & Sert. Petrop. l. c.; Bot. Reg. t. 1940; Bot. Mag. t. 3774. *N. discoidalis*, Hortul.; Fl. Serres, ii. t. 75, a cult. form, with the dark spots confluent into a uniform dark brown-purple eye, or almost covering the corolla (Regel, Gartenfl. 1864, t. 442). — Common in California, extending to Oregon. Corolla from half an inch to at most an inch in diameter; the larger forms many-ovulate and much resembling *N. insignis*; the smaller passing towards *N. parviflora*, and sometimes only 7-9-ovulate.

* * Ovules only 4, i. e. a pair to each placenta: leaves all or mainly alternate: flowers mostly large: internal scales of the corolla very broad and partly free, conniving or united in pairs at the base of the filaments: seeds globose, with inconspicuous caruncle or none: peduncles rarely exceeding the leaves, or the later ones forming as it were a naked few-flowered corymb or raceme.

N. phacelioides, Nutt. Sparsely hirsute, a foot or two high: leaves all but the earliest alternate, with naked petioles, 5-9-parted; the divisions oblong or oval, the larger ones 2-5-lobed: appendages of the calyx oblong or ovate, almost half the length of the lobes: corolla ample, blue; the appendages in throat hairy outside: seeds obscurely impressed-punctate. — Nutt. in Jour. Acad. Philad. ii. 179, & Trans. Am. Phil. Soc. n. ser. v. 192; Bart. Fl. Am. Sept. ii. t. 61; Bot. Mag. t. 2373; Bot. Reg. t. 740; Brit. Fl. Gard. t. 32. *N. Nuttallii*, Colla, Hort. Rip. App. i. t. 5. *N. hirsuta* & *N. pilosa*, Buckley in Proc. Acad. Philad. — Low grounds, Arkansas and Texas. Corolla an inch or more in diameter, with white or pale centre.

N. aurita, Lindl. Hirsute, and the weak stems usually retrorsely hispid, a foot or two long: leaves all with dilated clasping base or winged petiole; the lowest opposite, deeply pinnatifid; the 5 to 9 oblong or lanceolate divisions more or less retrorse: appendages of the calyx small: corolla violet, from two-thirds to nearly an inch in diameter; its internal scales with erose and somewhat ciliate margins: seeds favose-reticulated. — Bot. Reg. t. 1601; Brit. Fl. Gard. n. ser. t. 338. — California, from the Sacramento Valley to San Diego. Upper peduncles almost always bractless and at length racemose.

N. racemosa, Nutt. More slender and weak than the preceding: leaves shorter and with fewer divisions and a naked petiole destitute of auricled base: flowers only half the size, the upper ones racemose. — Gray, Proc. l. c. & Bot. Calif. l. c. — San Diego, *Nuttall*; Island of Catalina, *Dall* and *Baker*. Leaves of ovate rather than linear outline. Corolla little longer than the calyx, only 4 or 5 lines wide.

* * * Ovules only 4, i. e. a pair to each placenta: lower leaves opposite, and the upper commonly alternate: flowers small or minute: corolla more campanulate: its internal scales delicate and nearly glabrous, or obsolete: seeds oval or globose, the caruncle at length evanescent: peduncles shorter than the leaves: plants small or slender, diffuse or prostrate, hirsute-pubescent.

† Corolla, as in all preceding species, longer than the calyx.

N. parviflora, Dougl. Leaves pinnately 3-9-parted or cleft, or below divided; the divisions obovate or oblong; the distinct lower ones either sessile or petiolulate, the upper confluent: appendages of the calyx rather conspicuous: corolla light blue or whitish, 3 to 5 lines in diameter; its lobes considerably longer than the tube; its oblong appendages manifest, wholly adherent by one edge: anthers oblong-sagittate: filaments filiform, inserted on the very base of the corolla. — Benth. l. c. 275; Gray, l. c. *N. parviflora* & *N. pedunculata*, Hook. Fl. ii. 79. *N. heterophylla*, Fisch. & Meyer, l. c.; a larger-flowered form. — Shady places, British Columbia to California; common, and exceedingly variable in the foliage, size of corolla, &c. Seeds from one to four, smooth and even, with obscure impressed punctures or pits, or becoming rather deeply pitted or scrobiculate. All but the upper leaves mostly opposite.

N. microcalyx, Fisch. & Meyer. Leaves pinnately 3-5-parted or divided, or the upper only 3-cleft; divisions obovate or cuneate, 2-3-lobed or incised, all approximate, commonly the whole leaf with a triangulate-reniform or cordate general outline: appendages of the calyx small and inconspicuous, in flower less evident than in fruit: corolla whitish or bluish, 1 to 2 lines long; its lobes shorter than the campanulate tube; the appendages (always?) obsolete: filaments short, inserted rather high on the tube of the corolla: anthers oval. — Sert. Petrop. l. c.; Gray, Man. 368. *N. evanescens*, Darby, S. Bot. *N. parviflora*, A. DC. l. c., as to Louisiana plant. *Ellisia microcalyx*, Nutt. Trans. Am. Phil. Soc. l. c.; Hook. Comp. Bot. Mag. i. 172. *E. ranunculacea*, Nutt. l. c., ex char. — Moist woods, Virginia to Florida, Arkansas, and Texas. Leaves prevailing and often all but the lowest opposite. Seeds either globular or oval, when young minutely and sparsely pruinose with little papillæ, when old with impressed punctures.

— — Corolla decidedly shorter than the calyx.

N. breviflora, Gray. A span or more high, at length diffuse: leaves sometimes all alternate, pinnately 3-5-parted; the divisions approximate, oblong-lanceolate, acute, entire, (3 to 9 lines long): peduncles seldom exceeding the petioles; appendages of the calyx nearly half the length of the proper lobes, both ciliate with long hirsute bristles: corolla whitish or tinged with violet, broadly short-campanulate; the lobes considerably shorter than the tube; internal appendages cuneate, the broad free summit fimbriate-incised: style minutely 2-cleft at apex: seed solitary, almost filling the cell, globose, nearly smooth and even; the caruncle evanescent. — Proc. Am. Acad. xi. 315. *N. parviflora*, Watson, Bot. King, 249, excl. char. — Utah, in Parley's Park, Watson. Interior of Oregon, Tolmie, W. C. Cusick. When full grown, the habit is somewhat that of *Flækea*. Seed nearly 2 lines in diameter.

3. ELLÍSIA, L. (In honor of *John Ellis*, an English correspondent of John Bartram and of Linnæus, and who published the first account of *Dionæa*, &c.) — North American annuals, with tender herbage, somewhat hirsute; the once to thrice pinnatifid leaves either all opposite or the upper alternate; peduncles solitary or racemose; corolla whitish, mostly small in comparison with the at length stellate calyx.

§ 1. **EUELLÍSIA**, Gray. Ovules in the manner of the tribe all on the inner face of the placenta, a pair to each: seeds globose, uniform, alveolate-reticulated: leaves once pinnately parted.

E. Nyctélea, L. A span to a foot high, at length very diffuse: leaves on naked or barely margined petioles, the upper mostly alternate; the divisions 7 to 13, lanceolate, acute, mostly 1-3-toothed or lobed: peduncles solitary in the forks or opposite the leaves, or some of the later ones racemose and secund: calyx-lobes lanceolate or at length ovate-lanceolate, gradually acuminate, longer than the capsule: corolla cylindraceous-campanulate, rather shorter than the calyx: seeds very minutely reticulated. — (Moris. Hist. iii. 451, sect. 2, t. 28; Ehret in Act. Ups. i. 97, t. 5; Trew. Pl. Sel. t. 99.) Linn. Spec. ed. 2, 1662. *E. ambigua*, Nutt. Gen. i. 118, merely a slender form. *Polemonium Nyctelea*, L. Spec. ed. 1, &c. — Damp and shady places, New Jersey to Virginia and west to Saskatchewan and Missouri; flowering through spring and summer.

E. membranacea, Benth. Weak, a foot or two long, sparsely beset with short hirsute or hispid hairs or bristles, otherwise glabrous: leaves mostly opposite, on narrowly winged or margined petioles; the divisions 3 to 9, linear, obtuse, entire, or sometimes with a lobe: flowers chiefly bractless and becoming racemose on a terminal peduncle: calyx-lobes oblong or at length obovate, very obtuse, rather shorter than the open-campanulate corolla, not exceeding the capsule: seeds rather coarsely reticulated. — Benth. l. c. 274; A. DC. l. c.; Gray, Bot. Calif. i. 505. — California, from the Bay of San Francisco to San Diego. Flowers very much smaller than in the preceding: corolla 4 lines in diameter, one lobe outside in æstivation. Ovary beset with a few subulate bristles.

§ 2. **EUCRÝPTA**, Gray, l. c. Ovules a pair on the back as well as on the face of each placenta; the seeds of the two dissimilar, oval; the outer ones (usually

solitary) flattened and hidden between its placenta and the valve : leaves twice or even thrice pinnately parted. — *Eucrypta*, Nutt. Pl. Gamb. 159.

E. chrysanthemifolia, Benth. l. c. A foot or two high, erect, paniculately branched, more or less hirsute and scabrous : leaves opposite or the uppermost alternate, on short petioles auriculate-dilated at base, finely twice or thrice (or the uppermost once) parted or cleft into small and short lobes : flowers loosely racemose, the short filiform pedicels bractless : calyx-lobes ovate or broadly oval, about equalling the small striate-nerved capsule, shorter than the open-campanulate corolla : seeds oval ; the ordinary ones (2 to 4 maturing) rugose-tuberculate, terete, discharged upon dehiscence ; a posterior one (or sometimes a pair) enclosed between each valve and the placenta which lines it, meniscoid, smooth, usually rather larger than the others. — *Eucrypta paniculata* & *E. foliosa*, Nutt. l. c. *Phacelia micrantha*, var.? *bipinnatifida*, Torr. in Ives Colorad. Exped. Bot. 21. — California, from Contra Costa Co. to San Diego and to the borders of Arizona. Corolla and fruiting calyx about 3 lines in diameter, sometimes smaller. (Islands of Lower Calif.)

4. DRAPÉRIA, Torr. (Dedicated to Professor *John William Draper* of New York, chemist and historian.) — A single species. Gray, Proc. Am. Acad. vii. 401, x. 316, & Bot. Calif. i. 505.

D. systyla, Torr. l. c. Low and diffuse or decumbent perennial herb, branching from slightly lignescent base, silky-hirsute and somewhat viscid, leafy : leaves all opposite, ovate, entire, pinnately veined, slender-petioled : flowers crowded in a pedunculate terminal once or twice 2-3-fid cyme ; the unilateral spikes or racemes of which slightly elongate in age : sepals narrow-linear : corolla light purplish, 4 or 5 lines long : capsule thin ; the oval placental portion usually separating from the dissepiment in dehiscence : seeds oval and angled ; the coat very minutely or obscurely reticulated. — *Nama systyla*, Gray, Proc. Am. Acad. vi. 37. — California, ravines and shaded hillsides, along the Sierra Nevada ; first collected by *Lobb*.

5. PHACÉLIA, Juss. (From *γάζελος*, a cluster or fascicle, alluding to the crowded flowers of the original species.) — Annual or some few perennial herbs (all American, chiefly N. American) ; with alternate simple or compound leaves, and more or less scorpioid cymes or so-called racemes or spikes. Corolla deciduous (as generally in the order), at least thrown off by the enlarging capsule (except in *P. sericea* !), blue, purple or white, never yellow, except the tube of certain species ; the tube with or sometimes without appendages within ; these when present generally in the form of 10 vertical folds or lamellar projections (borne on a lateral vein), in pairs, either adnate to or free from and alternate with the base of the slender filaments. Calyx-lobes commonly narrow, often wider upwards, more or less enlarging in fruit. Seed-coat reticulated or pitted. — Gray, Man. ed. 5, p. 369, & Proc. Am. Acad. x. 316. *Phacelia*, *Cosmanthus* (Nolte), *Eutoca* (R. Br.), & *Microgenetes*, A.DC. Prodr. ix. 292, 297.

§ 1. **EUPHACÉLIA**, Gray. Ovules 4, i. e. a pair to each placenta : seeds as many or by abortion fewer, vertical ; the testa areolate-reticulate or favose : lobes of the campanulate corolla entire (or rarely erose-dentate) ; the tube with 10 laminate appendages in pairs at the base of the stamens. — *Phacelia*, Juss., A.DC.

* Lower leaves and all the branches opposite : no hispid or hirsute pubescence : spikes or branches of the cyme hardly at all scorpioid : pedicels much shorter than the calyx. (An anomalous species.)

P. namatoídes, Gray. Annual, a span high, brachiately branched, glabrous and glaucous below, above glandular-pubescent : leaves narrowly-lanceolate, entire, tapering at base, obscurely petioled ; only the uppermost alternate, equalling or surpassing the rather loose spikes or branches of the cyme : sepals spatulate-linear, a little shorter than the

narrow-campanulate blue corolla, exceeding the globular sparsely hirsute-pubescent capsule: stamens and at length deeply 2-parted style included: appendages at base of filament short: seeds alveolate-reticulated. — Proc. Am. Acad. x. 317, & Bot. Calif. i. 506. *Nama racemosa*, Kellogg, Proc. Acad. Calif. v. 51. — California, in the Sierra Nevada from Calaveras to Nevada Co., at Cisco, Summit Station, &c., *Bolander, Kellogg*. Corolla and capsule a line long.

* * Leaves (as in the rest of the genus) all alternate: pubescence or some of it hispid or hirsute: spikes or branches of the cyme scorpioid and dense: pedicels short or hardly any (except in *P. pedicellata*): appendages of the corolla broad and salient, usually more or less united at the base of the filament.

++ Leaves all simple and entire, or some of the lower pinnately 3-5-parted or divided; the segments or leaflets entire: capsule ovate, acute: seeds densely alveolate-punctate, upper end acutish.

P. circināta, Jacq. f. Hispid and the foliage strigose, and either green or canescent, a span to 2 feet high from a perennial or biennial root: leaves from lanceolate to ovate, acute, pinnately and obliquely straight-veined; the lower tapering into a petiole and commonly some of them with one or two pairs of smaller lateral leaflets: inflorescence hispid; the dense spikes thyrsoid-congested: corolla whitish or bluish, moderately 5-lobed, longer than the oblong-lanceolate or linear calyx-lobes: filaments much exerted, sparingly bearded. — Eclog. 135, t. 91; Benth. l. c.; A. DC. Prodr. l. c., where see the older synonymy. (*Aldea circinata*, Willd. Enum.) *P. heterophylla*, Pursh, Fl. i. 140. *P. Californica*, Cham. in Linn. iv. 495. *P. hastata*, Dougl. in Hook. Fl. ii. 80. *P. leucophylla*, Torr. in Frem. Rep. 93. *P. canescens*, Nutt. Pl. Gamb. 159, a dwarf very canescent state. — Dry ground, Dakota to British Columbia, New Mexico, and California. (S. to the Straits of Magellan.) Very variable: dwarf forms sometimes with a naked scape-like stem.

Var. calycōsa, Gray, l. c. Divisions of the calyx more foliaceous and ample, and in fruit with narrowed base, oblong to obovate-spatulate, reticulated. — California; not rare in the western part of the State, under otherwise varying forms.

P. Brēweri, Gray, l. c. Resembling the preceding but smaller and slender, from an annual root: corolla blue or violet, more broadly campanulate, nearly twice the length of the linear calyx-lobes: filaments glabrous, a little shorter than the corolla. — Monte Diablo, California, on dry and soft sandstone, *Brewer*. Leaves seldom an inch long, exclusive of the petiole of the lowermost; many of them 3-5-parted; the lanceolate lobes ascending. Corolla barely 3 lines long.

P. hūmilis, Torr. & Gray. Annual, diffusely branched from the base, a span high, pubescent, or the inflorescence often hirsute: leaves spatulate-oblong or oblanceolate, rather obtuse; the lower rarely with one or two lateral ascending lobes, the veins branching: spikes loosely paniculate or solitary, in age rather slender: pedicels either all very short, or the lower sometimes almost as long as the calyx: corolla indigo-blue, rather deeply lobed, surpassing the usually linear calyx-lobes: filaments moderately exerted, glabrous or sparingly bearded above. — Pacif. R. Rep. ii. 122, t. 7; Watson, Bot. King, 250. — Sierra Nevada, California, from Siskiyou to Mariposa Co., and E. Nevada. Leaves an inch or two in length. Corolla 2 or 3 lines long.

Var. calycōsa, Gray. A strict and slender form: corolla apparently pale: calyx-lobes larger and spatulate, as in the similar variety of *P. circinata*. — Proc. Am. Acad. & Bot. Calif. i. 507. — E. side of the Sierra Nevada, near Mono Lake, *Bolander*.

++ Leaves simple, all petioled, rounded-cordate, somewhat palmately lobed or incised, the lobes serrate.

P. malvæfōlia, Cham. Rather tall and stout, from an annual? root, hispid with spreading or reflexed stinging bristles, and the foliage more or less pubescent: leaves (1 to 3 inches in diameter) green and membranaceous, round-cordate, incisely 5-9-lobed, acutely toothed: somewhat palmately ribbed at base: spikes solitary or geminate: corolla (3 or 4 lines long) white, longer than the unequal linear and spatulate calyx-lobes: stamens exerted: seeds alveolate-scarious. — Linn. iv. 494; Gray, l. c. — California, Bay of San Francisco, *Chamisso, Kellogg, G. R. Vasey*.

+++ Leaves oblong or narrower in outline, pinnately toothed, lobed, or compound, and the lobes or divisions toothed or incised: capsule globular or ovoid, obtuse: seeds with excavated ventral face divided by a salient ridge: annuals, or rarely biennials (or one perennial?), mostly with cymosely or umbellately or thyrsoid congested spikes.

++ Calyx, &c., not setose-hispid: stamens and style more or less exerted.

= Pedicels short, when any, and erect in the fruiting spike: divisions of the calyx entire, little exceeding the capsule: seeds minutely reticulated.

P. integrifolia, Torr. A span to 2 feet high, strict, viscid-pubescent or hirsute, very leafy: leaves ovate-oblong or lanceolate, sessile or the lower short-petioled with a commonly subcordate base, simply or mostly doubly crenate-toothed, sometimes incised: spikes crowded, at first thyrsoid: corolla narrow-campanulate, whitish or bluish: stamens and style long-exserted; the latter cleft to the middle: capsule short-ovoid. — Ann. Lyc. N. Y. ii. 222, t. 3, & Bot. Mex. Bound. 143; Watson, l. c. — Gypseous soil, Colorado and N. W. Texas to S. Utah and Arizona. (Adjacent Mex.)

Var. Palmeri, Gray, l. c. A strict form, apparently from a biennial root, more hirsute and viscid: leaves more acutely sinuate-toothed: inflorescence thyrsoid-contracted. — S. Utah, Palmer, Siler, and intermediate forms by Parry and Ward.

P. crenulata, Torr. A span or two high, often branched from the base and somewhat spreading, viscid-pubescent or hirsute: leaves mainly petioled, spatulate-oblong, crenately toothed or pinnatifid, sometimes lyrate and the lowest divisions distinct or nearly so; the lobes crenulate-toothed: spikes soon open and spreading: corolla rotate-campanulate, bright violet or paler; the internal appendages very broad: stamens moderately exserted: style cleft far beyond the middle: capsule globular. — Watson, Bot. King, 251; Gray, l. c. — Rocky slopes, New Mexico to Arizona and N. W. Nevada. Flowers commonly deep-colored, half-inch in diameter, and showy, sometimes considerably smaller and paler.

P. glandulosa, Nutt. Viscid-pubescent and glandular, softly if at all hirsute, a span to a foot or more high: leaves irregularly and interruptedly twice pinnatifid, or below divided; the numerous lobes small, oblong, somewhat incised, obtuse: calyx-lobes oblong or spatulate: corolla (2 lines long) bluish, purplish, or white, with lobes shorter than the tube: stamens and 2-cleft style moderately or conspicuously exserted: seeds with the minute reticulations even. — Nutt. Pl. Gamb. 160 (very pubescent and viscid form); Gray, l. c. *P. Popei*, Torr. & Gray, Pacif. R. Rep. ii. 172, t. 10 (less pubescent form, with corolla lobes quite entire). *Eutoca glandulosa*, Hook. Kew Jour. Bot. iii. 293. — Gravelly soil, N. W. Texas and Colorado to Arizona. (Mex.)

Var. Neo-Mexicana, Gray, l. c. Lobes of the corolla either slightly or conspicuously erose-denticulate. — *P. Neo-Mexicana*, Thurber in Bot. Mex. Bound. 143. — Colorado and New Mexico.

P. congesta, Hook. Pubescent and commonly cinereous, hardly in the least viscid or glandular, a foot or more high: leaves pinnately 3-7-divided or parted, and with a few interposed small lobes; the main divisions oblong or oval, incisely pinnatifid or irregularly lobed; the lower ones mostly petiolulate and the upper confluent: calyx-lobes linear or somewhat spatulate: corolla blue (3 lines long); the lobes as long as the tube: stamens more or less exserted: seeds reticulate-scarious, the fine sharp meshes being as it were toothed at the junctions. — Bot. Mag. t. 3452; A. DC. l. c. 249. *P. conferta*, Don. *P. tanaacetifolia*, A. DC. l. c., as to pl. Tex. Berland. — Margin of thickets, &c., throughout Texas. Not rarely cultivated.

= = Pedicels slender and horizontal, or divisions of calyx 3-5-lobed, much longer than the capsule, villous. Extra-limital species, of Lower California.

P. pedicellata. A foot or less high, villous or soft-hirsute and glandular: not annual: leaves pinnately 3-5-divided; the divisions oval or oblong, incised and numerous toothed; the lower nearly sessile, the uppermost confluent or larger and 3-cleft: flowers much crowded in short paniced or cymose-clustered racemes, small: pedicels filiform, about the length of the flower, somewhat deflexed in fruit: calyx-lobes linear or in age oblanceolate, entire, villous (as also the pedicel), hardly twice the length of the globular capsule: corolla apparently white (little over 2 lines long), moderately surpassed by the stamens and 2-cleft style; the internal appendages short and rounded: seeds rugose-reticulated and somewhat tuberculate at maturity. — Lower California, Dr. Thomas H. Streets.

P. phyllomanica, Gray. A foot or two high from a rigid (and possibly perennial) base, very leafy, canescent with soft-tomentose and some longer villous pubescence, not glandular: leaves elongated-oblong in outline, pinnately parted or below divided; the divisions 9 to 18 pairs, linear-oblong, pinnatifid; the short lobes 1-2-toothed or entire: condensed spikes thyrsoid-crowded: flowers nearly sessile: calyx-lobes foliaceous, all or 2 or 3 of them pinnately 3-5-parted: corolla violet, a little longer than the calyx; the expanded

limb 3 lines in diameter: stamens and style slightly exerted: fruit not seen. — Proc. Am. Acad. xi. 87. — Guadalupe Island, off Lower California (beyond our limits), *Palmer*.

Var. interrupta, Gray, l. c. Lower, and with pubescence more villous or hirsute: leaves with fewer and sparser divisions (the larger crenately pinnatifid) and some very small interposed lobes. — With the other form.

++ ++ Calyx more or less setose-hispid, in fruit usually much surpassing the capsule: the divisions entire, but often dissimilar: seeds favose-pitted or in age tuberculate: style 2-parted. (Species running together or difficult to discriminate: leaves mostly 1-3-pinnately divided and incised: corolla light violet or bluish, varying to white.)

P. tanacetifolia, Benth. Erect annual, roughish-hirsute or hispid, not glandular, or above slightly so, 1 to 3 feet high: leaves pinnately 9-17-divided into linear or oblong-linear once or twice pinnately parted or cleft divisions, all sessile or nearly so; the lobes mostly linear-oblong: spikes cymosely clustered, at length elongated: very short fruiting pedicels ascending or erect: calyx-lobes linear or linear-spatulate, not twice the length of the ellipsoidal capsule: stamens and style conspicuously exerted: seeds with very narrow pits bounded by thick walls. — Bot. Reg. t. 1696; Bot. Mag. t. 3703; Brit. Fl. Gard. n. ser. t. 360. — California, very common, at least near the coast. Variable in foliage: the var. *tenusifolia*, Thurber in Bot. Mex. Bound., is a common form, with fine Tansy-like foliage. Common garden annual.

P. ramosissima, Dougl. About 2 feet high, decumbent or ascending from a perennial root (according to *E. L. Greene*); the branches divergent, pubescent and more or less viscid or glandular, or above hispid: leaves 5-9-divided or parted into oblong or narrower pinnatifid-incised divisions: spikes glomerate, short and dense, little elongated in age: flowers subsessile and in fruit ascending on the rhachis: stamens and style usually moderately exerted: appendages to the corolla with a merely acute free apex: calyx-lobes from linear-spatulate to obovate, twice or thrice the length of the ovate or short-ovoid capsule: seeds oblong. — Benth. in Linn. Trans. l. c. 280; Hook. Fl. ii. 80 (but ovary not glabrous in original specimens); Gray, Proc. Am. Acad. x. 319, & Bot. Calif. i. 508, excl. var. *P. tanacetifolia*, Thurber in Bot. Mex. Bound. 143. — Washington Territory and Oregon (through the dry interior) to San Diego Co., California, and Arizona. In some forms very near the foregoing.

P. hispida. A foot or less high from an annual root, diffusely branching, hardly viscid, setose-hispid with long and slender white bristles: leaves with fewer and coarser divisions than the preceding, the uppermost sometimes merely lacinate-incised: spikes soon loose and loosely paniculate, 2 or 3 inches long in fruit: flowers nearly all on short but manifest and slender horizontal pedicels: stamens and style equalling or barely surpassing the corolla: calyx-lobes narrowly linear with attenuated base, nearly equalling the corolla, in fruit 4 to 6 lines long and about 4 times the length of the globose capsule: seeds short-oval. — *P. ramosissima*, var. *hispida*, Gray, l. c. — Western part of California, from Santa Barbara to San Diego, *Nuttall*, *Wallace*, *Torrey*, *Cleveland*. Bristles resembling those of Borage.

P. ciliata, Benth. Erect or ascending, a span to a foot or more high from an annual root, more or less pubescent or sparingly hirsute above: stems scabrous: leaves pinnately parted, or the lower divided and the upper merely cleft; the divisions or lobes oblong, pinnatifid-incised: spikes rather short and in fruit rather loose: pedicels short or hardly any, ascending: stamens and the 2-parted style shorter than or not surpassing the corolla: appendages of the latter with pointed tips: calyx-lobes from lanceolate to ovate, more or less shorter than the white or bluish corolla, accrescent and becoming venose-reticulated in age, then sparsely ciliate with short rigid bristles, 4 or 5 lines long, only twice the length of the ovate mucronate capsule: seeds oval, favose. — Linn. Trans. l. c.; Gray, l. c. — California, from the Sacramento and the vicinity of San Francisco to Monterey, apparently in shaded moist soil.

* * * Flowers in loose and only slightly scorpioid racemes; the pedicels equalling or surpassing the flowers: appendages of the very open corolla long and rather narrow, villous on the edge, approximate between the stamens, from which they are remote: seeds with a rather fleshy obscurely areolate testa.

P. bipinnatifida, Michx. A foot or more high from a slender biennial root, erect, paniculately branched, hirsute-pubescent and above mostly viscid and glandular: leaves slender-petioled, green and thin, pinnately 3-7-divided; the divisions ovate or oblong-ovate,

acute, coarsely and irregularly incised or pinnatifid; the lower short-petiolulate and the uppermost confluent: racemes loose, 7-20-flowered: pedicels spreading or in fruit recurved: calyx-lobes linear, loose, longer than the globular capsule: corolla rotate-campanulate, violet-blue, over half an inch in diameter, with rather short rounded lobes and very conspicuous internal appendages: stamens (bearded) and style usually more or less exserted. — Fl. i. 134, t. 16; Gray, Man. ed. 5, 369. — Shaded banks of streams, Ohio and Illinois to Alabama: flowering in June.

Var. brevistylis, Gray. A remarkable form, with corolla about one half smaller: style and especially the stamens not exserted. — *P. brevistylis*, Buckley, in Am. Jour. Sci. xiv. (1843) 172. — Alabama, Buckley, Nevius, &c.

§ 2. **COSMANTHUS, Gray.** Ovules and seeds of *Euphacelia*: corolla destitute of internal appendages, almost rotate; its lobes fimbriate: filaments (villous-bearded) rarely longer than the corolla: ovary villous-hispid at the summit, otherwise glabrous: low annuals, with loosely racemose flowers in the manner of the last preceding species and of earliest of the next section. — Man. Bot. ed. 2, 328, & 5, 369. *Cosmanthus*, Nolte. *Cosmanthus* § *Eucosmanthus*, A.DC. in part.

P. Púrshii, Buckley. A span to a foot high, diffusely branched from the base, sparsely hirsute: cauline leaves pinnately 5-11-parted, the upper closely sessile; lobes oblong or lanceolate, acute: racemes rather many-flowered, sometimes forking: calyx-lobes linear: corolla light blue varying to white (half inch in diameter). — Buckley in Am. Jour. Sci. xlv. 172; Gray, Man. l. c. *P. fimbriata*, Pursh, &c. *Cosmanthus fimbriatus*, Nolte, A.DC. Prodr. ix. 297. — Moist wooded banks, W. Pennsylvania to Minnesota and Missouri, North Carolina and Alabama. — Pedicels filiform, 6 to 10 lines long. Perhaps only a variety of the next. Seeds as in the preceding.

P. fimbriata, Michx. Weak and diffuse, a span high, less hirsute: cauline 3-7-cleft or lobed or the lower lyrate-divided; the lobes obtuse or roundish: racemes few-flowered: pedicels filiform: calyx-lobes linear-oblong or spatulate: corolla white (only 3 or 4 lines broad), rather shorter than the stamens. — Fl. i. 134; Gray, Man. l. c. In woods of the higher Alleghany Mountains, Virginia to Alabama; flowering early.

Var.? Boykini, Gray. More robust, evidently growing in more exposed soil: racemes rather many-flowered, at length strict, with fruiting pedicels erect and not longer than the calyx: corolla far less fimbriate, bluish. — Proc. Am. Acad. x. 320. — Upper part of Georgia, Boykin. Perhaps a distinct species, more likely a state of *P. fimbriata*, growing in a lower and warmer region.

§ 3. **COSMANTHOIDES, Gray.** Ovules and seeds 3 to 8 (rarely only a pair) on each placenta, the latter with reticulated testa: appendages of the rotately or open-campanulate corolla wanting, or very inconspicuous and remote from the stamens: capsule globular and pointless: low annuals of the Atlantic United States, early-flowering, hirsute-pubescent or glabrate, with mostly pinnatifid leaves, the upper closely sessile, simply racemose flowers, and somewhat villous-bearded filaments about the length of the blue or white corolla.

* Ovules 2 to 4 on each (at length deciduous) placenta: globose capsule thin-walled: slender and smoothish little annuals, with the aspect of *Cosmanthus*, but lobes of the corolla entire, its base with no appendages or only obscure vestiges. — Proc. Am. Acad. x. 320.

P. glabra, Nutt. Slender, 3 to 8 inches high, glabrous except a few hirsute short hairs chiefly on the margins of the leaves and calyx: corolla 3 or 4 lines in diameter: calyx-lobes in fruit little longer than the capsule, mostly oblong or oval: otherwise as in *P. parviflora*. — Trans. Amer. Phil. Soc. n. ser. v. 192; Gray, l. c. — Low prairies, Arkansas and Eastern Texas. Very like slender and smoother forms of the next, into which it probably passes. Ovules 4 in some flowers, 5 to 7 or 8 in others.

P. parviflora, Pursh. A span or more high, sparsely hirsute or glabrate, branched from the base: radical and lowest cauline leaves lyrate-pinnate, with 3 to 5 roundish leaflets or divisions, or sometimes simple and entire; the upper mostly sessile and 3-9-parted or cleft into oblong or linear-lanceolate lobes: racemes loose, several-many-flowered;

the spreading filiform pedicels longer than the fruiting calyx: corolla light blue or nearly white, 4 to 6 lines in diameter: calyx-lobes linear or lanceolate, in fruit nearly twice the length of the capsule (this only a line and a half long). — Fl. i. 140; Gray, Man. l. c. (Pluk. t. 245, fig. 5.) *Polemonium dubium*, L. *Eutoca parviflora*, R. Br. in Richards. App. Frankl. Journ. 36; Benth. l. c. *Cosmanthus parviflorus*, A.DC. l. c. *Phacelia pusilla*, Buckley, l. c., ex char. — Shaded places, Pennsylvania and Ohio to Carolina, Missouri, and Texas: the south-western and also Virginian forms passing into

Var. hirsúta, Gray. More hirsute and the stems less slender, apparently growing in more open or dry soil: corolla larger, 5 to 7 lines in diameter. — Proc. Am. Acad. l. c. *P. hirsuta*, Nutt. l. c. 191. — Prairies and barrens, south-western part of Missouri to eastern Texas. Also similar forms from Giles Co., Virginia, and Stone Mountain, Georgia, Canby. Well developed capsule 2 lines long. Ovules only 4 in some flowers, 8 in others.

* * Ovules (and commonly the seeds) about 8 on each placenta: plants stouter, with less divided leaves: vestiges of appendages to the corolla sometimes manifest, in the form of very narrow lamellæ approximate in pairs between the stamens.

P. patuliflora, Gray. Rather softly cinereous-hirsute or pubescent, and the inflorescence somewhat glandular, branched from the base, a span to a foot high, erect or diffuse: leaves obovate or oblong (an inch or two long); the lowest lyrate-pinnatifid; the upper commonly only pinnatifid-incised, sessile: racemes lax, at length elongated: pedicels spreading or nodding, especially in fruit, 4 to 7 lines or more long: corolla deep blue with yellow base, from half to three quarters inch in diameter; the lobes somewhat eros-denticulate: calyx-lobes lax or spreading, linear or somewhat lanceolate, occasionally becoming spatulate or obovate, sometimes twice the length of the rather thin-walled capsule. — Proc. Am. Acad. x. 321. *Eutoca patuliflora*, Engelm. & Gray, Pl. Lindh. i. 45. *Phacelia hispida*, Buckley in Proc. Acad. Philad. 1861, 463. — Low prairies and thickets, Texas along and near the coast, *Berlandier*, *Lindheimer*, *Wright*, *Buckley*, &c. Capsule $2\frac{1}{2}$ lines long: placenta at length deciduous: seeds apparently as in the next.

P. strictiflora, Gray, l. c. Shorter and stouter than the preceding, more cinereous-hirsute: leaves rather more pinnatifid (an inch or so long): racemes in fruit strict and mostly dense, with pedicels erect and not longer than the capsule: corolla similar or rather larger: calyx-lobes usually becoming spatulate: capsule firm-coriaceous (3 lines long): seeds round-oval, minutely alveolate-reticulated and coarsely more or less tuberculate-rugose! — *Eutoca strictiflora*, Engelm. & Gray, l. c. — Sand-hills, San Felipe and Austin, Texas, *Drummond*, *Lindheimer*, *E. Hall*. Also Mississippi, *Spillman*. Perhaps a variety of the last, growing in more exposed soil. Capsule of firmer texture; the placenta inclined to be adnate. In the seeds alone there is some approach to the character of the *Microgenetes* section.

§ 4. **GYMNÓBYTHUS, Gray.** Ovules and seeds very numerous on the dilated placenta, descending or nearly horizontal; the testa favose-pitted: appendages of the rotate-campanulate corolla wholly absent: capsule ovate and pointed: style 2-parted: very glandular and viscid Californian annuals, with ovate dentate leaves, simple or sometimes geminate loose racemes, and very slender filaments (usually a little bearded at base) about the length of the corolla. — Proc. Am. Acad. x. 321. *Cosmanthus* § *Gymnobythus*, A.DC.

P. viscida, Torr. A foot or two high, branching, hirsute at base, very glandular above: leaves ovate or obscurely cordate, doubly or incisely and irregularly dentate (an inch or two long): corolla deep blue with purple or whitish centre, from half to nearly an inch in diameter. — Bot. Mex. Bound. 143; Gray, l. c. & Bot. Calif. i. 513. *Eutoca viscida*, Benth. in Bot. Reg. t. 1808; Bot. Mag. t. 3572. *Cosmanthus viscidus*, A.DC. l. c. 296. — Open soil, along the coast of California, from Santa Barbara southward. Calyx-lobes linear or becoming obscurely spatulate, about the length of the abruptly cuspidate-pointed capsule; the firm placenta of which persist on the valves.

Var. albiflora, Gray, l. c., differs only in its white corolla. — *Eutoca albiflora*, Nutt. Pl. Gamb. 158. — Same range.

P. grandiflora, Gray, l. c. Very like the preceding, or disposed to be more hispid: corolla light blue or sometimes white, an inch to an inch and a half in diameter. — *Eutoca*

grandiflora, Benth. in Linn. Trans. l. c. 278. *E. speciosa*, Nutt. Pl. Gamb. l. c. *Cosmanthus grandiflorus*, A.DC. l. c. — California, from Santa Barbara Co. southward, *Douglas*, *Nuttall*, *Peckham*, &c. Capsule 4 lines long, the cuspidate persistent and indurated base of the style a line in length.

§ 5. **WHITLÁVIA**, Gray. Ovules and seeds numerous or rather few; the testa favose-pitted: appendages of the corolla reduced to 5 small truncate or emarginate scales, one adnate to the inner base of each capillary somewhat exerted filament: style 2-cleft above the middle: Californian annuals, with inflorescence and habit of the preceding section, but less glandular, and with longer petioles and pedicels, and looser racemes, the flowers showy. — Proc. Am. Acad. x. 321.

* Corolla large (violet-purple, varying to white in cultivation), with tube longer than the rounded lobes and much longer than the linear calyx-lobes: placenta and seeds of preceding section. — *Whitlavia*, Harvey.

P. Whitlavia, Gray, l. c. About a foot high, loosely branching, hirsute and glandular: leaves ovate or deltoid, incisely toothed: corolla with cylindraceous ventricose tube usually an inch long, thrice the length of the lobes: appendages to the filaments hairy. — *Whitlavia grandiflora* (and *W. minor*), Harvey in Lond. Jour. Bot. v. 312, t. 11, 12; Bot. Mag. t. 4813. — S. California, *Coulter*, &c. Cultivated as an ornamental annual.

P. campanulária. Lower: leaves subcordate, less deeply dentate: tube of the truly campanulate corolla half inch long, expanded at throat, barely twice the length of the lobes: appendages to the filaments glabrous and smaller; otherwise much resembles the preceding, and almost as showy. — S. California, San Bernardino Co., *Parry* and *Lemmon*. San Diego Co., *Cleveland*.

* Corolla rotate-campanulate, deeply-lobed, hardly twice the length of the narrow calyx-lobes: racemes very loose: pedicels filiform, widely spreading: herbage hirsute or somewhat hispid and glandular.

P. Párryi, Torr. A span or two high, rather slender: leaves ovate, irregularly and incisely doubly toothed or lacinate, or the lowest sometimes pinnately parted; the upper cauline longer than their petioles: corolla cleft beyond the middle, deep violet, two-thirds inch in diameter: filaments bearded: ovules on each placenta 20 or 30 and seeds 15 to 20. — Bot. Mex. Bound. 144; Gray, l. c. — California, near Los Angeles and San Diego, *Parry*, *Cooper*, *Davidson*, &c.

P. longipes, Torr. Slender, loosely branched: cauline leaves roundish-oval or subcordate, coarsely and obtusely 5-8-toothed, about half inch long, all shorter than the petioles: corolla hardly half an inch long, apparently white, 5-cleft barely to the middle; ovules on each placenta 8 or 10, and the seeds fewer — Gray, l. c. — Santa Barbara Co, California, *Torrey*.

§ 6. **EÚTOCA**, Gray. Ovules and seeds several (6 to 12) or more numerous on each placenta; the testa areolate-reticulated or favose-pitted, but not transversely rugose: appendages of the mostly campanulate corolla in the form of 10 vertical salient lamellæ: capsule ovate or oblong. (Chiefly occidental, one or two boreal; habit very various, several distinguished from analogous *Euphaceliæ*, &c., only by the ovules and seeds.) — Man. ed. 2, 329. & Proc. Am. Acad. x. 322. *Eutoca*, R. Br., excl. spec. *Eutoca* § *Ortheutoca*. A.DC.

* Perennials, or annuals, with conspicuously (in *P. Bolanderi* and *P. Mohavensis* more slightly) exerted stamens and dense scorpioid inflorescence: appendages of the open-campanulate corolla conspicuous and usually broad, more or less oblique, at base united in pairs with or across the base of the filament, forming a kind of sac behind it.

+ Root annual: spikes solitary terminating the branches, or geminate: ovules only 4 to 9 on each placenta: anthers oval.

++ Low, a span or more high, diffusely branched, merely hirsute and with finer somewhat viscid pubescence: leaves from ovate-oblong to linear-lanceolate, entire or rarely 1-2-toothed or incised, tapering at base into a short petiole: appendages to the corolla elongated-oblong and adnate up to the truncate summit: capsule ovate, acute.

P. Mohavensis. Barely a span high: leaves lanceolate or the lowest linear-oblong (about an inch long): racemes at length an inch or two long and strict: short pedicels erect:

calyx-lobes spatulate-linear: glabrous filaments and 2-parted style (3 or 4 lines long) slightly surpassing the purple corolla: ovules only 4 or 5 to each placenta. — South-eastern California, on the Mohave River, May, 1876, *Palmer*. Habit somewhat of *P. Menziesii*, but lower, more diffuse, less hispid, and with different appendages to the corolla, this fully 4 lines long.

Var. exilis, a slender form, more erect: leaves and calyx-lobes all linear and slightly broader upward: corolla only 3 lines long: seeds as in the next species. — Bear Valley on the Mohave slope of the San Bernardino Mountains, California, *Parry & Lemmon*.

P. grisea, Gray. A span or two high, more cinereous with a sparse hirsute and a close finer pubescence, rather stout: leaves ovate or oblong: spikes more densely hirsute or even hispid, at length 4 to 6 inches long, densely flowered: calyx-lobes obovate-spatulate, little exceeding the capsule: corolla nearly white: filaments and 2-cleft style conspicuously exerted; the former minutely and sparsely retrorsely papillose or hirsute: ovules 5 or 6 to each placenta: seeds coarsely alveolate. — *Proc. Am. Acad.* xii. 80. — W. California, on Pine Mountain, back of San Simeon Bay, *Palmer*, 1876.

++ ++ Taller, setose-hispid: leaves pinnatifid and incised, petioled: appendages to the corolla large, free and pointed at apex.

P. loosæfólia, Torr. A foot high, somewhat viscid-pubescent as well as hispid with long and stiff spreading bristles: leaves ovate or oblong, rarely subcordate, more or less pinnatifid, and the lobes acutely toothed or incised: spikes geminate: corolla short-campanulate (3 lines long), little exceeding the linear-spatulate calyx-lobes; its internal appendages transverse and auriculate-incurved, with the free apex acuminate or cuspidate: naked filaments and 2-parted style conspicuously exerted: ovules 6 to 9 on each placenta: seeds angled, alveolate. — *Bot. Mex. Bound.* l. c.; Gray, *Proc. Am. Acad.* x. 323, & *Bot. Calif.* i. 509. *Eutoca loosæfolia*, Benth. l. c. — California, near Monterey, *Douglas, Parry*. Little known, in aspect between *P. malvæfolia* and *P. ramosissima*.

+ + Root probably perennial: scorpioid inflorescence at length open and geminate-racemose: ovules and seeds about 50 on each dilated placenta: stamens hardly surpassing the very open corolla: leaves conspicuously petioled, incised.

P. Bolánderi, Gray. Hispid with slender bristles, also viscid-pubescent, especially above: stem stout, erect, a foot or two high, freely branching: radical and lower cauline leaves lyrate and oblong in outline, with one or two pairs of small and incised lateral divisions; the terminal division and the short petioled upper leaves ovate or oval (2 or 3 inches long), coarsely incised or lobed, truncate or subcordate at base: corolla nearly rotate when expanded and almost an inch in diameter, white; its appendages semi-obovate, almost, as broad as long, distinctly connected at base in front of the adnate and sparingly bearded filaments: anthers oblong: style cleft nearly to the middle: capsule broadly ovate, acute, shorter than the lanceolate or at length spatulate lobes of the calyx. — *Proc. Am. Acad.* x. 322, & *Bot. Calif.* i. 509. — Cottonaby Creek, 20 miles north of Noyo, Mendocino Co., California, *Bolander*. Lowest leaves 4 inches long, exclusive of the petiole. Cymes once to thrice forked; the short racemes at length open: pedicels 1 or 2 or sometimes the lower 3 lines long. Calyx 3 or at length 4 lines long, decidedly shorter than the ample corolla.

+ + + Root perennial: spikes of the congested cyme once to thrice geminate or crowded at the summit of a terminal peduncle, short and densely-flowered: ovules and seeds rather few: appendages of the corolla very broad and obtuse: stamens and style conspicuously exerted: anthers linear or oblong: leaves all petioled, incisely lobed.

P. hydrophylloídes, Torr. A span or two high from slender subterranean shoots proceeding from a thickened stock or root, canescently pubescent, and above hirsute or hispid as well as glandular: leaves silky-pubescent both sides, slender-petioled, ovate or rhomboidal, an inch or two long, obtuse, incisely few-toothed or lobed, or sometimes the lowest lyrate, having one or two nearly detached small basal lobes or divisions: short spikes or racemes of the glomerate cyme not elongating: corolla violet-blue or whitish; its appendages semi-oval, united at base with that of the naked filament: anthers short-linear: style almost 2-parted: capsule about the length of the calyx, abruptly mucronate-pointed: seeds 6 to 8, angled. — Gray, *Proc. Am. Acad.* vii. 400, x. 323, & *Bot. Calif.* l. c. — Dry sandy or gravelly soil in the Sierra Nevada, California, at 5–9,000 feet, from Mariposa to Sierra Co., *Brewer, Bolander, Lemmon*, &c. Corolla 3 or 4 lines long: the appendages as in the following species, but hardly connected in front of the base of the filament.

P. prócera, Gray. Erect, 3 to 7 feet high, minutely soft-pubescent; the summit of the simple stem glandular, but even the calyx not hispid: leaves green and membranaceous, 2 to 5 inches long, ovate-lanceolate and ovate, acute, mostly laciniate-pinnatifid or cleft; the lobes 2 to 4 pairs and acute: spikes of the glomerate or bifid cyme somewhat lengthened with age: corolla white or bluish; the semi-obcordate oblique appendages united over the base of the sparsely bearded filament: anthers oblong: style 2-cleft above the middle: capsule globular-ovate, hardly mucronate: seeds 10-18, wing-angled. — Proc. Am. Acad. x. 323, & Bot. Calif. i. 509. — In mountain meadows of the Sierra Nevada, California, Nevada to Siskiyou Co., *Bolander, Lemmon, Greene*. Flowers at length very short pedicelled: corolla cleft to the middle.

* * Perennial, with long exserted stamens and spiciform-thyrsoïd inflorescence: appendages of the campanulate *marcescent-persistent* corolla conspicuous, oblong, vertical, wholly free from the filament: ovules moderately numerous.

P. sericea, Gray. A span to a foot high from a branching caudex, silky-pubescent or canescent, or the simple virgate stems and inflorescence villous-hirsute, rather leafy to the top: leaves pinnately parted into linear or narrow-oblong numerous and often again few-cleft or pinnatifid divisions, silky-canescenscent or sometimes greenish; the lower petioled; the uppermost simpler and nearly sessile: short spikes crowded in a naked spike-like thyrsum: corolla violet-blue or whitish, very open-campanulate, cleft to the middle: anthers short-oval: style 2-cleft at the apex: capsule ovate, short-acuminate, a little longer than the calyx and marcescent-persistent corolla, 12-18-seeded: seeds oval-oblong, terete, acutish, longitudinally costate and transversely alveolate, reticulated. — Am. Jour. Sci. ser. 2, (1862) xxxiv. 254, & Proc. l. c.; Watson, Bot. King, 252. *Eutoca sericea*, Graham; Hook. Bot. Mag. t. 3003; & Fl. ii. 79. *E. pusilla*, Lehm. Pugill. — Higher mountains of Colorado and Nevada, and north to British Columbia and the arctic region. Corolla 3, and stamens and style 7 to 10 lines long. Shallow alveolations of the seed in vertical rows.

Var. Lyálli, Gray. Low, less silky: leaves green and sparsely hirsute-pubescent, more simply pinnatifid; the lobes short and broad: inflorescence thyrsoïd-capitate. — Proc. Am. Acad. x. 323. — Rocky Mountains in lat. 49°, at 6-7,000 feet, *Lyall*, &c.

* * * Annuals, with stamens about the length of the rotate-campanulate corolla, and the densely-flowered spikes or spike-like racemes thyrsoïd-cymose or paniculate: appendages of the corolla long and narrow, free at apex, and at base free from the (glabrous or slightly hairy) filaments: anthers short: calyx-lobes linear: style 2-cleft at apex: capsule ovate, acuminate or acute.

P. Franklinii, Gray. A span to a foot or more high, soft-hirsute or pubescent: stem erect, simple or corymbose at summit: lower leaves petioled and pinnately or somewhat bipinnately divided or parted into numerous and short linear-oblong divisions or lobes, the upper sessile and less divided: spikes cymose-glomerate or crowded, little elongated in age: corolla pale blue or almost white: ovules 40 or more: capsule about the length of the calyx: seeds oval, minutely alveolate in vertical lines (nearly as in *P. sericea*, but the lines less conspicuous). — Man. ed. 2, 329, & ed. 3, 370. *Eutoca Franklinii*, R. Br. l. c. t. 27; Hook. Bot. Mag. t. 2985. — Shores of Lake Superior to Bear Lake, and on Snake River, southwestern Idaho.

P. Menziésii, Torr. A span to a foot high, at length paniculate-branched, hispid or roughish-hirsute, usually also minutely cinereous-pubescent: leaves mostly sessile, linear or lanceolate and entire, or some of them deeply cleft; the lobes few or single, linear or lanceolate, entire: spikes or spike-like racemes thyrsoïd-paniculate, at length elongated and erect: corolla bright violet or sometimes white: ovules 12 to 16: capsule shorter than the calyx: seeds oblong, coarsely favose-reticulated. — Watson, Bot. King, 252. *Hydrophyllum lineare*, Pursh, Fl. i. 134. *Eutoca Menziesii*, R. Br. l. c. t. 27, fig. 1-5; Hook. Fl. l. c. & Bot. Mag. t. 3762; Brit. Fl. Gard. ser. 2, t. 334. *E. multiflora*, Dougl. in Lehm. Pugill. & Bot. Reg. t. 1180. *E. heterophylla*, Torr. in Stansb. Rep. — Open soil, Montana to Utah, and west to British Columbia, Oregon, and the Sierra Nevada in California. Very floriferous and handsome: corolla half to three-fourths of an inch in diameter.

* * * * Annuals, with stamens shorter than (in *P. divaricata* sometimes equalling) the corolla, and spiciform or racemiform inflorescence.

+ Leaves pinnately compound, and seeds excavated and ridged on the ventral face, in the manner of *P. congesta*, *tanacetifolia*, &c.

P. infundibulifórmis, Torr. A foot or so high, villous-hirsute or somewhat hispid, viscid-glandular: leaves all petioled and pinnately divided; the divisions 5 to 11, oval or

oblong, incisely pinnatifid; the short lobes very obtuse or retuse, sometimes 1-2-lobed: spikes mostly cymose or geminate, elongated in fruit, dense; the pedicels very much shorter than the calyx: corolla pale purple or white, funnelliform; the rounded and somewhat erose lobes not half the length of the tube; its appendages narrow-oblong, free from the stamens: ovules 8 to 12 on each dilated placenta: style 2-cleft at the tip: capsule oblong, very obtuse or retuse, membranaceous, about the length of the narrow spatulate calyx-lobes: seeds (about 20) oval, reticulated. — Bot. Mex. Bound. 144. — New Mexico, near the Santa Rita copper mines, *Wright, Bigelow* (and south into Chihuahua, *Bigelow*). Habit of *P. congesta*, &c. Corolla nearly 3 lines long, narrow. Capsule 3 lines long.

— Leaves simply pinnatifid; the lobes short and obtuse.

++ Flowers crowded in at length elongated spikes: corolla small, white or nearly so.

P. brachýloba, Gray. A foot or two high, erect, roughish-pubescent, viscid-glandular above: leaves elongated-oblong or spatulate, short-petioled; the 7 to 15 lobes entire or obtusely few-toothed: spikes solitary or geminate, at length much elongated and slender: pedicels very short: corolla campanulate; the lobes about half the length of the tube; its long and narrow appendages nearly free from the stamens: ovules about 6 on each placenta: style 2-cleft above the middle: capsule oblong-oval, very obtuse, membranaceous, shorter than the narrow spatulate calyx-lobes: seeds oval, reticulated. — Proc. Am. Acad. x. 324, & Bot. Calif. l. c. *Eutoca brachyloba*, Benth. l. c. — California, near Monterey and Santa Barbara (*Douglas, Brewer, Torrey*), to San Diego Co. (*Cleveland*) and the Mohave region, *Palmer*.

++ ++ Flowers loosely racemose, long-pedicelled: corolla (blue or purple or varying to white) open-campanulate, twice the length of the calyx; the appendages elongated, nearly free from the base of the usually sparsely bearded filament: low and diffuse, a span or less high, with the leaves mostly at or near the base.

P. Douglásii, Torr. Diffuse, pubescent and hirsute with mostly spreading hairs: leaves elongated-oblong or linear in outline, pinnatifid or pinnately parted into several or numerous pairs of lobes; the terminal lobe not larger nor parallel-veined: racemes at length elongated: pedicels filiform, mostly longer than the flower: calyx-lobes spatulate: appendages to the tube of the ample corolla semi-oblancoate: style 2-cleft above the middle: ovules to each dilated placenta 12 to 14: capsule ovate, mucronate: seeds roundish-oval, scrobiculate. — Bot. Mex. Bound. 143; Gray, l. c. *Eutoca Douglasii*, Benth. l. c. — California, apparently rather common in the western part of the State south of Monterey. Habit somewhat of *Nemophila insignis*. Pedicels half an inch to an inch long, spreading. Corolla generally half an inch high, and proportionally broad when expanded.

P. Davidsonii, Gray. Resembles the preceding, but more hairy and hoary, the foliage with strigose, the racemes and calyx with villous-hirsute and spreading pubescence: leaves deeply pinnatifid into 2 to 4 triangular entire lateral lobes and a much larger oblong terminal one, the evident veins of which are nearly parallel with the midrib (in the manner of *P. humilis* and of the succeeding); some of the upper leaves occasionally entire: pedicels seldom longer than the fructiferous calyx, in age inclined to be recurved-ascending or sigmoid: calyx-lobes narrowly spatulate: appendages to the tube of the corolla semi-oval: ovules to each placenta 8 or 10. — Proc. Am. Acad. x. 324, & Bot. Calif. i. 510, a depauperate and small-flowered form. — California, in Kern Co., *Prof. Davidson*, the small form above mentioned. San Bernardino Co., a larger form, with flowers fully the size of *P. Douglasii*, and limb or lobes of the corolla bright purple, *Parry* and *Lemmon*.

— Leaves entire (or the lower rarely 1-2-lobed or toothed), petioled, not fleshy nor cordate, the veins somewhat parallel or converging: pubescence not glandular: flowers spicate-racemose: calyx hirsute or hispid with long spreading hairs: appendages of the tube of the corolla broader at base and united with the base of the (usually pubescent or sparsely bearded) filaments: capsule ovate, acute or mucronate, 6-16-seeded, much shorter than the linear or linear-spatulate enlarging calyx-lobes: seed with favose-pitted or scrobiculate testa.

++ Corolla narrow, somewhat funnelliform, little longer than the calyx, apparently pale or white, much exceeding the stamens.

P. circinatiformis, Gray, l. c. Erect, a span or so high, hispid and puberulent: leaves ovate and oblong-lanceolate, parallel-veined, somewhat strigose-hispid: racemes or spikes dense: style 2-cleft above the middle: ovules 4 (or rarely more) to each placenta. — *Eutoca phacelioides*, Benth. l. c. — California, *Douglas* (from whose collection only is the species yet known), probably from the vicinity of Monterey. Aspect of a small form of *P. circinata*. Corolla $2\frac{1}{2}$ to 3 lines long. Fruiting calyx 5 lines long.

++ ++ Corolla broadly open-campanulate, violet or blue, not rarely nearly equalled by the stamens and style.

P. cûrvipes, Torr. Diffuse, 2 to 4 inches high, hirsute and puberulent: leaves from oval to lanceolate, mostly shorter than the slender petiole: racemes simple, at length loose, the lower pedicels as long as the calyx: style cleft to the middle: ovules 8 or 10 to each placenta. — Watson, Bot. King, 252; Gray, l. c. — Foothills of the desert region, W. Nevada (Carson City, *Watson*), and Owens Valley, California, *Dr. Horn*. Habit of *P. humilis*. Blade of the leaf 6 to 10 lines long. Corolla barely 3 lines high. Hispid calyx in fruit becoming 4 and 5 lines long. Pedicels from a line to 5 lines long in fruit; the lowest sometimes sigmoid-curved (deflexed and then ascending); and petiole sometimes "more or less abruptly curved," whence the specific name, which ordinarily seems rather inappropriate.

P. divaricâta, Gray, l. c. Diffusely spreading, a span high, more or less hirsute and pubescent: leaves ovate or oblong, mostly longer than the petiole, occasionally 1-2-toothed or lobed at base, the veins curving upwards: spikes or racemes at length loose; the pedicels usually much shorter than the calyx: style 2-cleft at the apex: ovules 12 to 20 on each placenta (or rarely fewer?). — *Eutoca divaricata*, Benth. l. c.; Lindl. Bot. Reg. t. 1784; Hook. Bot. Mag. t. 3706. *E. Wrangeliana*, Fisch. & Meyer; Don, Brit. Fl. Gard. ser. 2, t. 362, a form (var. *Wrangeliana*, A.D.C.) with leaves inclined to be lobed or 1-2-toothed. — California, common about San Francisco Bay. Leaves 1 to 3 inches long. Flowers pretty large; the expanded corolla often three-fourths of an inch broad.

+ + + + Leaves entire or somewhat crenate-lobed or toothed, slender-petioled, the veins divergent or commonly obsolete: pubescence viscid or glandular: corolla narrow-campanulate or somewhat funnelform, the appendages of the tube linear or oblong and nearly free from the unequal glabrous filaments: style 2-cleft only at the apex. (Species peculiar to the interior desert region.)

++ Flowers and the very dense short spikes closely sessile: calyx equalling the narrow corolla: leaves thickish, spatulate-oblong.

P. cephalôtes, Gray, l. c. Divaricately branching from the very base, nearly prostrate, more or less viscid-pubescent and the calyx, &c., hispid-hirsute: leaves chiefly radical and at the bifurcations, apparently fleshy-coriaceous, nearly veinless, oblong or spatulate, entire (about half an inch long and tapering into the commonly longer petiole): sessile spikes or heads radical and in all the forks, at length oblong: calyx-lobes spatulate-linear, twice the length of the oval obtuse 8-10-seeded capsule: seeds with a lax cellular-reticulated pellicle. — *P. curvipes*, Parry in Am. Naturalist, ix. 16, not Torr. — Southern Utah, *Bishop, Mrs. Thompson, Parry*. Corolla 2 lines long, cylindraceous, white or yellowish, with the short limb blue or purplish; the internal appendages linear. Earliest spike radical, much shorter than the subtending leaves; the first internode of the prostrate branches 2 to 4 inches long.

++ ++ Flowers not so crowded, more or less racemose: calyx conspicuously shorter than the somewhat open-funnelform or campanulate corolla, a little longer than the obtuse capsule: leaves thickish, apparently fleshy-coriaceous, roundish or oval, the veins mostly obscure.

P. demissa, Gray, l. c. Diffusely branched from the base, less than a span high, viscid-puberulent or glabrate: leaves from orbicular to obscurely reniform or subcordate, entire or repand, half inch in diameter: flowers rather few and short-pedicelled in a sessile or very short-peduncled spike which is mostly shorter than the petioles and the internodes of the branches: corolla apparently white, barely 2 lines long, little exceeding the linear calyx-lobes; its short appendages narrowly oblong: capsule (2 lines long) short-oval, very obtuse, about 10-seeded: seeds oblong, proportionally large, alveolate-reticulated. — New Mexico, *Palmier*.

P. pulchêlla, Gray, l. c. Diffusely branched, barely a span high, merely viscid-puberulent: leaves roundish-ovate or obovate, entire or crenate-toothed, obtuse or acutish at base, half an inch or less in length: flowers numerous in the at length elongated paniced racemes: pedicels mostly shorter than the calyx: corolla deep purple (with a yellowish base), commonly thrice the length of the spatulate calyx-lobes: capsule narrowly oblong, very obtuse, about 30-seeded. — *P. crassifolia*, Parry in Am. Naturalist, l. c., not Torr. — Southern Utah, on gypseous clay knolls, *Parry*. A showy vernal species. Corolla 4 or 5 lines long, with an ampler limb than in the related species; the appendages conspicuous, semi-oval. Seeds not half the size of those of the preceding species, short-oval, pitted.

P. pusilla, Torr. Very small, not over 3 inches high, simple or loosely branching, glandular-pubescent: leaves broadly oval or oblong, entire, a quarter to half an inch long: flowers few in a loose raceme, on filiform pedicels: corolla white, not twice the length of the narrow linear or obscurely spatulate calyx-lobes: capsule narrow-oblong, obtuse and mucronulate, 18-24-seeded. — Watson, Bot. King, 253; Gray, l. c. — Western part of Nevada to the borders of California, "under sage-brush and junipers," Watson. Corolla hardly but capsule fully 2 lines long. Seeds somewhat pyriform, roughish-scribulate. Pedicels 1 to 5 lines long.

++ ++ ++ Flowers loosely racemose in fully developed inflorescence: calyx shorter than the campanulate corolla, rather longer than the short-pointed capsule: leaves round-cordate and crenately lobed or repand, obscurely palmately veined.

P. rotundifolia, Torr. Diffusely branched, 2 to 4 inches high, glandular-hirsute: leaves crenately 7-13-toothed or even lobed, mostly with a deep-cordate base (a quarter to a full inch long), usually much shorter than the petiole: pedicels shorter than the linear-spatulate calyx-lobes: corolla white: style obscurely 2-cleft at apex: capsule oval-oblong, abruptly pointed, 60-100-seeded. — Watson, Bot. King, 253; Gray, l. c. — S. E. borders of California, near Fort Mohave, to S. Utah and Arizona, Cooper, Palmer, Parry. Corolla 2 lines long. Capsule 2 lines long. Seeds globular, scribulate.

§ 7. MICROGÉNÈTES, Gray. Ovules and seeds of the preceding section; but the latter oblong and strongly corrugated transversely (vermiculiform!): style 2-cleft only at the apex: stamens unequal, included: corolla with internal appendages present or rarely wanting: low annuals, all W. American: leaves mostly pinnatifid. — Proc. Am. Acad. x. 326.

* Corolla short, almost rotate; the appendages 10 transverse plicæ in the throat, remote from the stamens! — § *Helminthospermum*, Torr. in herb.

P. micrantha, Torr. Slender, paniculately branched, a span or more high, minutely hirsute-glandular: leaves membranaceous, pinnately parted into 5 to 9 obovate or oblong very obtuse and mostly entire lobes; the lower with margined petiole, the upper with dilated and sometimes auriculate partly clasping base: racemes geminate or panicle, very loose: pedicels as long as the calyx: corolla (bright blue with a yellowish tube, or sometimes pale) little exceeding the obovate or spatulate and enlarging calyx-lobes: capsule globular, obtuse, 20-24-seeded. — Bot. Mex. Bound. 144; Gray, l. c., & Bot. Calif. i. 511. — New Mexico and Arizona, from the Rio Grande near El Paso to S. Utah, and the borders of California. Corolla barely 2 lines in diameter when expanded: no vertical appendages at the base of the stamens and on the intermediate veins, but a pair of completely transverse short and narrow folds high upon the short tube, stretching from the mid-vein of each lobe nearly to the lateral vein which springs from near its base. Style short, glabrous. Calyx in fruit 2 lines long. Seeds cylindraceous, incurved, very deeply rugose transversely and tuberculate.

* * Corolla funnelliform or cylindraceous; the appendages vertical, long and narrow, united more or less to the base of the filaments (in the Chilian *P. Cumingii* obsolete): style more or less hairy below in our species: seeds minutely reticulated as well as coarsely corrugated: leaves chiefly pinnatifid, and the petioles naked. — *Microgenetes*, A.DC. Prodr. ix. 292. *Phacelia* § *Euglyptis*, Watson, Bot. King, l. c.

+ Corolla white or pale purple, slightly longer than the little-dilated calyx-lobes, 2 or at most 3 lines long.

P. Ivesiana, Torr. About a span high, diffusely much branched from the base, hirsute-pubescent and glandular: leaves pinnately parted into 7 to 15 linear or oblong and entire or incisely few-toothed lobes, rarely bipinnatifid: racemes loose, 6-20-flowered: narrow appendages of the corolla adnate to the filament only at base: capsule oblong, 16-24-seeded. — Ives Colorad. Exped. Bot. 21; Watson, Bot. King, 254. — Utah, Nevada, and Arizona, from Salt Lake to the south-eastern borders of California. This species most resembles *P. Cumingii*, the *Microgenetes Cumingii*, A.DC. Narrow calyx-lobes becoming 3 or 4 lines long, and conspicuously surpassing the capsule. Seeds over half line long, strongly rough-corrugated.

+ + Corolla conspicuously longer than the calyx; the limb violet or blue-purple; the throat and tube yellow or whitish.

++ Leaves deeply once or twice pinnatifid: short fruiting pedicels erect: corolla half inch long: pubescence minute, more or less viscid.

P. Fremontii, Torr. l. c. A span to a foot high, much branched from the base: leaves once pinnatifid into 7 to 15 oblong or obovate entire or obtusely 2-3-lobed divisions: flowers crowded in the at length elongated spiciform raceme: corolla broadly funnelform, double the length of the spatulate calyx-lobes; the long and narrow appendages united below with the filament or almost free from it: capsule oblong: seeds 20 to 30, strongly and somewhat evenly corrugated. — Watson, Bot. King, 253; Gray, l. c. — S. Utah and Nevada to W. Arizona and Kern Co., California.

P. bicolor, Torr. Lower and more diffuse: leaves pinnately parted and the divisions again irregularly pinnatifid into small nearly linear lobes: spiciform racemes loosely 10-20-flowered: corolla narrowly funnelform (sometimes 7 lines long), thrice the length of the narrowly linear and obscurely spatulate calyx-lobes; the long and narrow appendages united for more than half their length with the filament, forming a long tubular cavity behind it: capsule oval-oblong: seeds about 16, shorter, minutely corrugated. — Watson, Bot. King, 255; Gray, l. c. — W. Nevada and adjacent parts of California in the Sierra Nevada, first collected by *Anderson*. The handsomest of the section.

++ ++ Leaves merely pinnatifid-dentate: corolla only 3 or 4 lines long.

P. gymnóclada, Torr. Diffusely branched from the base, a span or less high, somewhat viscid-pubescent; the primary branches decumbent and with long naked internodes: leaves obovate or oblong, obtuse, coarsely and obtusely toothed (an inch or less long), mostly shorter than the petiole: spike several-flowered: short-funnelform corolla (rarely white) not twice the length of the linear or obscurely spatulate-hirsute calyx-lobes; its appendages united with the lower part of the filament: capsule globose-ovate, 8-16-seeded. — Watson, l. c.; Gray, l. c. — W. Nevada and E. California, in the foothills of the Sierra Nevada and Humboldt Mountains, *Watson, Lemmon*.

P. crassifolia, Torr. Diffusely branched from the base, 3 or 4 inches high, viscid-pubescent: leaves somewhat fleshy, oblong-ovate, scabrous (3 to 6 lines long), tapering into a short petiole; the lower with a few short obtuse teeth; the cauline entire: racemes rather loosely few-flowered; the short pedicels spreading: funnelform corolla fully twice the length of the linear calyx-lobes; the obscure appendages free from all but the very base of the filament: capsule ovoid, 6-8-seeded. — Watson, Bot. King, 255. — Reese River Valley, Nevada, *Watson*. Seeds rather strongly rugose, oblong, half a line long.

6. EMMENÁNTHE, Benth. (From *ἐμμένω*, I abide, and *ἄνθος*, flower, the corolla persisting.) — Low annuals (of California and Nevada), with much the habit and general character of certain sections of *Phacelia*, but the yellow or cream-colored campanulate corolla persistent (not carried off by the enlarging capsule). — Gray, Proc. Am. Acad. x. 328, & Bot. Calif. i. 514.

§ 1. **MILTÍZIA, Gray.** Diffuse or depressed, and with the general characters of *Phacelia* § *Microgenetes*, except the persistent corolla: flowers small: calyx-lobes broader upward: seeds more or less rugose transversely or obliquely, as well as minutely reticulated. — *Miltizia*, A.D.C. Prodr. ix. 296.

* Corolla bright yellow, merely 5-lobed, exceeding or at least equalling the calyx both in blossom and fruit, withering-persistent and enclosing the capsule; the tube within mostly with 10 narrow appendages: style persistent: herbage pubescent.

E. parviflora, Gray. Depressed, densely pubescent and viscid: leaves deeply pinnatifid: flowers crowded in short spikes or racemes, on very short pedicels: corolla not longer than the linear obscurely spatulate calyx-lobes: style hardly longer than the ovary: ovules 20 to 40: seeds 15 to 20. — Pacif. R. Rep. vi. 85, t. 15. — Shores of Klamath Lake, borders of California and Oregon, *Newberry*. Specimen poor. Except for the greater number of ovules and the shorter style (which may be inconstant), this would be referred to the next.

E. lútea, Gray. Diffusely branched, decumbent-spreading, more minutely pubescent, somewhat viscid but hardly or slightly glandular: leaves oblong or obovate, incisedly few-lobed or toothed or pinnatifid: flowers rather crowded in short racemes; the lower pedicels often longer than the calyx: corolla exceeding the spatulate-linear calyx-lobes: style

filiform, much longer than the ovary: ovules about 12. — *Eutoca?* *lutea*, Hook. & Arn. Bot. Beech. 373; Hook. Ic. t. 354. *Miltitzia lutea*, A. DC. l. c. *Emmenanthe parviflora*, Watson, Bot. King, 257, not Gray. — S. E. borders of Oregon (*Tolmie*), and W. Nevada to the borders of California, *Anderson, Watson, Lemmon*. Corolla nearly 3 lines long: the linear appendages (like those of many *Phacelice*) plainly discernible in this and the preceding, but readily overlooked, slightly confluent below with the adnate base of the filaments. Hypogynous disk conspicuous, saucer-shaped, much larger and more free than in the preceding.

E. glandulifera, Torr. Very slender, 3 or 4 inches high, diffusely branched, minutely glandular-pubescent and viscid: leaves small (a quarter to half inch long), oblong or spatulate, incisedly few-toothed or the upper entire: flowers numerous in slender spikes or racemes, mostly on very short pedicels: corolla narrow-campanulate, exceeding the linear calyx-lobes: style filiform: ovules 6 to 12. — *Watson, Bot. King, l. c.* — W. borders of Nevada, *Anderson, Watson*. Corolla 2 lines long: the appendages not found. Probably a mere form of the preceding.

* * Corolla apparently nearly white, 5-cleft, short-campanulate, usually shorter than the calyx and capsule, investing the base of the latter at maturity, its internal appendages not manifest: leaves mostly entire: capsule 8-10-seeded.

E. glaberrima, Torr. Wholly glabrous and glandless, diffuse or decumbent, a span or less high, much branched: leaves thickish, somewhat succulent, oblong-spatulate or obovate, entire, or the lower incisedly 2-4-toothed (half an inch or more long), tapering into the petiole: flowers few or several, in short or at length elongated often geminate spikes or racemes; the short pedicels appressed: corolla not exceeding the spatulate or oblong thick calyx-lobes: style not longer than the wholly glabrous ovary: ovules 8 or 10: capsule pointed with the subulate indurated base of the style. — *Watson, Bot. King, l. c.* — Nevada, in the lower Humboldt and Reese River Valleys, *Watson*. Also N. Arizona, *Newberry*, being, according to *Watson*, the *Eutoca aretioides* of the botany of the Ives Expedition.

E. pusilla, Gray. Pubescent, an inch or two high, at length diffusely branched: leaves spatulate or oblong-lanceolate, entire or nearly so (2 to 5 inches long), tapering into a petiole of equal length: peduncles slender, loosely and racemously 3-7-flowered; the earliest ones scapiform: pedicels spreading: corolla about half the length of the linear obscurely spatulate calyx-lobes and of the ovoid very blunt capsule: style very short, at length deciduous. — *Proc. Am. Acad. xi. 87, & Bot. Calif. i. 515.* — North-western Nevada, *Watson, Lemmon*. Calyx in blossom one line, in fruit 2 lines long.

§ 2. EMMENANTHE proper. Erect, with comparatively large and very broad cream-colored corolla: divisions of the calyx ample and broader downward (ovate-lanceolate): style deciduous: placentæ conspicuously dilated in the axis: seeds somewhat rugosely alveolate-reticulated.

E. penduliflora, Benth. A span to a foot high, villous-pubescent and somewhat viscid: leaves pinnatifid into numerous short and somewhat toothed or incised lobes: racemes panicle, mostly short and loose, at base occasionally bracteate: pedicels filiform, as long as the at length pendulous flowers: filaments slightly adnate to the very base of the broadly campanulate corolla: ovules about 16. — *Linn. Trans. xvii. 281.* — California, not rare from Lake Co. to San Diego, and east to S. Utah. (South to Guadalupe Island.) Corolla 5 lines long, with short rounded lobes, and no trace of internal appendages. Seeds oblong-oval, a line long.

7. CONÁNTHUS, S. Watson. *Eutoca?* § *Conanthus*. A. DC. (Name not happily chosen, formed of *κωνος*, cone, and *ἄνθος*, flower, referring to the elongated *funnel* form corolla.) — A single species, which would be referred to *Nama* except for the united styles; the flowers apparently 2-3-morphous as to length and insertion of style and stamens.

C. aretioides, Watson. A small and depressed winter-annual, 2 or 3 inches high, repeatedly forked from the very base, forming a matted tuft, hirsute-hispid, copiously flowering through a long season: leaves spatulate-linear: flowers comparatively large and

conspicuous, sessile in the forks, fully half inch long: corolla purple, funnelform, with rather long narrow tube and ample limb: calyx-lobes filiform-linear, not widening upward, hispid with long spreading hairs: stamens unequally inserted: style 2-cleft at the apex, sometimes only slightly so: ovules about 20: seeds usually fewer; the testa thin and translucent, smooth, or in age obscurely and sparsely excavated. — Bot. King, 256; Gray, Proc. Am. Acad. x. 329, & Bot. Calif. i. 585. *Eutoca aretioides*, Hook. & Arn. Bot. Beech. 374; Hook. Ic. t. 355. *E.?* (*Conanthus*) *aretioides*, A. DC. Prodr. ix. 295. *Nama demissa*, Gray, Proc. Am. Acad. viii. 283, in part. — Through the dry interior region, from Oregon to Arizona along the eastern borders of California. Style and filaments sometimes long and sometimes short in different plants, but not reciprocally so.

8. **TRICÁRDIA**, Torr. (From *τρι-* three, and *καρδία*, heart, referring to the shape of the three larger sepals.) Sepals thin; the three exterior much enlarging after flowering, becoming somewhat scarious and finely reticulate-veiny. Corolla with the 10 narrow internal appendages free and rather distant from the filaments. — A single (Nevadan) species: —

T. Watsoni, Torr. Perennial herb, branched from the base; the ascending stems a span high, pubescent with long and soft cottony hairs, more or less glabrate with age: leaves all alternate, glabrate, entire; the radical and lower cauline spatulate-lanceolate, an inch or two long, and tapering into a conspicuous margined petiole; the upper much smaller, short-petioled or sessile and more oblong: flowers rather few, loosely racemose: short pedicels in fruit recurved: corolla purplish, about 3 lines wide, moderately 5-lobed: stamens and style included: larger sepals of the fruiting calyx becoming two-thirds of an inch long and wide, strongly cordate, much longer than the ovate pointed incompletely 2-celled capsule: ovules 4 to each placenta: "seeds a line long, oblong, slightly roughened." — Watson, Bot. King, 258, t. 24. — Western Nevada, at Truckee Pass, *Watson*. Rio Virgen, S. Utah, *Parry*.

9. **ROMANZÓFFIA**, Cham. (Dedicated to Count *Nicholas Romanzoff*, the promoter of Kotzebue's voyage, in which the original species was discovered.) — Low and delicate perennial herbs, with the aspect of Saxifrage; the leaves mainly radical, all alternate, round-cordate or reniform, crenately 7–11-lobed, long-petioled; the lobes glandular-mucronulate. Scapes or flowering stems a span or less in length, racemously or sometimes paniculately several-flowered; the pedicels filiform. Calyx-lobes oblong-linear or lanceolate. Corolla pale pink or purple, varying to white, delicately veiny. Ovary and retuse capsule 2-celled or nearly so: the placenta narrowly linear, many-seeded. Seeds oval: the testa alveolate-reticulated.

R. Unalaschkénsis, Cham. Loosely somewhat pubescent: rootstock not tuberiferous: scape erect, 3 to 5 inches high; the erect or ascending pedicels shorter than the flowers: calyx-lobes herbaceous, a little shorter than the very short-funnelform corolla and equalling or surpassing the capsule: style short. — Cham. in Hor. Phys. Berol. 71, t. 14; Chois. Hydrol. t. 3; Gray, Proc. Am. Acad. x. 330. *Saxifraga nutans*, Don. — Unalaska and adjacent islands, *Chamisso*, *Nelson*, *Harrington*, *Dall*, &c.

R. Sitchénsis, Bongard. Slightly and sparsely pubescent or glabrate: slender rootstocks tuberiferous: scapes filiform, weak, a span long; the spreading pedicels longer than the flowers: calyx-lobes very glabrous, much shorter than the funnelform corolla, and shorter than the capsule: style long and slender. — Veg. Sitk. 41, t. 4; Torr. in Pacif. R. Rep. iv. t. 25; Hook. Bot. Mag. t. 6109; Gray, l. c. — Sitka to the coast range of California, as far south as Redwoods occur, viz. to Monterey Co.

10. **HESPEROCHÍRON**, S. Watson. (*Hesperus*, evening, used for western, and *Chíron*, a Centaur distinguished for his knowledge of plants, i. e. Western Centaury, the plant having been supposed to belong to the Gentian

family). — Dwarf stemless perennials, or possibly biennials (W. N. American), soft-pubescent; with entire spatulate or oblong leaves, on mostly elongated margined petioles, crowning the caudex or rootstock; and from their axils sending forth naked one-flowered peduncles, equalling or shorter than the leaves. Parts of the flower occasionally in sixes or sevens. Corolla purplish or nearly white; the tube and the base of the subulate filaments more or less hairy or hirsute; the lobes often slightly unequal. Disk none. Base of the calyx obscurely adnate to the broad base of the conical-ovate ovary, which tapers into the rather stout style: stigmas minute. Ovary 1-celled; the narrow placentæ projecting more or less on incomplete half-dissepiments: ovules 20 or more to each placenta. Capsule loculicidal, 15–20-seeded. Seeds pretty large, with a somewhat fleshy minutely reticulated testa. — A genus of doubtful affinity, but most probably Hydrophyllaceous. — Watson, Bot. King, 281; Gray, Proc. Am. Acad. x. 330, & Bot. Calif. i. 516; Benth. & Hook. Gen. ii. 829.

H. Californicus, Watson. Leaves copious in a rosulate radical tuft: corolla somewhat oblong-campulate; the lobes shorter than the tube. — Bot. King, 281, t. 30. *Ourisia Californica*, Benth. Pl. Hartw. 327. *Hesperochiron latifolius*, Kellogg in Proc. Calif. Acad. v. 44, a large form. — Hills and meadows, Sierra Nevada, California, from the Yosemite northward to Washington Terr., and east to the mountains of Utah. — Leaves an inch or two long, besides the petiole, into which the blade abruptly contracts or gradually tapers. Corolla from nearly half to three-fourths of an inch long in the largest specimens; the lobes oblong. Here belongs *Nicotiana nana*, Lindl. Bot. Reg. t. 833.

H. pumilus, T. C. Porter. Leaves fewer, crowning the rather slender rootstock: corolla nearly rotate; its lobes longer than the tube, which is densely bearded within. — Hayden, Geol. Rep. 1872, 768; Gray, Proc. Am. Acad. x. 330. *Villarsia pumila*, Dougl.; Griseb. in Hook. Fl. ii. 70, t. 157. — Springy and marshy ground, mountains of Idaho to Oregon, Douglas, Geyer, Hayden, &c. Also Plumas Co., California, Mrs. Austin.

11. LEMMÓNIA, Gray. (Named after *John Gill Lemmon*, the discoverer, a most ardent and successful explorer of E. Californian and Nevadan botany.) — Proc. Am. Acad. xii. 162. Single species.

L. Californica, Gray, l. c. Small and depressed winter-annual, canescently pubescent, and the calyx white-villous: stem branched from the base, divergently and repeatedly dichotomous: leaves alternate, rosulate at base, and crowded at the summit of the branches; entire, spatulate and tapering into a short petiole, nearly veinless, 3 to 5 lines long: flowers sessile, solitary in the lower forks, cymose-glomerate at the leafy extremity of the branches: sepals very narrowly linear, not widening upward, in fruit 2 lines long and exceeding the short-oval retuse capsule: corolla apparently white, a line long, not surpassing the calyx, moderately 5-lobed: styles shorter or not longer than the ovary: placentæ or half-dissepiments narrow, adhering to the valves: seeds half a line long, somewhat rugose-foveolate in the manner of *Conanthus*. — Desert region of San Bernardino Co., California, about the sources of the Mohave River, May, 1876, *J. G. Lemmon*.

12. NÁMA, L. (*Nāua*, a stream or spring, in allusion to supposed place of growth of the original species.) — Chiefly low herbs, some few suffrutescent or woody-based (N. & S. American and one Hawaiian), of various habit; the corolla purple, bluish, or white; the stamens sometimes equally, oftener unequally adnate to the base or lower part of the tube. (Besides the following there are several species in the bordering parts of Mexico.) — Gray, Proc. Am. Acad. v. 337, viii. 282, x. 330, & Bot. Calif. i. 517, 621.

§ 1. Low annuals, merely pubescent or hairy: leaves entire: flowers terminal or lateral, or in the forks of the stem.

* Leaves decurrent on the stem.

N. Jamaicensē, L. Diffusely spreading or prostrate, soft-pubescent: leaves membranaceous (an inch or two long), broadly obovate or spatulate, tapering into a petiole-like base which is continued into wing-like margins of the stem: flowers mostly solitary, terminal and soon extra-axillary, short-pedicelled: corolla white, hardly longer than the narrow linear sepals: capsule narrow oblong. — Lam. Ill. t. 184; P. Browne, Jam. t. 18. — Low grounds, Texas, Florida. (W. Ind., Mexico.)

* * Leaves not decurrent.

⊕ Cauline leaves all sessile, the upper by a more or less clasping base: villous-pubescent and somewhat viscid: seeds very numerous.

N. undulātum, HBK. Erect, diffusely branched, at length procumbent, leafy: branches a span to a foot long: leaves oblong; the upper with a broad sessile base, the lower spatulate: flowers commonly subsessile: corolla funnelform, somewhat longer than the linear-spatulate sepals: capsule oblong, more or less shorter than the sepals: seeds oval, with a smooth and thin diaphanous coat, which is obscurely striate lengthwise and minutely pitted under a strong lens. — HBK. Nov. Gen. & Spec. ii. 130. (Mexico.)

Var. macránthum, Chois. (Hydrol. 18, t. 2, fig. 1); a looser and less leafy form, with flowers (solitary or 2 and 3 together) on pedicels which vary from 1 to 5 lines long: corolla (4 or 5 lines long) almost twice the length, and capsule only about half the length of the spatulate-tipped sepals. — Gray, Proc. Am. Acad. x. 330. *N. Berlandieri*, Gray, Proc. Am. Acad. viii. 282. — Texas, along the Rio Grande near its mouth, and on the Mexican side of the river.

N. stenocárpum, Gray. Like the preceding, or sometimes with narrower leaves: pedicels, if any, short and rigid in fruit: capsule cylindrical, nearly linear (3 lines long), nearly equalling the narrow linear sepals: seeds short, angled by mutual pressure, with a thickish and opaque strongly reticulated and somewhat alveolate coat (only a quarter of a line long). — Proc. Am. Acad. x. 331. *N. undulatum*, Gray, l. c. viii. 282, not HBK. — Texas near the mouth of the Rio Grande, *Berlandier*. Along the northern borders of Mexico to the province of Sonora on the borders of Arizona, *Palmer*.

⊕ ⊕ Leaves not at all clasping, more or less tapering at base, at least the lower petioled.

⊕⊕ Corolla narrow-funnelform, mostly much longer than the calyx: seeds oval, with a thin and diaphanous close coat: flowers subsessile or short-peduncled.

N. hispídum, Gray. A span to a foot high, repeatedly forked, hispid or hirsute: leaves broadly or narrowly linear-spatulate, most of the cauline ones sessile: flowers lateral and solitary, or 3 to 5 in terminal unilateral nearly bractless clusters: sepals narrowly linear, very little if at all broadened upwards: capsule narrowly oblong, 30–40-seeded: seeds smooth, very obscurely rugulose when highly magnified. — Proc. Am. Acad. v. 339, & Bot. Calif. i. 517. *N. Jamaicensis*, Engelm. & Gray, Pl. Lindh., not Linn. *N. dichotoma* & *N. biflora*, var. *spatulata*, partly, Torr. Bot. Mex. Bound. 147, &c. — Plains and prairies, Texas to Arizona, and south-eastern borders of California. The extreme western form, with softer pubescence, sometimes has 3 or 4 styles and placentæ.

N. demíssum, Gray. Dwarf, diffuse or depressed, 2 or 3 inches high, hirsute-pubescent, sometimes hispid: leaves linear-spatulate, all or most of them tapering into a petiole: flowers subsessile in the forks: sepals very narrowly linear, not at all broader upwards: capsule short-oblong, 10–16-seeded: seeds much larger than in the preceding (oval or oblong, a quarter to a third of a line long). — Proc. Am. Acad. viii. 283 (mainly); Watson, Bot. King. 259, 460; Gray, Bot. Calif. i. 517. — Interior desert region, Washington Terr. to Nevada, and Utah (form with corolla only 3 lines long); also S. Utah, Arizona, and the south-eastern borders of California; the latter forms with ampler purple or crimson corolla, 4, 5, or nearly 6 lines long. Filaments very unequally inserted, their adnate bases with somewhat free margins.

N. Coulteri, Gray. Diffusely branched from the base, ascending, a span high, hirsute-pubescent, somewhat viscid: leaves oblong-spatulate, the lower tapering into a petiole: flowers mostly in the forks and short-pedicelled: sepals with spatulate-dilated tips, not half the length of the narrow funnelform corolla: capsule narrowly oblong, 50–60-seeded: seeds short-oval, obscurely rugulose-pitted. — Proc. Am. Acad. viii. 283, & Bot. Calif. 517. — "California," *Coulter*. But probably from Arizona or the adjacent part of Mexico. Corolla 5 lines long.

++ ++ Corolla short-funnelform, hardly exceeding the calyx: seeds with a thickish opaque coat, coarsely pitted or sculptured.

N. dichotomum, Ruiz & Pav. A Mexican and South American species, with oval or oblong-lanceolate leaves.

Var. angustifolium, Gray. Erect, a span high, minutely pubescent, glandular: stem repeatedly forked and with a nearly sessile flower in each fork: leaves narrow, linear or nearly so (an inch or less long, a line or two wide): sepals narrowly linear and slightly broadened upwards: capsule oblong-oval (nearly glabrous): seeds oval-oblong, marked with about 5 longitudinal rows of large pits, from 4 to 6 in each row. — Proc. Am. Acad. viii. 284. — New Mexico, *Fendler, Wright*. Also Colorado, *Hayden, Rothrock, Brandegee*. Possibly a distinct species. Sometimes a weed of cultivated ground.

§ 2. Suffruticose and cespitose-procumbent, silky-woolly: leaves entire: flowers thyrsoïd-glomerate: ovary and styles hirsute.

N. Lobbii, Gray. Leaves linear or somewhat spatulate, tapering to the base, nearly sessile (an inch or two long), more or less persistent; the older with revolute margins and becoming glabrate; the younger white with the soft villous wool: flowers clustered in the upper axils and at the summit, nearly sessile: sepals subulate-linear, more than half the length of the narrow funnelform (purple) corolla. — Proc. Am. Acad. vi. 37, viii. 285, & Bot. Calif. 1. c. — Sierra Nevada, California, *Lobb, Kellogg, Mrs. Pulsifer-Ames, Lemmon, &c.* Forming dense and broad tufts, the older stems rigid and woody. Corolla half an inch long: the filaments unequally adnate high up. Fruit not seen.

§ 3. Perennial or woody-stemmed, erect, hirsute or hispid: leaves sessile, undulate or sinuate-dentate: flowers glomerate or spicate. (Approaching *Wigandia*, but with the narrowly funnelform corolla (also the capsule) of *Nama*.)

N. Rothrockii, Gray. A span or two high from an apparently deep perennial root, herbaceous, cinereous with a fine and somewhat viscid roughish pubescence, at least the inflorescence and calyx hispid with sharp spreading bristles: leaves lanceolate-oblong, almost pinnatifid; the pinnate veins running straight to near the sinuses between the strong teeth, there forking: flowers numerous in a capitate terminal cluster: sepals hardly dilated upward, half inch long, nearly equalling the corolla: ovary and capsule slightly hirsute: seeds rather few (almost a line long), oval, minutely reticulate-pitted. — Bot. Calif. i. 621; Rothrock in Wheeler Rep. t. 18. — Meadows on S. Kern River, California, *Rothrock*.

N. Parryi, Gray, l. c. Stem 6 feet high! below woody, over half inch in diameter and with a large brownish pith: leaves (as far as seen) linear, 2 or 3 inches long, 2 or 3 lines broad, villous-hirsute, numerous pinnate-veined, somewhat bullate; the margins revolute and undulate or repand: flowers unilateral and the fruit densely spicate on the few branches of the compact scorpioid cyme: sepals nearly filiform, little surpassing the oval capsule, barely 2 lines long: seeds oval (half line long), minutely reticulated. — S. E. California, on the Mohave slope of the San Bernardino Mountains (seen only in winter vestiges), *Parry*.

13. ERIODICTYON, Benth. (Formed of *ἐρίον*, wool, and *δίκτυον*, network, on account of the netted veins and woolliness of the under surface of the leaves.) — Low shrubs (California to New Mexico); with alternate pinnately veined and finely reticulated leaves, of firm or coriaceous texture, their margins mostly beset with rigid teeth, at base tapering into more or less of a petiole; the flowers scorpioid-cymose, forming a terminal usually naked thyrus. Sepals narrow, not enlarging upwards. Corolla violet or purple, or sometimes white. Filaments adnate variably and sometimes very extensively to the tube of the corolla, usually sparsely hirsute. Ovary nearly or completely 2-celled by the meeting of the dilated placenta in the axis. Capsule small (a line or two long), globose-ovate, pointed. — Benth. Bot. Sulph. 35; Gray, Proc. Am. Acad. x. 313, 331, & Bot. Calif. 1. c.

- E. tomentosum**, Benth. l. c. White-tomentose with a dense coat of short villous hairs, sometimes rusty-colored with age, 6 to 10 feet high: branches leafy to the top: leaves oblong or oval, rigid, obtuse (2 to 4 inches long): cymes at length broad: calyx densely and corolla slightly villous, the latter somewhat salverform and about twice the length of the former. — Torr. Mex. Bound. 148, &c. *E. crassifolium*, Benth. l. c., described from flowers with imperfect corollas. — Southern part of California, San Gabriel to San Diego and Tejon.
- E. glutinosum**, Benth. l. c. Glabrate, glutinous with a balsamic resin, 3 to 5 feet high: leaves lanceolate (3 to 6 inches long), irregularly more or less serrate, sometimes entire, whitened beneath between the reticulations by a minute and close tomentum, above glabrous: cymes in an elongated naked thyrus: corolla tubular-funnelform (half an inch long), thrice the length of the slightly and sparsely hirsute calyx. — *Wigandia Californica*, Hook. & Arn. Bot. Beech. 364, t. 88. — Dry hills, rather common in California. Infusion of the leaves in spirit used as a tonic, under the name of Yerba Santa.
- E. angustifolium**, Nutt. Glabrate and glutinous: leaves narrowly linear or narrowly lanceolate, rigid, and the margins at length revolute: corolla 2 or 3 lines long, short-funnelform or approaching campanulate: otherwise nearly as in the preceding. — Pl. Gamb. 181. *E. glutinosum*, var. *angustifolium*, Torr. l. c. — S. Nevada, Arizona, and adjacent parts of New Mexico. Leaves $1\frac{1}{2}$ to 4 inches long, 1 to 3 lines wide.

14. **HYDRÓLEA**, L. (Ἵδωρ, water, the plants inhabiting wet places.) — Herbs, or rarely suffruticose plants (widely diffused in warm climates); with ovate or lanceolate pinnately veined entire leaves, numerous on the stems, often with a spine in the axils, and clustered blue or rarely white flowers. Sepals distinct to the base. Corolla rotate or very open campanulate, 5-cleft. Stamens about the length of the corolla: filaments dilated at the insertion. Capsule globular; the fleshy or spongy placenta very large. Seeds minute, generally striate-ribbed. Styles and placenta occasionally varying to 3. — Ours appear to be perennials, flowering through the summer.

H. corymbosa, Ell. Spineless or nearly so: stem slender, a foot or two high, above minutely pubescent: leaves lanceolate, nearly sessile (an inch or so long), glabrous: flowers in a terminal corymbose cyme: sepals linear-lanceolate, villous-hispid; shorter than the corolla: filaments and styles long and filiform. — Sk. i. 336; A. W. Bennett in Jour. Linn. Soc. xi. 275. — Pine-barren ponds, S. Carolina to Florida. Expanded corolla two-thirds of an inch in diameter.

H. affinis, Gray. More or less spiny, glabrous throughout or nearly so: stems ascending: leaves lanceolate, somewhat petioled (2 to 5 inches long): flowers in short axillary leafy-bracted clusters: sepals ovate, equalling the corolla: styles shorter than the capsule. — Man. ed. 5, p. 370. *H. leptocaulis*, Featherman, Louisiana Univ. Rep. 1871. — S. Illinois to Texas. Often confounded with the next.

H. Caroliniána, Michx. More or less spiny, sparsely villous-hispid or the leaves nearly glabrous: stem ascending: leaves lanceolate, short-petioled (3 or 4 inches long): flowers in short axillary clusters, or solitary in the upper axils: sepals linear or linear-lanceolate, about the length of the corolla: styles shorter than the capsule. — Fl. i. 177. *H. quadrivalvis*, Walt. Car. 110, an older but false and deceptive name. *H. paniculata*, Raf. Neobot. 64. — N. Carolina to Florida and Louisiana? (S. Amer.?)

H. ováta, Nutt. Spiny, minutely soft-pubescent and above slightly hirsute: stems a foot or two high, paniculately branched at summit: leaves ovate, sometimes ovate-lanceolate (8 to 20 lines long): flowers clustered at the end of the branches: sepals lanceolate, very villous-hirsute, shorter than the corolla; this an inch broad when expanded: filaments and especially the styles long and filiform. — Fl. Arkans. in Trans. Am. Phil. Soc. ser. 2, v. 196; Choisy. Hydrol. t. 1; A. W. Bennett, l. c. 270. *H. ovatifolia*, Raf. Neobot. (1836), 64. *H. Ludoviciana*, Featherman, l. c. — Margin of ponds, Arkansas, W. Louisiana, and Texas. (S. Amer.)

ORDER XCIII. BORRAGINACEÆ.

Mostly scabrous or hispid-hairy plants, with watery juice, entire and alternate (or partly opposite) leaves, no stipules, prevalently scorpioid inflorescence, and regular flowers (in *Echium* the corolla, &c., irregular), the 5 or sometimes 4 stamens on the tube or throat of the corolla, as many as and alternate with its lobes, a single style rising between the divisions of a deeply 4-parted ovary, or from the summit of an undivided one, the cells or lobes of which contain a solitary ovule, the seed with little or no albumen, the embryo straight or rarely curved, its radicle superior or centripetal. Flowers perfect, generally 5-merous. Calyx and corolla free; the lobes of the latter imbricated, convolute, or sometimes plicate or induplicate in the bud. Hypogynous disk usually present, but inconspicuous. Pistil of 2 biovulate carpels, although seemingly of 4 and uniovulate. Ovule anatropous or amphitropous. Fruit of 4 nutlets (or by abortion fewer), or a drupe containing 2 to 4 nutlets or cells, rarely reduced to one. — Some of the first great division have serrate and even incised leaves, and are trees or shrubs, of tropical or subtropical regions: these well distinguished from related orders by the superior radicle. The true *Borraginaceæ* are almost all herbs, mainly of temperate climates, with undivided style and even stigma, surrounded at base by the four distinct divisions of the ovary. Inflorescence and its nomenclature as in the preceding order.

I. Ovary undivided (or only laterally 4-lobed) and surmounted by the style.

TRIBE I. CORDIÆ. Style twice bifid: stigmas terminal, not annular. Fruit drupaceous. Cotyledons longitudinally plicate or corrugated. Trees or shrubs, with leaves sometimes deptate.

1. **CORDIA.** Calyx tubular or campanulate, merely toothed or lobed. Corolla funnel-form or salverform; the lobes and stamens sometimes more than 5. Stigmas clavate or capitate. Ovary and drupe 4-celled, 4-seeded, or fewer by the abortion of some of the cells and seeds of the hard stone.

TRIBE II. EHRETIEÆ. Style once bifid or 2-parted (the divisions sometimes coalescent to the top): stigmas more or less capitate. Cotyledons plane. Trees, shrubs, or low herbs.

* Fruit drupaceous: ovules mostly amphitropous: trees or shrubs.

2. **BOURRERIA.** Calyx globular or ovoid, closed in the bud, valvately splitting at the summit into 2 to 5 teeth. Corolla campanulate or short-funnel-form. Drupe containing 4 more or less separable one-seeded nutlets.
3. **EHRETIA.** Calyx 5-parted or 5-cleft, imbricated or open in the bud. Corolla from short-funnel-form to rotate. Drupe usually containing 2 two-celled two-seeded nutlets.

* * Fruit dry: ovules anatropous, pendulous: herbaceous or suffruticulose plants.

4. **COLDENIA.** Calyx 5-parted, or in original species 4-parted; the divisions narrow. Corolla short-funnel-form or nearly salverform, seldom much surpassing the calyx; the lobes rounded, imbricated or sometimes partly convolute in the bud. Stamens included. Style 2-cleft or 2-parted. Ovary entire or laterally 4-lobed, 4-celled. Fruit separating at maturity into 4 one-seeded nutlets, or by abortion fewer, or in one species by suppression one-celled and one-seeded. Cotyledons thickish. Albumen none.

TRIBE III. HELIOTROPIÆ. Style entire, sometimes wanting: stigma peltate-annular, forming a complete ring, surmounted usually by an entire or 2-lobed (from hemispherical to subulate) tip or appendage. Ovules pendulous. Seeds with a straight or incurved embryo, in sparing or copious albumen. Leaves entire, rarely denticulate. Inflorescence more or less scorpioid.

5. **TOURNEFORTIA.** Fruit drupaceous. Shrubs or woody twiners, or rarely almost herbaceous. Otherwise nearly as *Heliotropium*.
6. **HELIOTROPIUM.** Calyx deeply 5-parted, persistent. Corolla salverform or funnel-form, plaited and mostly imbricated in the bud. Stamens included: filaments short or none: anthers connivent, sometimes cohering by pointed tips. Ovary 4-celled, 4-ovuled. Fruit dry, 2- or 4-lobed, separating into 2 indurated 2-celled and 2-seeded closed carpels, or more commonly into 4 one-seeded nutlets. Seed sometimes with rather copious albumen, and, with the embryo, curved.—Low herbs or undershrubs; the flowers almost always small.

II. Ovary 4-parted (rarely 2-parted) from above into one-celled one-ovuled divisions surrounding the base of the undivided (rarely 2-lobed) style: stigma not annular, terminal.

TRIBE IV. BORRAGEÆ. Style entire, in *Echium* 2-cleft at the apex: stigma truncate or depressed-capitate, in a few species of *Lithospermum* tipped with a rudimentary terminal appendage. Ovules amphitropous or almost orthotropous and commonly ascending or erect, or when anatropous mostly pendulous. Nutlets 4 (or by abortion fewer), distinct, or sometimes at base united in pairs. Radicle superior or centripetal. Albumen none. Chiefly herbs, with somewhat mucilaginous watery juice and entire leaves. Flowers mostly near, but not in the axil of leaves or bracts, or bractless in scorpioid so-called spikes or racemes. Æstivation of the corolla imbricated, except when otherwise indicated. (The depressed or elevated disk, receptacle, or axis on which the nutlets are inserted, and from which they fall away, is called the gynobase.)

* Corolla and stamens regular: style entire, or sometimes barely 2-cleft at the very apex.

+ Ovary only 2-parted: fruit involved in a bur-like transformed portion of the calyx.

7. **HARPAGONELLA.** Calyx at first slightly but in fruit exceedingly unequal; three of the lobes nearly distinct; the remaining two more united, closely enwrapping the fruit, and becoming cornute with 7 to 9 divergent long and uncinately glochidiate soft-spinous processes, forming a bur. Ovule erect, anatropous. Nutlets one or sometimes both maturing, obovoid-oblong, thin-coriaceous, very smooth, obliquely fixed by the narrowed base to the small depressed gynobase. Seed filling and conformed to the nutlet, erect or ascending. Radicle directed to the gynobase. Corolla, stamens, style, &c., as in *Pectocarya*.

+ + Ovary 4-parted or 4-lobed: fruit of 4 nutlets, or by abortion fewer, subtended or surrounded by the unchanged or merely accrescent calyx.

++ Nutlets divergent or divaricate (either radiately or in pairs), outwardly or backwardly extended much beyond the insertion (which is by a roundish or oblong arcola or scar): seed accordingly horizontal or obliquely ascending, with radicle centripetal: but the anatropous ovule (and ovary-lobes) in flower erect or ascending. (Calyx deeply 5-cleft or parted, spreading or reflexed in fruit: corolla appendaged with strong fornicate processes almost closing the throat: stamens short, included.)

8. **PECTOCARYA.** Nutlets flat and thin (depressed-obcompressed), attached at the inner end underneath to the small depressed gynobase, either winged, laciniate-bordered, or pectinately setose around the thin margin; the bristles or prickles simply uncinately at tip. Style short: stigma capitate. Annuals, with minute white flowers imperfectly opposite the leaves.

9. **CYNOGLOSSUM.** Nutlets equally divergent, horizontal or obliquely ascending on a depressed or pyramidal gynobase, turgid, wingless, all over glochidiate-muricate, mostly separating (by an ovate or roundish scar at the upper end of the inner face) and carrying away an exterior portion of the indurated style from below upward, by which they are for a time pendulous. Stigma small, on a comparatively long style. Perennials or biennials, with flowers in usually bractless racemes.

++ ++ Nutlets erect and parallel with the style, or sometimes incurved,

= Obliquely attached by more or less of the ventral face or angle, or by the base or prolongation of it, to

- a. The more or less elevated (from low-conical or globular to subulate) gynobase which supports the style (and when narrow has been termed the base of the style), not stipitate, and the scar not excavated.

10. **ECHINOSPERMUM.** Nutlets armed (either along a distinct margin or more or less over the whole back) with glochidiate prickles, forming burs. Calyx 5-parted, reflexed or open in fruit. Corolla short-salverform or somewhat funnellform, white or blue; the throat closed with prominent fornicate appendages.
11. **ERITRICHIMUM.** Nutlets unarmed or rarely with a row of (non-glochidiate) prickles around the back, very rarely wing-bordered. Calyx 5-parted or deeply cleft, closed or not spreading in fruit (rarely circumscissile-deciduous). Corolla with or occasionally without fornicate appendages at the throat, white or blue, in one species yellow!
12. **AMSINCKIA.** Nutlets crustaceous or coriaceous, unappendaged, triquetrous or ovate-triangular, attached below the middle to an oblong-pyramidal gynobase. Corolla salverform or tubular-funnelform, with a slender tube and open throat; the limb sometimes plicate at the sinuses, yellow. Style filiform: stigma capitate or 2-parted. Cotyledons each 2-parted.
 - b. Nutlets conspicuously stipitate, and the stipe more or less hollowed at the insertion upon the broadly pyramidal or globular gynobase.
 13. **ECHIDIOCARYA.** Calyx 5-parted, lax in fruit. Corolla between short-salverform and rotate, slightly constricted at the more or less appendaged throat; the tube not exceeding the calyx, shorter than the roundish lobes. Filaments very short, inserted on the middle of the tube: anthers oblong, included. Style short: stigma capitate. Nutlets ovate-trigonous, oblique, acutely cristulate-muricate or rugose, dorsally and ventrally carinate, incurved-ascending on a stout stipe; the stipes either united in pairs or distinct. Leaves all alternate. Flowers white.
 - c. Nutlets sessile or obscurely stipitate on a flat or merely convex receptacle.
 14. **ANTIPHYTUM.** Corolla (short), &c., of *Eritrichium*. Nutlets crustaceous, ovate, rounded on the back and granulate or rugulose, carinate ventrally down to the flat roundish scar close to the base, which is either slightly protuberant and rather large, or smaller and somewhat stipitate: gynobase plane or barely umbonate by the base of the style. Flowers racemose, white, mostly bracteate. Leaves commonly opposite!
 15. **MERTENSIA.** Corolla from tubular-funnelform or trumpet-shaped to almost campanulate, with open throat, bearing obvious or obsolete transverse folds for crests. Stamens with either flattened or nearly filiform filaments. Style filiform: stigma entire. Nutlets from somewhat fleshy to coriaceous-membranaceous, attached by a small or short scar just above the base to a barely or sometimes strongly convex gynobase. Perennials, often smooth and glabrous, with blue or rarely white flowers, mostly bractless.

== Nutlets sessile and directly (usually centrally) attached by the very base to a plane gynobase;

 - a. The flat scar not excavated or perforate and bordered with a ring, mostly small.
 16. **MYOSOTIS.** Corolla short-salverform or almost rotate; its throat contracted by transverse crests; the rounded lobes convolute in the bud! Anthers ovate or oblong. Nutlets small, ovoid, smooth and shining, thin-crustaceous; the scar small. Racemes mainly ebracteate.
 17. **LITHOSPERMUM.** Corolla salverform, funnellform, or sometimes approaching campanulate, either naked or with pubescent lines or intruded gibbosities or low transverse crests at the throat. Filaments mostly very short: anthers short, included. Style slender: stigma mostly truncate-capitate or 2-lobed. Nutlets ovoid, bony, either polished and white or dull and rough. Flowers all subtended by leaves or bracts.
 18. **ONOSMODIUM.** Corolla tubular or oblong-funnelform, with open and wholly unappendaged throat; the lobes erect or hardly spreading, mostly triangular and acute; the sinuses more or less inflexed. Stamens not surpassing the corolla-lobes: filaments flat or dilated: anthers oblong-linear or sagittate, erect (sometimes in Mexican species becoming transverse). Style filiform or capillary, very long: stigma small and truncate, exerted before the corolla opens. Nutlets ovoid or globular, bony, smooth and polished, white. Flowers all subtended by leafy bracts.
 - b. The scar large and excavated, bordered by a prominent margin. (Old World plants.)
 19. **SYMPHYTUM.** Corolla oblong-tubular, ventricose above the insertion of the stamens, or with campanulate-dilated limb, and with 5 short nearly erect lobes or teeth; the throat closed by 5 prominent lanceolate or linear papillose-margined scale-like appendages. Anthers lanceolate, more or less included. Style filiform: stigma small. Nutlets obliquely ovoid, crustaceous or coriaceous, the cartilaginous prominent ring denticulate at the edge.

* * Corolla irregular with limb oblique and lobes unequal. (Old World genera.)
 20. **LYCOPSIS.** Corolla somewhat salverform; the tube curved at the middle; the more or less spreading lobes rather unequal; the oblique throat closed with hispid for-

nicate scales. Stamens and style included: stigma 2-lobed. Nutlets ovoid, oblique, coriaceous, coarsely reticulate-rugose, erect, almost laterally attached to a thickened protuberant gynobase; the scar large, oval, excavated or perforate, bordered by a thickened cartilaginous ring.

21. **ECHIUM**. Corolla funnelform, with dilated throat oblique and not at all appendaged; the lobes unequal, roundish, erect or slightly spreading. Stamens unequal and exserted: filaments filiform. Style long and filiform, 2-cleft at apex: stigmas small. Nutlets cartilaginous, rough or rugose, ovoid, acute, erect, fixed to the flat gynobase by a plane and marginless scar.

BORRÁGO OFFICINÁLIS, L. (BORAGE), with very rotate blue corolla, is a not uncommon annual in country gardens, but does not run wild. **OMPHALODES LINIFOLIA**, Mönch, of S. Europe, is given in Hooker's *Flora Boreali-Americana*, on the strength of a specimen received from Newfoundland, to which it cannot be native, and the plant is rare in gardens, in which *O. VERNA* is a hardy perennial, but it does not escape.

1. **CÓRDIA**, Plumier, L. (*Valerius Cordus*, a German botanist of the 16th century.) — Tropical or subtropical trees or shrubs, the greater portion American. — Benth. & Hook. Gen. ii. 838.

§ 1. Corolla large, an inch or two long, funnelform, deciduous; the tube longer than the cylindraceous calyx; its lobes and the stamens 5 to 12: drupe enclosed in the enlarged calyx: inflorescence open-cymose. — § *Sebestenoides*, DC.

C. Sebesténa, L. Tall shrub or small tree, scabrous-pubescent or smoothish: leaves ovate (4 to 8 inches long): flowers pedicelled: calyx not striate; the teeth irregular and obtuse: corolla varying from orange to flame-color, 5-8-lobed. — Bot. Rep. t. 157. *C. speciosa*, Willd., DC. — Keys of Florida. (W. Indies, &c.)

C. Boissiéri, A.DC. Soft-tomentose: leaves oval or oblong-ovate, when old minutely rugose and somewhat scabrous above: calyx not pedicelled, somewhat campanulate and striate; the teeth often acute: corolla white with a yellow centre, 5-lobed, externally downy. — DC. Prodr. xi. 478; Torr. Bot. Mex. Bound. 135. — Southern frontier of Texas and New Mexico, *Berlandier*, *Gregg*, *Schott*, &c. (Mex.)

§ 2. Corolla small or proportionally large, salverform or funnelform, deciduous: calyx short, not sulcate-striate; its lobes and those of the corolla as well as stamens no more than 5, sometimes 4: flowers in our species capitate-glomerate, and the leaves serrate! — § *Myxa*, Endl.

C. globósa, HBK. Shrub hirsute or somewhat hoary: branches slender, spreading: leaves oblong-ovate, obtusely serrate (an inch or two long), the pinnate veins rather conspicuous and the upper surface often rugose: peduncle mostly short: calyx-teeth nearly filiform, longer than the tube: corolla funnelform, white (2 to 4 lines long), about twice the length of the calyx. — Nov. Gen. & Spec. iii. 76. *Varronia globosa*, L., & *V. bullata* in part. *Cordia bullata*, DC. Prodr. ix. 496; Chapm. Fl. 329. — Keys of Florida, *Blodgett*, &c. (W. Ind. to Isthmus.)

C. podocéphala, Torr. A foot or two high, woody only at base, minutely strigose-hirsute, scabrous: branches slender, erect: leaves varying from ovate-lanceolate to linear-lanceolate, narrowed at the base into a short petiole, coarsely serrate (an inch or two long): peduncles filiform, 2 to 4 inches long, bearing a small and very dense head: calyx-teeth triangular-subulate or ovate, very much shorter than the tube: corolla broadly funnelform, white or pale purple (half inch or more long), its narrow tube hardly exceeding the calyx. — Bot. Mex. Bound. 135. — Lower Rio Grande, Texas to the borders of New Mexico, *Wright*, *Bigelow*, *Schott*, &c. (Adjacent Mex.)

C. GRÉGGII, Torr. l. c., which is hardly of this section, is a Mexican species, found only at a considerable distance from our frontiers.

2. **BOURRÉRIA**, P. Browne. (Named after one *Bourrer*, a Nuremberg apothecary, not *Beurrer*, therefore the orthography *Beurreria*, Jacquin and others, is not to prevail over the original form.) — Tropical American trees and shrubs;

with white flowers in open terminal cymes. Lobes of the style not rarely coalescent even to the stigma. — Benth. & Hook. Gen. Pl. ii. 840, excl. syn. *Hymenesthes*, Miers, which is a *Cordia*. *Bourreria* & *Crematomia*, Miers, Bot. Contrib. ii. 230, 242.

B. Havanensis, Miers. Shrub or small tree, glabrous or nearly so: leaves mostly obovate-oblong and acute at base (about 2 inches in length), bright green and shining above, coriaceous, entire: cyme loose: calyx at length campanulate, glabrous or puberulent, a little shorter than the tube of the corolla: style cleft only at the apex, or even quite entire: drupe as large as a pea, orange. — Bot. Contrib. ii. 238, t. 36 (*Ehretia Havanensis*, Willd.), with *B. recurva* & *B. ovata*, Miers, l. c. *B. tomentosa*, var. *Havanensis*, Griseb. (*Ehretia tomentosa*, Lam.), is probably a pubescent form of the same species. *Pittonia similis*, Catesb. Car. ii. t. 79. *Ehretia Beurreria*, Chapm. Fl. 329, not L. (the *B. succulenta*, Jacq.). — Keys of Florida, *Blodgett*, &c., a glabrous and smooth form. (W. Ind.)

Var. rádula. Upper face of the leaves tuberculate-scabrous or hispidulous from papillosties, the lower and the branchlets either glabrous or minutely pubescent. — *B. radula*, Don, Syst. iv. 390; Chapm. l. c.; Miers, l. c. *B. virgata*, Griseb., not Swartz, ex Miers. *Ehretia radula*, Poir., ex Miers. — Keys of Florida, *Blodgett*, *Palmer*, &c. (W. Ind.)

3. EHRÉTIA, L. (*George Dionysius Ehret*, a gifted botanical painter of the 18th century.) — Trees or shrubs, chiefly tropical; with small white flowers in open cymes or panicles, or rarely almost solitary. — Benth. & Hook. l. c.

E. elliptica, DC. Tree 15 to 50 feet high: leaves oval or oblong, sometimes serrate, nearly smooth and glabrous or (with the branchlets and open cymes) minutely hirsute-pubescent and the upper face very scabrous: divisions of the calyx broadly lanceolate, acuminate, as long as the campanulate tube of the corolla: drupes yellow, globose, of the size of small peas (the thin pulp edible). — Prodr. ix. 503; Torr. Mex. Bound. 136; Miers, Contrib. ii. 228, t. 85. — River-bottoms South-western Texas, *Berlandier*, *Lindheimer*, &c. (Adjacent Mex.)

4. COLDÉNIA, L. (*Dr. Cadwallader Colden*, Colonial Lieut.-Governor of New York, a correspondent of Linnæus.) — Low herbaceous or suffrutescent plants, canescent or hispid; with small and mostly white flowers sessile and usually in clusters; the original species a prostrate annual, with usually 4-merous flowers and coarsely toothed leaves, the strong simple veins of which run to the sinuses. (Lam. Ill. t. 89; Gærtn. Fruct. t. 68, embryo wrongly figured.) Genus extended by the addition of several North and W. South American species, diverse in habit and minor characters, which might well form more than half as many subgenera as there are species, but may be ranked under three. (Insertion of stamens probably both high and low in the same species.) — Gray, Proc. Am. Acad. v. 340, viii. 292, x. 48, & Bot. Calif. i. 520; Benth. & Hook. Gen. ii. 841.

§ 1. **EUCOLDENIA**, Benth. Fruit merely 4-sulcate; the nutlets with plane contiguous sides and thick crustaceous walls, or in one species reduced by abortion to a single cell: corolla not appendaged within: stamens equally inserted: veins of the leaves straight and simple. — *Stegnocarpus* & *Ptilocalyx*, Torr.

C. canescens, DC. Prostrate or procumbent, with somewhat ligneous perennial base, white-sericeous or tomentose: leaves (barely half inch long) ovate or oblong, entire, petioled, obscurely veined: flowers solitary or in small clusters at the axils or forks: calyx-lobes linear-lanceolate: fruit depressed-globose; the four thick-walled nutlets smooth and rounded on the back, obscurely rugose on the plane sides, pointless: embryo slightly curved. — Prodr. ix. 559 (§ *Stegnocarpus*); Gray, l. c. *Stegnocarpus canescens*, Torr. Pacif. R. Rep. ii. 169, t. 7. — S. Texas to Arizona, *Berlandier*, *Wright*, &c. (Adjacent Mex.)

C. Gréggii, Gray. Suffrutescent, a foot or two high, tomentose-canescens: leaves ovate or oval (2 to 4 lines long), short-petioled, almost veinless, entire, the margins revolute: flowers capitate-glomerate at the summit of the branches: calyx-lobes filiform from a broader base, elongated-plumose with long villous hairs: ovary obscurely 4-lobed; but the fruit even, ovate-oblong, by abortion 1-celled and 1-seeded, the walls comparatively thin, showing mere vestiges of three abortive cells: embryo straight. — *Ptilocalyx Greggii*, Torr. l. c. 170, t. 8. — Rocky ravines, New Mexico, and south-western borders of Texas, *Gregg, Wright, &c.* (Adjacent Mex.)

§ 2. **ÉDDYA, Gray.** Fruit deeply 4-lobed; the mature nutlets rounded and only ventrally united, thin-walled but crustaceous, rough-granulate: corolla not appendaged: stamens unequally inserted: narrow leaves with very thick midrib, veinless. — *Eddya*, Torr. l. c.

C. hispidíssima, Gray, l. c. Suffrutescent, diffuse, soon procumbent, a span or two high, very setose-hispid, and with some minute cinereous pubescence: leaves fascicled, rigid, lanceolate, soon linear or aciculate by strong revolution of the margins, dilated at base; the lower or primary ones petioled: flowers scattered: calyx-lobes linear, resembling the leaves: embryo straight. — *Eddya hispidissima*, Torr. l. c. 170, t. 9. — Dry hills, &c., W. Texas (*Wright, &c.*) to Arizona and S. Utah.

§ 3. **TIQUÍLIA, DC.** Fruit deeply 4-lobed (or by abortion occasionally fewer); the thin-walled nutlets rounded and united only at the centre, smooth and shining: stamens equally inserted: leaves entire, petioled, veined. — *Tiquilia*, Pers. *Galapagoa*, Hook. f. — In our species (§ *Tiquiliopsis*, Gray, l. c.), the corolla is appendaged within, and the cotyledons either 4-parted around or incumbent upon the radicle.

C. Nuttállii, Hook. Prostrate annual, repeatedly and divergently dichotomous, canescently pubescent, also sparsely hirsute or hispid: leaves ovate or rhomboid-rotund, 2 to 4 lines long and on longer petioles, with two or at most three pairs of strong and somewhat curving veins, and margins somewhat revolute: flowers densely clustered in the forks and at the ends of the naked branches: calyx-lobes linear, sparsely hispid, equalling the tube of the pink or whitish corolla: filaments shorter than the anthers, inserted nearly in the throat of the corolla, the tube of which bears 5 short obtuse scales near the base: nutlets oblong-ovate, marked with a linear and raphé-like ventral scar: embryo straight: cotyledons very deeply horseshoe-form, their elongated bases almost enclosing the radicle. — *Kew Jour. Bot.* iii. 296; *Watson, Bot. King*, 248; *Gray, Bot. Calif.* i. 520. *Tiquilia brevifolia*, Nutt.; Torr. Bot. Mex. Bound. 136, & Wilkes Exped. xvii. 417, t. 12, under the name of *T. Oregana*. — Arid plains, Arizona through Utah and E. California to Wyoming and Washington Terr.

C. Pálmeri, Gray. Apparently perennial or even suffrutescent at base, less prostrate, more canescent but not hispid or even hirsute: leaves obovate or ovate, about the length of their petiole, plicate-lineate by about 6 pairs of straight and strong veins: flowers fewer in the clusters: calyx less deeply cleft; the lanceolate lobes about half the length of the bluish corolla, which bears 5 salient plates above the base of the tube, extending to the insertion of the slender filaments: nutlets only one or two maturing, globular, with an orbicular scar: cotyledons very thick, somewhat hemispherical, not even cordate, incumbent on the radicle. — *Proc. Am. Acad.* vii. 292, & x. 49; *Watson, l. c.* *Tiquilia brevifolia*, var. *plicata*, Torr. Bot. Mex. Bound. 136. — Sandhills on the Mohave and Colorado, E. California and W. Arizona, *Emory, Schott, Cooper, Palmer*.

5. TOURNEFORTIA, L. (*Joseph Pitton de Tournefort*, of France, the great botanist of the 17th century.) — Shrubby, arborescent, or rarely nearly herbaceous plants; a rather large genus all round the world in and near the tropics, one or two extratropical. Flowers white, small, unilateral and as it were spicate on the scorpioid cyme-branches, usually destitute of bracts. A polymorphous and artificial genus, in a few species too nearly approaching the next.

* Lobes of the small white corolla slender-subulate, valvate-induplicate in the bud.

T. volúbilis, L. Slender shrub, with filiform sarmentose more or less twining branches, and minute usually rusty pubescence: leaves ovate or oblong-ovate, acute or acuminate, slender-petioled: spikes of the loose cyme filiform and divaricate: slender flowers merely 2 lines long: drupe 1-3-seeded. — *Messersmidia volubilis*, Rœm. & Sch. Syst. iv. 544; Miers Contrib. ii. 210. — Keys of Florida. (W. Ind., &c.)

* * Lobes of the white corolla broad, more or less plicate in the bud and undulate.

T. móllis, Gray. Erect from a suffrutescent base, a foot or less in height, branching, canescently silky-tomentose: leaves deltoid- or rhombic-ovate, obtuse, and with undulate margins, rather long-petioled: flowers middle-sized, crowded in a pair of naked peduncled spikes: tube of the corolla a little longer than the calyx, and longer than the rounded undulate or crenulate lobes: drupe globose-ovate, minutely tomentose, excavated at base, by abortion about 2-seeded. — Proc. Am. Acad. x. 50. *Heliotropium molle*, Torr. Bot. Mex. Bound. 138. — On the Rio Grande, Texas, at or opposite Presidio del Norte, *Bigelow*. Leaves about 2 inches long, including the petiole. Corolla apparently white, 3 lines long, the limb rather ample. Fruit probably fleshy in the living plant.

T. gnaphalódes, R. Br. Somewhat fleshy shrub, very white silky-tomentose throughout, thickly leafy: leaves spatulate-linear, obtuse: flowers densely clustered: corolla fleshy, downy outside: drupe ovate-conical, deeply excavated at base, with thin flesh, and 2 two-seeded nutlets. — *Heliotropium gnaphalodes*, Jacq. Amer. 25, t. 173. (Pluk. Alm. t. 193, fig. 5.) — Coast of Florida. (W. Ind.)

6. HELIOTRÓPIUM, Tourn. TOURNSOLE, HELIOTROPE. (Ancient Greek name, not indicating that the flowers turn to the sun, but that they begin to appear at the summer solstice.) — Herbs, or low more or less shrubby plants, belonging mainly to the warmer parts of the world, represented in cultivation by the vanilla-scented *H. Peruvianum*, and in the southern part of the United States by several indigenous and two or three naturalized species: fl. all summer. — Gray, Proc. Am. Acad. x. 49; Benth. & Hook. Gen. Pl. ii. 843.

§ 1. **EÚPLOCA, Gray, l. c.** Fruit didymous, solid; the two carpels each splitting into two almost hemispherical one-seeded nutlets, their internal face flat and smooth: embryo semicircular in rather copious albumen: corolla large, naked and not appendaged, strongly plicate in æstivation: anthers slightly cohering by their minutely bearded tips: style long and filiform: cone of the stigma truncate and bearded with a penicillate tuft of strong bristles: flowers scattered. — *Euploca*, Nutt.

H. convolvuláceum, Gray. Low spreading annual, strigose-hirsute and hoary, much branched: leaves lanceolate, or sometimes nearly ovate and sometimes linear, short-petioled: flowers generally opposite the leaves and terminal, short-peduncled: limb of the bright white corolla ample, angulate-lobed; the strigose-hirsute tube about twice the length of the linear sepals: anthers inserted at or above its middle. — Mem. Am. Acad. vi. 403, & Proc. v. 340. *Euploca convolvulacea*, Nutt. in Trans. Am. Phil. Soc. ser. 2, v. 189; Hook. Ic. t. 651; Torr. in Marcy Rep. t. 15. *E. grandiflora*, Torr. in Emory Rep. 147. — Sandy plains, Nebraska to W. Texas. Soda Lake, S. E. California, *Dr. Cooper*. A showy plant; the sweet-scented flowers opening at sunset (*Nuttall*), in cultivation open nearly all day: tube of corolla (including the abruptly somewhat dilated throat, constricted at orifice) 4 lines long; the rotate border about half an inch broad; the wide sinuses not produced into teeth or appendages, but obscurely emarginate. Style fully thrice the length of the ovary: annular stigma obscurely 4-lobed; its strongly bearded terminal appendage rather longer, truncate or obscurely 2-lobed. Fruit somewhat pubescent or hairy.

§ 2. **EUHELIOtropium.** Fruit 4-lobed and separating at maturity into 4 one-celled one-seeded nutlets: style usually short: cone or tip of the stigma slightly bearded or naked, rarely obsolete: corolla plicate or induplicate in the bud; the

lobes obtuse (with one exception) and usually broad: inflorescence in most species either distinctly or indistinctly scorpioid. — § *Euheliotropium* & *Orthostachys*, Benth. & Hook. Gen. ii. 844. *Heliotropium* & *Schleidenia* (Endl.), Fresenius in Fl. Bras. viii. 31, 33.

* Flowers all or some of them accompanied by bracts or leaves; when spicate, the so-called spikes not naked, nor conjugate or forking to form a cyme, nor strongly coiled: anthers generally with tips connivent or cohering over the stigma. — § *Orthostachys*, R. Br.; A.DC.; Benth. & Hook. *Preslea*, Mart. *Schleidenia*, Endl.

+ Stigma-tip elongated (sometimes 2-cleft): anther-tips lightly or only at first cohering: corolla with naked and open throat, white: leaves narrowly linear: nutlets globular, beakless, externally hispid or pubescent.

++ Divisions of the calyx similar, more or less shorter than the tube of the corolla: nutlets with a pair of pits on the inner face.

H. Gréggii, Torr. A span high, diffusely spreading from a slightly woody base, strigose-canescens: slender branches leafy: leaves narrowly linear, flat, about an inch long and a line wide: flowers short-pedicelled or almost sessile in an at first crowded and short scorpioid spike, with or often mainly without bracts: corolla with an ample and slightly 5-lobed limb: anthers long, acuminate, minutely bearded at tip: stigma-tip subulate-conical, much thicker than the very short style, as well as much longer. — Bot. Mex. Bound. 137; Gray, Proc. Am. Acad. x. 49. — Sandy or gravelly soil, western borders of Texas, New Mexico, and adjacent part of Mexico, first collected by *Dr. Gregg*. Flowers very fragrant: corolla a third to nearly half an inch broad when expanded.

H. angustifolium, Torr. A span to a foot high, erect and densely branched from a woody base, strigose-canescens: branches rigid, very leafy: leaves very narrowly linear, with revolute margins, almost filiform when dry (4 to 9 lines long): spike few-flowered, at length slender, nearly straight, bracteate at base or without bracts: flowers small, short-peduncled: corolla salverform, with narrow canescent tube and 5-parted limb; the lobes ovate-lanceolate (acute!); hardly a line long, or half the length of the tube: anthers with mucronate glabrous tips: stigma-tip slender-subulate, longer and hardly broader than the rather long style. — Bot. Mex. Bound. 137. — South-western borders of Texas, *Wright*. (Adjacent Mex., *Gregg*.)

++ ++ Divisions of the calyx very unequal, the larger about the length of the corolla: nutlets without pits on the inner face: inflorescence not in the least scorpioid.

H. tenellum, Torr. A span to a foot high, erect from an annual root, paniculately branched, slender, strigose-canescens: leaves narrowly linear, with more or less revolute margins (about an inch long and a line wide): flowers scattered, terminal, becoming lateral and axillary, on rather slender peduncles, many of them bractless: limb of the corolla rather shorter than the narrow canescent tube; the lobes oblong or obovate, a line long: anthers oblong and with nearly naked blunt tips scarcely at all cohering: stigma-tip narrowly subulate, 3 or 4 times the length of the short style. — Torr. in Marcy Rep. t. 14, & Bot. Mex. Bound. 138. *Lithospermum tenellum*, Nutt. in Trans. Am. Phil. Soc. ser. 2, v. 189. *L. angustifolium*, Torr. in Ann. Lyc. ii. 225, not Michx. — Open dry ground, Kentucky to Alabama, west to Kansas and throughout Texas.

+ + Stigma-tip conical or more slender: anthers cohering by minutely bearded tips: corolla appendaged and throat sometimes almost closed by a pubescent projection or gibbosity at or below the base of each fold of the sinuses: divisions of the calyx usually of unequal breadth: nutlets in our species beakless.

++ Diffuse or tufted, a span or less high: internal appendages of the corolla small roundish pubescent gibbositities low in the throat.

H. confertifolium, Torr. Suffruticose, very much branched and tufted, silvery-white with a dense silky-hirsute pubescence: leaves crowded throughout and imbricated along the upper part of the branches, from narrowly oblong to linear, 2 or 3 lines long, equally white both sides, the margins somewhat revolute: inflorescence not in the least scorpioid: flowers sessile among the leaves, mainly glomerate with them at the end of the branches and hardly surpassing them: corolla pale purple; its silky-hairy tube hardly longer than the calyx; limb angulate-5-lobed, only 2 lines in diameter: style thrice the length of the ovary: annular stigma much broader than the subulate-conical tip. — Herb. Torr. *H. limbatum* & var. *confertifolium*, Torr. Bot. Mex. Bound. 138, not *H. limbatum*, Benth. — South-western borders of Texas, *Berlandier*, *Wright*, &c. (Adjacent Mex.)

H. phyllostáchyum, Torr. Annual, diffusely spreading, strigulose-hirsute: leaves oblong or broadly lanceolate, plane (3 to 7 lines long), obtuse, contracted abruptly at base into a short petiole, those subtending flowers similar: flowers small, loosely unilateral-spicate along the branches, very short-peduncled, some bractless, others at the axils of leaves: calyx-divisions unequal, lanceolate, in fruit one of them mostly ovate-lanceolate and larger: corolla white, hardly exceeding the calyx, its lobes ovate and the folds at the sinuses sometimes more or less extended into teeth: style very short: nutlets with 2 deep pits. — Bot. Mex. Bound. l. c., in part (1859). *H. myosotoides*, Chapm. Fl. 330 (1860). — Rocky hills, southeastern part of Arizona, Wright. Key West, Florida, Blodgett, Palmer. Flowers barely a line long. Fruiting-calyx becoming 2 lines long, the larger sepal fully twice the length of the depressed-globose fruit. The Mexican specimens of Berlandier referred to this by Dr. Torrey seem rather to belong to *H. hispidum*, HBK.

== Erect, about a foot high: internal appendages of the throat of the corolla prominent and deflexed.

H. polyphýllum, Lehm. Many-stemmed from a ligneous base or root, minutely strigulose-cinereous: stems very leafy throughout: leaves linear-oblong or lanceolate, 3 to 7 lines long, very short-petioled or sessile: flowers approximate in a leafy slightly scorpioid spike: divisions of the calyx broadly lanceolate or one lanceolate-ovate: tube of the (mostly white) corolla not longer than the calyx, nearly equalling the moderately 5-lobed limb (this 3 or 4 lines in diameter); the strong folds of the sinuses produced at base into conical and pouch-like appendages: style short: nutlets 2-pitted on the inner face. — Lehm. Asper. 63, & Ic. t. 8; Gray, l. c. *H. glomeratum*, A.DC. Prodr. ix. 550? *H. bursiferum*, C. Wright in Griseb. Cat. Cub. 211. *Schleidenia polyphylla*, Fresen. in Fl. Bras. l. c. — E. Florida, Buckley, Palmer, &c. (W. Ind. to Brazil.)

Var. Leavenwóρθii, Gray, l. c. Stems a foot or two high, the larger plants decidedly shrubby: corolla golden yellow! — *H. Leavenworthii*, Torr. ined., at least as to the original specimen. — Everglades of S. Florida, Leavenworth, Palmer, Garber. Appears to differ only in the yellow color of the corolla, which is remarkable.

* * Flowers bractless, in distinct unilateral scorpioid spikes, which are commonly in pairs or once or twice forked, forming the scorpioid cyme of this and related orders: anthers free. (Style none and the corolla mainly white in our species.) — § *Euheliotropium*, DC., &c. *Heliotropium*, Fresenius, l. c.

+ Pubescent annuals, not fleshy: anthers pointless or mucronulate.

H. EUROPEUM, L. A foot or so high, cinereous-pubescent, loosely branched: leaves oval or obovate, long-petioled: spikes in pairs or single, becoming slender: flowers small, scentless: stigma-tip long and slender-subulate, 2-cleft at apex. Waste grounds of Southern and rarely in Northern Atlantic States: nat. from Eu.

H. inundátum, Swartz. A foot or two high, strigose-cinereous, branching from the base: leaves spatulate-oblong, varying to oblanceolate (commonly an inch long), rather slender-petioled: spikes 2 or 4 in a cluster, filiform, hirsute: flowers very small, crowded (corolla barely a line or so long): stigma thick, surmounted by a short obtuse cone. — Fl. Ind. Occ. i. 343; DC. Prodr. ix. 539. *H. procumbens*, *canescens*, & *cinereum*, HBK. Nov. Gen. & Spec. iii. t. 206. — Texas to the frontiers of California (Coulter). (S. Am. & W. Ind.) The stems may become indurated, but the root is annual.

+ + Wholly glabrous perennial (or sometimes annual?), fleshy and glaucous: anthers acuminate.

H. Curassávicum, L. Diffusely spreading, a span to a foot high: leaves succulent, oblanceolate, varying on the one hand to nearly linear, on the other to obovate (an inch or two long): spikes mostly in pairs or twice forked, densely flowered: corolla with a rather ample 5-lobed limb (3 lines broad) and open throat (white, with a yellow eye, sometimes changing to blue!); the lobes round-ovate, rather shorter than the tube: stigma umbrella-shaped, as wide as the glabrous ovary, flat, not surmounted by a cone! — Hook. Bot. Mag. t. 2669. — Sandy seashore from Virginia (or farther north as a ballast-weed), and from Oregon southward; also in the interior, chiefly in saline soils. (Widely distributed over most warmer parts of the world.)

§ 3. **TIARÍDIUM**. Fruit at maturity more or less 2-lobed, and separating into 2 two-celled and two-seeded (or by abortion one-seeded) carpels, which may at length each split into 2 nutlets, with or without empty cavities or false cells:

style very short or none: flowers in bractless scorpioid spikes, which are either solitary, geminate, or collected in a cyme. — *Tiaridium*, Lehm. Asper. 13 (1818); Cham. *Helioophytum*, DC. *Heliotropium* § *Helioophytum* with *Cochranea* (Miers), Benth. & Hook. Gen. ii. 844.

* Fruit didymous; the nutlets parallel.

H. ANCHUSÆFOLIUM, Poir.; Fresen. in Fl. Bras. viii. 46 (which is *Tournefortia heliotropioides*, Hook. Bot. Mag. t. 3096, and probably also *Helioophytum sidefolium*, DC.), is a low perennial, with oblong or lanceolate repand leaves, and a pedunculate close cyme of 3 or 4 spikes of bright violet-blue flowers, much resembling those of the Sweet Heliotrope (*H. Peruvianum*), but not sweet-scented, and the nutlets when fresh with a thin fleshy exocarp: stigma sessile and with a depressed cone. It is a native of Buenos Ayres and S. Brazil, is cultivated for ornament, occasionally appears among ballast-weeds at Philadelphia, and is becoming spontaneous in East Florida.

H. parviflorum, L. Annual, or becoming woody at base, more or less pubescent, a foot or two high: leaves oblong-ovate or ovate-lanceolate, acute or acuminate at both ends, pinnately veined, slender-petioled, some of them opposite: spikes single or sometimes in pairs, filiform, 2 to 6 inches long: flowers small and crowded (a line long), white: fruit hardly a line long, blunt, commonly with no distinct empty cell. — *Helioophytum parviflorum*, DC.; Fresen. l. c. 45, t. 10, fig. 6. — Keys of Florida and southern borders of Texas. (Mex., Trop. Amer.)

H. glabriusculum, Gray. A span high, diffusely branching from a perennial and perhaps rather woody base, minutely and sparsely strigulose-pubescent: branches slender, leafy to the top: leaves green and except the midrib beneath nearly glabrous (an inch or less long), rather obtuse and sometimes undulate, hardly veiny, short-petioled: spikes rather short, solitary or forking: corolla white with a green eye; its tube longer than the calyx and about the length of the oval lobes (these a line long): fruit cinereous-pubescent; the nutlets turgid, by abortion often only 1-seeded, 3-4-toothed at summit, commonly with 3 empty cells or spaces. — Proc. Am. Acad. x. 50. *Helioophytum glabriusculum*, Torr. Bot. Mex. Bound. 139. — W. borders of Texas, Wright, Bigelow. (Adjacent Mex.)

* * Fruit mitre-shaped (whence the name *Tiaridium*, founded on the following species); its two lobes diverging: style deciduous.

H. INDICUM, L. Coarse annual, hirsute, erect: leaves ovate or oval, sometimes rather cordate, on margined petioles, obscurely serrate or undulate: spikes mostly single, densely-flowered (becoming a span to a foot long): corolla bluish, the limb 2 or 3 lines in diameter: fruit glabrous; the nutlets acutely ribbed on the back, within a pair of large empty cells. — Sims, Bot. Mag. t. 1837. *Tiaridium Indicum*, Lehm.; Cham. in Linn. iv. 452, t. 5. *Helioophytum Indicum*, DC.; Fresen. l. c., t. 10, f. 4. — Waste grounds of the Southern Atlantic States, reaching to Illinois along the great rivers. (Nat. from India, &c.)

7. HARPAGONÉLLA, Gray. (Diminutive of *harpago*, a grappling-hook.) — Single species with the aspect of *Pectocarya*, in company with which it grows. Corolla only a line long, white; the rounded lobes imbricate-convolute in the bud. — Proc. Am. Acad. xi. 88, & Bot. Calif. i. 531; Benth. & Hook. Gen. ii. 846.

H. Palmeri, Gray, l. c. Small and insignificant annual, diffusely and rather simply branched from the base, strigulose-hirsute: leaves linear; the upper or bracts lanceolate: flowers soon lateral and scattered, a little above and partly opposite the leaf, on short at length strongly recurved and rigid peduncles: body of the bur-like fruiting calyx, oblong or fusiform, completely enclosing the solitary nutlet, or sometimes a pair. — (Guadalupe Island, off Lower California, Palmer.) Arizona, near Tucson, E. L. Greene. The two globular lobes of the ovary are unilateral, on the side of the style next the enveloping calyx-lobes, and distinct; they apparently belong to different carpels, each of which wants the other half. Both carpels uniovulate and alike in flower, and both, according to Bentham, are sometimes fertile and enclosed together in the calyx. Sometimes one is excluded and naked, but falls away without maturing.

8. PECTOCÁRYA, DC. (Compounded of *πεπτός*, combed, and *καρύα*, in place of *καρύον*, nut, referring to the pectinate border of the nutlets.) — Diminutive annuals, of the western coast of America, diffuse, strigose-hirsute or canescent; with narrow linear leaves, and small and scattered flowers along the whole length of the stem, on very short and sometimes recurved pedicels: corolla white, minute. — Meisn. Gen. 279; Benth. & Hook. Gen. ii. 847.

§ 1. KTENOSPÉRMUM. Nutlets bordered with a coriaceous undulate or lacinate wing, geminately divergent. — *Ktenospermum*, Lehm. Del. Sem. Hort. Hamb. 1837, without char. *Pectocarya*, DC. Prodr. x. 120.

P. lineáris, DC. Diffuse: nutlets with narrowly oblong body (one or two lines long), surrounded by a broad wing, which is pectinately or laciniately and often irregularly parted or cleft into subulate teeth, ending in a delicate uncinately-tipped bristle: cotyledons oblong. — Benth. Gen. 1. c. *P. linearis* & *P. Chilensis*, DC. Prodr. 1. c. *P. Chilensis*, C. Gay, Fl. Chil. t. 52, bis, fig. 2. *P. Chilensis*, var. *Californica*, Torr. Pacif. R. Rep. v. 124. *P. lateriflora*, Gray, Bot. Calif. i. 531, &c., not DC. *Cynoglossum lineare*, Ruiz & Pav. Fl. ii. 6. — Dry gravelly soil, southern part of California, Utah, and Arizona. (Chili.) One form, answering to *P. linearis*, DC., has coarsely cleft nearly plane wings; another, answering to *P. Chilensis*, DC., has narrower and more pectinate teeth to a somewhat incurved wing, and the nutlet arcuate-recurved in age.

P. penicilláta, A.DC., 1. c. Very diffuse and slender: nutlets with oblong body (a line long) surrounded by a merely undulate or pandurate wing (incurved in age), its rounded apex thickly and the sides rarely or not at all beset with slender uncinately bristles: cotyledons oblong-obovate. — *Cynoglossum penicillatum*, Hook. & Arn. Bot. Beech. 371. — British Columbia (*Macoun*) to California and W. Nevada. (The Missouri habitat and the syn. of Nuttall, cited by A. DeCandolle, belong to *Echinopspermum Redowskii*.)

P. LATERIFLORA, DC., of Peru, has broadly obovate and less geminate nutlets, as noted by Bentham, with the wing dentate in the manner of *P. linearis*.

§ 2. GRUVÉLIA. Nutlets broadly obovate and equably divergent (a line long), the wing or margin entire: cotyledons broadly obovate. — Gray, Proc. Am. Acad. xii. 81. *Gravelia*, A.DC. Prodr. x. 119.

P. setósa, Gray, 1. c. Hispid, as well as minutely strigose-pubescent, rather stout: calyx-lobes armed with 3 or 4 very large divergent bristles: nutlets bordered by a broadish (entire or obscurely undulate) thin-scarious wing; the faces as well as margins beset with slender uncinately-tipped bristles. — S. E. California, on the Mohave desert, *Palmer*.

P. pusilla, Gray, 1. c. Strigulose-canescens, slender: nutlets cuneate-obovate, wingless, and with a carinate mid-nerve on the upper face, the acute margin beset with a row of slender uncinately-tipped bristles. — *Gravelia pusilla*, A.DC. Prodr. x. 119; C. Gay, Fl. Chil. 1. c. fig. 3. — Common about Yreka, in the northern part of California, apparently native, *Greene*. (Chili.)

9. CYNÓGLÓSSUM, Tourn. HOUNDSTONGUE. (*Κύων*, dog, and *γλῶσσα*, tongue, from the shape and soft surface of the leaves of the commonest species.) — Mostly stout and coarse herbs; with a heavy herbaceous scent, and usually broad leaves, the lower petioled. Flowers in paniced mostly bractless racemes (purple, blue, or white), in summer.

* Biennial weed of the Old World: nutlets with somewhat depressed back surrounded by a slightly raised margin, ascending on the pyramidal gynobase, and after separation hanging by the splitting from the base of exterior portions of the long-subulate indurated style.

C. OFFICINÁLE, L. COMMON HOUNDSTONGUE. About 2 feet high, soft-pubescent, somewhat canescent, leafy to the top: leaves lanceolate or the lower oblong: flowers rather large: corolla rotate-campanulate, dull red purple (and a white variety), little exceeding the calyx. — Fl. Dan. t. 1147; Schk. Handb. t. 30. — Pastures and waste grounds, Atlantic States: burs adhering to fleece, &c. (Nat. from Eu.)

* * Perennial and indigenous: racemes elevated on a naked terminal peduncle: nutlets horizontal or nearly so, tumid, not margined,

+ Separating from the low-pyramidal gynobase and usually carrying away portions of the rather short slender-subulate style.

C. Virgínicum, L. About 2 feet high, hirsute, few-leaved: radical and lowest cauline leaves oval or oblong (4 to 10 inches long) and rather abruptly contracted into a long margined petiole; the upper oblong or ovate-lanceolate, conspicuously cordate-clasping: common peduncle half a foot or so in length: tube of the corolla hardly longer than the calyx-lobes (1 or 2 lines long) and not longer than the comparatively ample (pale blue) lobes. — *C. amplexicaule*, Michx. Fl. i. 132. — Open woods, Upper Canada and Saskatchewan to Florida and Louisiana.

+ Nutlets horizontal on a very depressed gynobase, at separation free from the long and slender style: Pacific species, with violet or blue and rather large paniculate-racemose flowers.

C. occidentále, Gray. Hirsute-pubescent or in age almost hispid, about a foot high: lower leaves spatulate, tapering gradually into winged petioles; the upper from lanceolate to ovate and partly clasping: tube of the corolla longer than the lanceolate calyx-lobes, and twice or thrice the length of its own roundish lobes: style wholly filiform: nutlets very tumid, almost globular, 4 lines long. — Proc. Am. Acad. x. 58, & Bot. Calif. i. 531. — California, in the Sierra Nevada from Plumas Co. northward, *Burgess, Lemmon, Mrs. Austin*.

C. gránde, Dougl. Soft-villous-pubescent, hardly hirsute below, becoming glabrate in age, about 2 feet high: lower leaves ovate- or subcordate-oblong and acute or acuminate, 4 to 8 inches long, on margined petioles of about the same length; the upper smaller, from ovate to lanceolate, abruptly contracted into shorter winged petioles: tube of the corolla slightly exceeding the ovate calyx-lobes, and hardly longer than its own ample lobes (these 2 or 3 lines long): slender style thicker towards the base: mature fruit unknown. — Hook. Fl. ii. 85; DC. Prodr. x. 153; Gray, l. c. *C. officinale*, Hook. & Arn. Bot. Beech. 152, not L. — In woods, from Monterey, California, to Washington Terr.

C. læve. Smooth and glabrous, except some soft and apparently deciduous pubescence on the lower face of the leaves (which otherwise resemble those of *C. grande*), and more on the lanceolate divisions of the calyx: flowers few: lobes of the corolla (1 or 2 lines long) about half the length of the tube: filiform style hardly thickened downward: fruit not seen. — Plumas Co., California, *Mrs. Pulsifer-Ames*.

* * * Perennials of doubtful genus (fruit unknown), with linear sessile leaves, bracteate racemes, rotate blue corolla, and short style.

C. ciliátum, Dougl. A foot or more high, canescently hirsute, the hairs on the lower part of the stem retrorse: leaves tomentose-hirsute, ciliate, 3-nerved; the lower 4 inches long and 2 lines wide, the upper an inch long: racemes subcorymbose: calyx-lobes lanceolate, obtuse: stigma capitate. — Lehm. Pug. ii. 24, & in Hook. Fl. ii. 85, from which the above description has been compiled. — "Dry banks of mountain streams, Little Falls of the Columbia and upwards to the Rocky Mountains, *Douglas*."

C. Howárdi. Depressed-cespitose, sericeous-canescant with appressed pubescence: leaves mainly crowded on the tufted branches of the caudex, 5 to 8 lines long, spatulate-linear: flowering stems an inch or two high, 3-4-leaved, densely few-flowered at the summit: bracts linear, equalling the linear calyx-lobes: corolla with rounded lobes (a line and a half long); fornicate appendages large; the tube very short: stigma truncate. — Rocky Mountains in Montana, *Winslow J. Howard*. In flower only: apparently related to the preceding.

10. ECHINOSPÉRMUM, Swartz. STICKSEED. (Formed of *ἐχῖνος*, a hedgehog, and *σπέρμα*, seed, referring to the prickly bur.) — Annuals, biennials, or occasionally perennials (the greater part of the Old World), either pubescent or hispid; with racemose or spicate flowers, usually small, blue or whitish; the inflorescence either bracteate or nearly bractless. The nutlets are troublesome burs.

§ 1. LÁPPULA. Prickles of the fruit glochidiolate-barbed at the apex, naked below (when only marginal sometimes confluent by their bases into a wing.) — *Lappula*, Moench. *Echinosperrum* § *Homolocaryum* & § *Lappula*, A.DC.

* Racemes panicle, leafy-bracteate only at base, minutely bracteate or bractless above: slender pedicels recurved or deflexed in fruit: calyx-lobes lanceolate or oblong, shorter than the fruit, and at length reflexed under it: scar of the nutlets ovate or triangular, medial or infra-medial: gynobase short-pyramidal: biennials or annuals, some perhaps perennials, pubescent or hirsute, not hispid.

+ Corolla short-funnelform (blue); the tube surpassing the calyx, about the length of the lobes.

E. diffusum, Lehm. A foot or so high; leaves oblong-lanceolate; or the lowest spatulate, narrowed at base into long wing-margined petioles; the upper sessile, from oblong-lanceolate to ovate or cordate, passing into small bracts: racemes commonly loose and spreading: fruiting pedicels 3 to 5 lines long: limb of the bright blue corolla from half inch in diameter to much smaller: style slender: fruit a globose bur; the nutlets 3 lines long, densely muriculate-scabrous, rather sparsely armed throughout with long and flattened prickles; the scar large and broadly ovate: gynobase broadly pyramidal. — Pug. ii. 23, & in Hook. Fl. ii. 83. *E. nervosum*, Kellogg, Proc. Calif. Acad. ii. 146, fig. 42. *E. deflexum*, var. *floribundum*, Gray, Bot. Calif. i. 541, in part. — Open woods, &c., Oregon, and California, along the Sierra Nevada, where it is common.

+ + Corolla rotate (from blue to nearly white); its tube shorter than the calyx and the lobes.

E. floribundum, Lehm., l. c. Rather strict, 2 feet or more high, or sometimes smaller: leaves from oblong to linear-lanceolate; the lowest tapering into margined petioles: racemes numerous, commonly geminate and in fruit rather strict: nutlets with elongated triangular back naked (2 lines long), merely scabrous; and the margin armed with a close row of flat subulate prickles, their bases often confluent; scar smaller and narrowly ovate. — Hook. Fl. ii. 84, t. 164. *E. deflexum*, var. *floribundum*, Watson, Bot. King, 246; Gray, l. c., mainly. *E. subdecumbens*, Parry in Proc. Davenport Acad. i. 148, a small form, said to be perennial. — Lake Winnipeg to British Columbia, and south to New Mexico and California. Limb of corolla varying from 2 to 5 lines in diameter.

E. deflexum, Lehm. Diffusely branched, a foot or so high: leaves from oblong to lanceolate: racemes lax, loosely paniculate: flowers soon sparse, smaller than in the preceding: nutlets smaller, and the mostly naked back (a line long) broader. — Asper. 120, & in Hook. l. c. *Myosotis deflexa*, Wahl. Act. Holm. 1810, 113, t. 4; Fl. Dan. t. 1568. — Saskatchewan, and Winnipeg Valley, *Drummond, Bourgeau*. Brit. Columbia, *Lyall*. Habit intermediate between the preceding and following; the American specimens having occasionally some few prickles developed from the rough-granulate dorsal face of the nutlets. Fruit as well as flowers about half the size of that of *E. floribundum*. (Siberia to Eu.)

E. Virginicum, Lehm., l. c. Stem 2 to 4 feet high, erect, with long and widely spreading branches: radical leaves round-ovate or cordate, slender-petioled; cauline (3 to 8 inches long) ovate-oblong to oblong-lanceolate, acuminate at both ends; uppermost passing into lanceolate bracts: loosely paniculate racemes divaricate, filiform: pedicel and flower each about a line long: corolla slightly surpassing the calyx, pale blue or white: fruit globular, 2 lines in diameter, armed all over with short prickles. — *Myosotis Virginiana*, L. Spec. 189. *M. Virginica*, L. Spec. ed. 2, 189 (Moris. Hist. iii. 449, sect. 11, t. 30, fig. 9). *Cynoglossum Morisoni*, DC. Prodr. x. 155. — Borders of woods and thickets, Canada to Alabama and Louisiana.

* * Spikes leafy-bracteate: pedicels erect or merely spreading, stout, shorter than the calyx: lobes of the latter little shorter than the small corolla, becoming foliaceous and often unequal, mostly exceeding the fruit: scar of the nutlets long and narrow, occupying most of the ventral angle, corresponding with the subulate gynobase: annuals, with rough or hispid pubescence: leaves linear, lanceolate, or the lower somewhat spatulate.

E. LAPPULA, Lehm., l. c. Erect, a foot or two high, branched above; nutlets rough-granulate or tuberculate on the back, the margins with a double row of slender and distinct prickles, or these irregular over most of the back. — Fl. Dan. t. 692. — Waste and cultivated grounds, from the Middle Atlantic States to Canada. (Nat. from Eu.)

E. Redóvskii, Lehm., l. c. Erect, a span to 2 feet high, paniculately branched: nutlets irregularly and minutely muricately tuberculate; the margins armed with a single row of stout flattened prickles, which are not rarely confluent at base. — Gray, Proc. Acad. Philad. 1862, 165; Watson, Bot. King, 246, t. 23, fig. 9-12. *Myosotis Redóvskii*, Hornem. Hort. Hafn. i. 174. *E. intermedium*, Ledeb. Fl. Alt. & Ic. ii. t. 180. (N. Asia.)

Var. occidentale, Watson, l. c., the American plant, is less strict, at length diffuse, and the tubercles or scabrosities of the nutlet are sharp instead of blunt or round-

ish, as in the Asiatic plant. — *E. patulum*, Lehm. in Hook. Fl. ii. 84; Torr. in Wilkes Exp. xvii. 418. *E. Lappula*, Hook. & Arn. Bot. Beech., not Lehm. *E. pilosum*, Buckley in Proc. Acad. Philad. 1861. *Cynoglossum pilosum*? Nutt. Gen. i. 114. — Plains, Saskatchewan and Minnesota to Texas, and west to Arizona and Alaska.

Var. cupulatum, Gray. Prickles of the nutlet broadened and thickened below and united into a wing or border, which often indurates and enlarges, forming a cup (the disk becoming depressed), with margin more or less incurved at maturity, sometimes only the tips of the prickles free. — Bot. Calif. i. 530. *E. strictum*, Nees in Neuwied, Trav. App. 17; Torr. in Pacif. R. Rep. ii. 15, & Bot. Mex. Bound. l. c., not Ledeb. *E. Redowskii*, var. *strictum*, Watson, l. c. *E. Texanum*, Scheele in Linn. xxv. 260. *E. scabrosum*, Buckley, l. c. — Nebraska to Texas and Nevada, with the common form, into which it passes.

§ 2. **ECHINOGLÓCHIN, Gray.** Prickles of the marginless nutlets (disposed without order over the back) beset for their whole length with short retrorse barbs; the scar next the base, ovate: calyx open but not reflexed in fruit: aestivation of the white corolla between convolute and imbricate (i. e. convolute except that one lobe is wholly interior); the fornicate appendages small: pedicels of the partly bracteate raceme erect, apparently articulated with the axis. — Proc. Am. Acad. xii. 163.

E. Greénei, Gray, l. c. Annual, with the habit of *Eritrichium fulvum*, diffusely branched from the base, a span high or more, strigulose-pubescent with whitish hairs, and the calyx silky-hirsute with fulvous-yellow hairs: leaves linear (a line or more wide, the lower an inch or two long), obtuse: racemes simple or forked, rather loose, leafy or bracteate at base and occasionally above: flowers 2 lines long: calyx-lobes oblong-linear, obtuse, nearly equalling the corolla: dilated limb of the latter 2 lines wide or nearly: stamens low on the tube: nutlets a line and a half long, shorter than the calyx, ovate-trigonus, obtusely carinate on the back, acutely carinate ventrally down to the low scar, minutely tuberculate-scabrous throughout; the scattered barbed prickles terete, rather slender, a third to half line long. — Northern part of California, common about Yreka, *E. L. Greene*. An additional link between *Echinosperrum* and *Eritrichium*, perhaps deserving the rank of a genus.

11. ERITRÍCHIMUM, Schrader. (Composed of *ἔριον*, wool, and *τρίχιον*, small hair, the original species being woolly-hairy.) — Now a large genus of wide distribution, but most largely W. N. American, between *Myosotis* on one hand and *Echinosperrum* on the other, not quite definitely distinguished from the latter. Lower leaves not rarely opposite. Flowers (spring and summer) white, in a few blue, only in the last species yellow. Calyx circumscissile and deciduous from the fruit in a few species, otherwise persistent. — A. DC. Prodr. x. 124, excl. spec.; Gray, Proc. Am. Acad. x. 55; Benth. & Hook. Gen. ii. 850. *Krynitzkia*, *Plagiobothrys*, &c., Fisch. & Meyer.

§ 1. **EUERITRÍCHIMUM, Gray, l. c.** Nutlets obliquely attached by the base of inner angle to a low-conical or pyramidal gynobase; the scar roundish or oblong, small: seed amphitropous, ascending: tube of the corolla not exceeding the calyx: pedicels not articulated with the rachis.

* (ECHINOSPERMOIDEA.) Nutlets with a pectinate-toothed or spinulose dorsal border: caespitose dwarf perennials. — *Eritrichium*, Schrader.

E. nanum, Schrader. Caespitose in pulvinate tufts, rising an inch or two above the surface, densely villous with long and soft white hairs: leaves oblong, 3 to 5 lines long: flowers terminating very short densely leafy shoots, or more racemose on developed few-leaved stems of an inch or more in height, short-pedicelled, some of them bracteate: corolla with limb very bright cerulean blue, 2 or 3 lines in diameter: crest-like or wing-like border of the nutlet various, mostly cut into slender teeth or lobes. (Alps of Eu.)

Var. aretioides, Herder. More condensed: leaves varying from ovate to lanceolate: long villous hairs sometimes with papillose-dilated base. — Radde, Riesen, iv. 253;

Gray, l. c. *E. aretioides*, DC. Prodr. x. 125; Seemann, Bot. Herald, 37, t. 8. *E. villosum*, var. *aretioides*, Gray in Proc. Acad. Philad. 1863, 73; Watson, Bot. King, 241. *Myosotis nana*, Torr. in Ann. Lyc. N. Y. ii. 225. *M. aretioides*, Cham. in Linn. iv. 443. — Highest Rocky Mountains of Colorado, Utah, and Wyoming, and north-west arctic coast and islands. Teeth or spines of the nutlets not rarely with a few bristly points, so that they would be glochidiolate in the manner of *Echinosperrum* if retrorse. The Rocky Mountain plant is very near the European, but whiter-villous. The form on the N. W. coast more sparsely and less softly villous, passing into

Var. Chamissónis, Herder, l. c. A stouter form, with broader leaves imbricated on the stems, and the grey hairs commonly with papillose-dilated base. — *E. Chamissonis*, DC. l. c. *Myosotis villosa*, Cham. l. c. — Island of St. Paul. (Adjacent Asia.)

* * (MYOSOTIDEA.) Nutlets not appendaged, ovate, oblong, or trigonous: low and mostly diffuse or spreading annuals (in South America some perennials), sparsely or minutely hirsute: leaves linear: the lower commonly opposite: flowers white, some bracteate, others racemose or spicate and bractless.

+ Flowers very small: corolla only a line long; the folds or appendages in its throat inconspicuous and smooth: stems diffuse or decumbent, a span or so in length.

E. plebéium, A.DC. Sparsely and minutely hirsute or glabrate: leaves lax (the larger 2 inches long and 2 lines wide): flowers scattered, on pedicels shorter than the calyx, which is open in fruit and the divisions foliaceous-acrescent: nutlets ovate-trigonous, a line long, coarsely rugose-reticulated, glabrous, sharply carinate ventrally down to the large ovate scar and dorsally only along the narrowish apex. — Gray, l. c. *Lithospermum plebéium*, Cham. & Schlecht. in Linn. iv. 446. — Aleutian Islands, *Chamisso*, *Harrington*.

E. Califórnicum, DC. Slender, more or less hirsute: leaves mostly smaller and narrower: stems flowering from near the base: flowers almost sessile, most or all the lower accompanied by leaves or bracts, at length scattered: calyx lax or open in fruit: nutlets ovate-oblong, transversely rugose and minutely scabrous or smooth, small; the scar almost basal. — Prodr. x. 130; Watson, Bot. King, 242. *Myosotis Californica*, Fisch. & Meyer, Ind. Sem. Petrop. 1835. — Springy or muddy ground, through California and Oregon to New Mexico and Wyoming. Passes into

Var. subglochidiátum, Gray. Slightly succulent: lower leaves inclined to spatulate: nutlets when young minutely more or less hirsute or hispid, especially on the crests of the rugosities, some of these little bristles becoming stouter and appearing glochidiolate under a lens! — Bot. Calif. i. 526. — E. California to Wyoming and Colorado.

+ + Corolla surpassing the calyx, with comparatively ample limb $2\frac{1}{2}$ to 4 or even 5 lines in diameter, therefore appearing rotate; the appendages in its throat conspicuous and yellow-puberulent: inflorescence more racemose: most of the lower leaves opposite, merely sparsely hirsute: calyx when young often ferrugineous-hirsute.

E. Scouleri, A.DC. Slender, mostly erect, a span to a foot high: leaves narrowly linear (an inch or two long): flowers in geminate or sometimes paniculate slender naked spikes, most of them bractless: pedicels erect or ascending, from very short to at most a line long: calyx erect in fruit: nutlets rugulose, glabrous, half line long; the scar small. — Gray, l. c. *Myosotis Chorisiana*, Lehm. in Hook. Fl. ii. 83, not Cham. *M. Scouleri*, Hook. & Arn. Bot. Beech. 370. *Eritrichium plebéium*, Torr. in Pacif. R. Rep. iv. 124, not DC. *E. Chorisianum*, *plebéium*, & part of *Califórnicum*, Gray in Proc. Am. Acad. viii. 397. — Comparatively dry soil, W. Oregon and California. Seems to pass into the next.

E. Chorisíanum, DC. At first erect, soon diffusely spreading or decumbent: larger leaves 2 to 4 inches long: flowers in lax usually solitary racemes, many of them leafy-bracted: pedicels spreading, sometimes filiform and 2 to 9 lines long, sometimes even shorter than the calyx: corolla more funnelliform, its ample limb 3 to 5 lines in diameter: nutlets (half line long) minutely rugose-tuberculate; the scar narrow. — Gray, Proc. Am. Acad. x. 56, & Bot. Calif. i. 525. *E. connatifolium*, Kellogg in Proc. Calif. Acad. ii. 103, fig. 51. *Myosotis Chorisiana*, Cham. & Schlecht. l. c. — Wet ground, California along the coast and the bays of Monterey and San Francisco.

§ 2. **PLAGIOBÓTHRYS, Gray, l. c.** Nutlets broadly ovate-trigonous, incurved (the narrowed tips conniving over the short style), rugose, attached by the middle of the concave or seemingly hollowed ventral face to a globular or short-conical gynobase, by means of a salient caruncle-like portion, which at maturity separates

from a corresponding deep cavity of the side of the gynobase, and persists on the nutlet in place of the ordinary areola or scar (when only one nutlet matures it becomes incumbent): seed amphitropous, attached above the middle of the cell: herbage villous-hirsute: calyx in the original species at length circumscissile above the base! — *Plagiobothrys*, Fisch. & Meyer, Ind. Sem. Petrop. 1835, 46; not well characterized, the fruit being probably immature.

* (GENUINA.) Mature nutlets very concave ventrally; the caruncle narrow and projecting, usually oval, each fitting into an orbicular cavity of the globular gynobase: low annuals, with small flowers, and villous or silky-hirsute but not hispid calyx.

† Nutlets dull or slightly shining, cartilaginous or coriaceous; the lines or ribs narrow and elevated, bounding depressed areolæ; the dorsal keel more or less salient.

E. fúlvum, A.DC. A span to a foot high, slender, branched from the leafy base, loosely hirsute or merely pubescent; leaves linear or the lower and larger lanceolate or spatulate; the upper sparse and small: spikes at maturity nearly filiform, bracteate only at base: calyx, &c., densely clothed with dark-ferruginous and some merely fulvous hairs, circumscissile from the mature fruit; the lobes narrow-lanceolate: limb of corolla 2 lines in diameter: nutlets (a line long) rugose with broad and shallow areolations. — Prodr. x. 132; Gray, l. c. 57. *Myosotis fulva*, Hook. & Arn. Bot. Beech. 38 (the Chilean plant, which has rather longer and narrower calyx-lobes), & 369. *Plagiobothrys rufescens*, Fisch. & Meyer, l. c.; A.DC. l. c. 134. *P. canescens*, Gray, Proc. Am. Acad. viii. 397 (no. 411, Hall). — Open grounds, California and Oregon, toward the coast. (Chili.)

E. canescens, Gray, l. c. Stonter and generally larger than the preceding, leafy, villous-hirsute; the pubescence whitish, even that of the calyx barely fulvous: leaves linear: calyx larger and with broader lanceolate lobes, less closed over the fruit and hardly if at all circumscissile: nutlets usually with more prominent transverse ribs. — *Plagiobothrys canescens*, Benth. Pl. Hartw. 326. — W. California and north to the Columbia River.

† † Nutlets crustaceous, vitreous-shining or enamel-like at maturity; the lines bounding the long transverse and closely packed rugæ very slender and impressed: low plants, seldom a span high: limb of corolla a line or two in diameter: calyx hardly if at all circumscissile at maturity.

E. tenellum, Gray, l. c. Hirsute with rather soft hairs; those of the calyx more or less fulvous or rusty-yellowish: stems slender and erect: radical leaves in a rosulate tuft, oblanceolate or broadly linear; the cauline rather few and small: spike few-flowered and interrupted, leafy only at base: calyx-lobes triangular-lanceolate: nutlets (a line long) very shining, somewhat cruciate from the abrupt contraction at both base and apex, hollowed on the ventral face, the close and straight transverse wrinkles either smooth or sparsely and sharply muricate. — *E. fulvum*, Watson, Bot. King, 243; Gray, Proc. Am. Acad. viii. 397, not A.DC. *Myosotis (Dasymorpha) tenella*, Nutt. in Hook. Kew Jour. Bot. v. 295. — Northern California to British Columbia, Nevada, and Idaho.

E. Torrèyi, Gray, l. c. More hispidly hirsute, the hairs even of the calyx greyish, much branched from the root: stems diffuse or decumbent, leafy; the flowers mainly leafy-bracteate: leaves broadly oblong: nutlets rather larger than in the preceding and less shining, broadly ovate, not cruciate nor muricate but smooth (or next the margins obscurely tuberculate), the straight wrinkles rather broader; caruncle not projecting. — California, Sierra Nevada, near Yosemite Valley, *Torrey*. Sierra Valley, *Lemmon*; the latter a depressed and very leafy form, with scattered flowers, accompanied throughout by leaves.

* * (AMBIGUA.) Mature nutlets moderately incurved, affixed to the obtusely conical or pyramidal gynobase by a vertical narrow crest (answering to the caruncle) which occupies the middle third of the concave face of the nutlet (terminating above in the sharp ventral keel which extends to the apex); the cavities of the gynobase oblong-ovate in outline: calyx, &c., more or less setose-hispid.

E. Kíngii, Watson. Apparently biennial, villous-hirsute and more or less hispid: stems a span or so high, rather stout: leaves from spatulate or oblong to spatulate-linear: inflorescence at first thyrsoid; the flowers in short spikes or clusters which are commonly leafy at base: tube of the corolla not longer than the lanceolate calyx-lobes; its limb 4 lines in diameter, or sometimes one-half smaller: nutlets coriaceous, dull, irregularly rugose, not distinctly carinate on the back, fully a line long. — Bot. King, 243, t. 23 (in flower); Gray, Proc. Am. Acad. x. 60, & Bot. Calif. i. 528. — Eastern portion of the Sierra Nevada, in Ne-

vada and California; Truckee Pass, *Watson*, a larger-flowered form. Sierra Valley, *Lenmon*, a smaller-flowered form and with some fruit. Connects *Plagiobothrys* with the following section.

§ 3. *KRYNITZKIA*, Gray. Nutlets ventrally attached from next the base to the middle or to the apex to the pyramidal or columnar or subulate gynobase; the scar mostly sulcate or slightly excavated: seed from amphitropous to nearly anatropous, commonly pendulous: corolla (except in the last species) white: calyx 5-parted, closed in fruit. — *Krynitzkia*, Fisch. & Meyer, Ind. Sem. Petrop. 1841, 52. § *Krynitzkia* & § *Piptocalyx*, Gray, l. c.

* (EUKRYNITZKIA.) Nutlets without acute lateral angles or margins, the sides more commonly rounded: corolla mostly small; the tube not surpassing the mostly setose-hispid calyx: anthers oval: root annual. *See also*

+ Calyx early circumscissile; the 5-cleft upper portion falling away, leaving a membranaceous somewhat crenate-margined base persistent around the fruit: corolla with naked and open throat: anthers mucronate: flowers all leafy-bracteate and sessile. — *Piptocalyx*, Torr.

E. circumscissum, Gray. Depressed-spreading, very much branched from the annual root, an inch to a span high, whitish-hispid throughout: narrow linear leaves (a quarter to half inch long) and very small flowers crowded, especially on the upper part of the branches: nutlets oblong-ovate, smooth or minutely puncticulate-scabrous, attached by a narrow groove (with transverse basal bifurcation) for nearly the whole length to the pyramidal-subulate gynobase. — Proc. Am. Acad. x. 58, & Bot. Calif. i. 527. *Lithospermum circumscissum*, Hook. & Arn. Bot. Beech. 370. *Piptocalyx circumscissus*, Torr. in Wilkes Exp. xvii. 414, t. 12. — Desert plains, E. California to Utah, Wyoming, and Washington Terr.

+ + Calyx neither circumscissile nor disarticulating from the axis in age; the lobes linear-oblong, obtuse, nearly nerveless; the bristles short and even, not setose or pungent: corolla with minute if any appendages at the throat: nutlets attached for the whole length to a slender columnar gynobase by a groove which does not bifurcate nor sensibly enlarge at base: flowers all leafy-bracteate, short-pedicelled: style at length thickened!

E. micranthum, Torr. Hirsute-canescens, slender, 2 to 5 inches high, at length diffusely much branched: leaves linear, only 2 to 4 lines long: flowers in the forks, and much crowded in short leafy spikes, about equalling the upper bracts: corolla barely a line high, and its lobes one to two-thirds of a line long, obscurely appendaged at the throat: nutlets oblong-ovate, acute or acuminate, smooth and shining or dull and puncticulate-scabrous (half to two-thirds of a line long): style becoming thicker than the gynobase, or even pyramidal. — Bot. Mex. Bound. 141; *Watson*, Bot. King, 244. — Dry plains, western border of Texas through Utah and Arizona to E. California, where larger flowered specimens connect with

Var. lépidum. Less slender and more hirsute: corolla larger, its expanded limb 2 or 3 lines in diameter; the appendages or folds in the throat very manifest: nutlets nearly a line long, puncticulate-scabrous. — California, in San Diego Co., *D. Cleveland*.

+ + + Calyx not circumscissile, 5-parted, conspicuously and often pungently hispid with large stiff bristles, and the lobes usually with a stout midnerve; the whole calyx (or short pedicel) in several species inclined to disarticulate at maturity and to form a sort of bur, loosely enclosing the nutlets: inflorescence scorpioid-spicate, without or partly with bracts.

+ + Gynobase slender and narrow: nutlets with narrow grooved scar, or continued into a groove above the attachment and so running the whole length of the ventral face: spikes when developed mainly bractless: leaves in all linear.

= Lobes of the fructiferous calyx very narrow; the strong bristles below reflexed and partly uncinate: appendages in the throat of the small corolla obsolete or wanting: only one nutlet usually maturing.

E. oxycaryum, Gray. Somewhat canescently strigulose-pubescent or above hirsute, slender, 6 to 20 inches high: leaves narrow: spikes dense in age, but slender, becoming strict, and with the sessile fruiting calyx appressed: this at most 2 lines long, thickly beset toward the base with stout reflexed bristles (of a line or less in length), the tips of some of them curving: nutlet ovate-acuminate or ovate-lanceolate, very smooth and shining, fully a line long, much surpassing the subulate gynobase and style, affixed to the latter only by the lower half or third of the narrow ventral groove. — Proc. Am. Acad. x. 58, & Bot. Calif. i. 526. *Myosotis flaccida*, Hook. & Arn. Bot. Beech. 369, ex Benth., not Dougl. *Krynitzkia leiocarpa*, Benth. Pl. Hartw. (no. 1872), 326, not Fisch. & Meyer. — Common in W. California. (Not seen from Oregon.)

== Lobes of fructiferous calyx very narrowly linear, twice or thrice the length of the nutlets, armed with remarkably long and straight spreading bristles: appendages in throat of corolla evident.

E. angustifolium, Torr. Hispid with spreading bristles, a span high, diffuse: leaves narrowly linear: spikes often geminate, dense and slender: corolla barely a line long and with a small limb: calyx-lobes almost filiform in age, seldom over a line long, beset with divaricate bristles of the same length: nutlets half a line long, ovate-triangular, with minutely granulate surface, all four maturing, little longer than the conical-subulate gynobase, to which they are attached by a narrow grooved scar with somewhat broader base. — *Pacif. R. Rep.* v. 363, & *Bot. Mex. Bound.* 141. — South-eastern California and Western Arizona. (Lower Calif.)

E. barbigerum. Hispid and hirsute, stouter, a span to a foot high, freely branching: leaves broader: spikes solitary or paniculate, elongating; the flowers at length rather sparse and less secund: limb of the corolla sometimes 3 lines in diameter: calyx-lobes linear-attenuate, in fruit 3 or 4 lines long, thickly beset with long shaggy bristles (of $1\frac{1}{2}$ to 2 lines length), which are sometimes accompanied with long white-villous hairs: nutlet commonly by abortion solitary, and a line or more in length, surpassing the style, ovate-trigonus and somewhat acuminate, mucicate-papillose, attached by the lower half and more to the subulate-columnar gynobase, the scar dilated at base (infertile ovary-lobes remaining on the gynobase, attached for almost their whole length). — S. California, from Santa Barbara Co. to S. Utah and Arizona, *Parry, Palmer, Smart, Rothrock, &c.* Has been confounded in imperfect specimens with the preceding and some of the following.

=== Lobes of the fructiferous calyx less attenuated, and the bristles less elongated: appendages of the throat of the corolla conspicuous: all four nutlets usually maturing.

E. leiocarpum, Watson. Roughish-hirsute or hispid, with mostly ascending hairs, a span to a foot high, usually branching freely: spikes when elongated becoming rather loosely-flowered: limb of corolla 2 lines or less in diameter: fructiferous calyx-lobes seldom over 2 lines long, from narrowly lanceolate to narrow-linear: nutlets ovate and oblong-ovate, very smooth and shining, a line or less long, somewhat surpassing the persistent style, attached from the middle downward to the subulate gynobase by a very slender scar which is divergently bifurcate at the very base. — *Bot. King*, 244; *Gray*, l. c. — *Echinopspermum leiocarpum*, *Fisch. & Meyer*, *Ind. Sem. Petrop.* 1835, 36. *Krynitzkia leiocarpa*, *Fisch. & Meyer*, *Ind. Sem. Petrop.* 1841, 52; *A.D.C.* l. c. *Myosotis flaccida*, *Dougl.* in *Hook. Fl.* ii. 82. — California to borders of British Columbia, and east to New Mexico and Saskatchewan. A wide-spread and also variable species.

E. muriculatum, A.D.C. Stouter, leafy, more hirsute-hispid with spreading hairs, a foot or two high: spikes often geminate or collected in a 3-5-radiate pedunculate cyme: limb of corolla 2 or 3 lines in diameter: calyx-lobes lanceolate, in fruit only $1\frac{1}{2}$ to 2 lines long and seldom twice the length of the nutlets: these ovate-triangular, obtuse, a line long, not equalling the style, dull or nearly so, mucicate-papillose on the back and sometimes on the inner faces also, attached to the subulate gynobase for two-thirds of their length by a grooved scar which widens downward and is transversely dilated at base. — *Prodr.* ix. 132. *Myosotis muricata*, *Hook. & Arn. Bot. Beech.* 369. — California, *Douglas* (specimen, in flower only, wrongly referred, in *Proc. Am. Acad.* x. 59, to *E. canescens*), *Brewer, Palmer* (in fruit, San Buenaventura and back of San Simeon Bay), *Coulter, Xantus, &c.*

Var. ambiguum. Fruit of *E. muriculatum*, or usually sparsely and more minutely muciculate, equally dull, equalling and usually somewhat surpassing the persistent style, yet occasionally shorter: in whole habit, sparse spikes, and generally the longer and narrower calyx-lobes agreeing with *E. leiocarpum*, of which there is also a form with lanceolate and shorter calyx-lobes. — *E. muriculatum*, *Torr. Bot. Wilkes Exp.* xvii. 416, t. 13; *Gray*, l. c., mainly. *E. angustifolium*, *Watson*, *Bot. King*, 241, not *Torr.*, at least not the original plant. — California and Nevada to Washington Terr.

++ Gynobase broader, pyramidal or conical: nutlets with a correspondingly broader scar (*E. Texanum* excepted): corolla small or minute (the limb only a line or two in diameter): calyx very hispid with yellowish or fulvous bristles: rough-hispid annuals, with spikes loose in fruit, and mostly leafy-bracteate at base.

== Nutlets all fertile and alike, small: midrib of calyx-lobes not thickened.

E. pusillum, Torr. & Gray. Low (2 or 3 inches high) and slender: linear leaves mainly clustered at the root: flowers rather crowded in small spikes: calyx-lobes ovate-

lanceolate: crests in throat of corolla inconspicuous: nutlets half a line long, ovate-triangular, strongly muricate-granulate on the rounded back, which is bordered by acute angles; the inner faces very smooth and concave when dry; the ventral angle beveled by the deltoid-lanceolate scar which terminates below the apex in a narrow groove: gynobase subulate-pyramidal. — Pacif. R. Rep. ii. 171. — North-western borders of Texas and adjacent New Mexico, *Pope, Wright*. Calyx in fruit about a line long, apparently not deciduous with the fruit.

E. hispídum, Buckley. A span or more high, greyish-hispid, diffusely much branched, even the loose paniculate spikes mostly leafy: leaves linear: flowers rather scattered: calyx-lobes lanceolate: crests in throat of the corolla rather conspicuous: nutlets half to two-thirds of a line long, triangular-ovate, without lateral angles, coarsely granulate (sometimes almost smooth) round to the deltoid or triangular-lanceolate excavated scar. — Proc. Acad. Philad. 1861, 462; Gray, Proc. Am. Acad. x. 59. *E. heliotropioides*, Torr. Bot. Mex. Bound. 140, mainly, excl. syn. DC. — Plains and sandy banks, W. Texas to New Mexico, extending into Mexico. Calyx a line long, closed at maturity, and deciduous with the enclosed fruit, like a bur.

== Nutlets either solitary or dissimilar: calyx-lobes linear, obtuse, thickish, closed over the fruit (2 or 3 lines long); the midrib below becoming much thickened and indurated.

E. Texánum, A. DC. About a foot high, loosely branching, rough-hispid: leaves obovate-oblong or spatulate, or the uppermost linear: spikes mostly leafless: flowers nearly sessile: calyx in fruit separating by an articulation: nutlet usually only one maturing, fully a line long, oblong-ovate, rounded on the back, smooth and even, but minutely puncticulate, fixed by a narrow scar from base to below the middle to a small conical-columnar gynobase. — Gray, l. c. — Texas, about Austin, &c., *Drummond, Wright, E. Hall*. Flowers smaller and midrib of the sepals less thickened than in the next.

E. crassisépalum, Torr. & Gray. A span high, diffusely much branched from the base, very rough-hispid: leaves oblanceolate and linear-spatulate: flowers short-pedicelled, many or most of them bracteate: lobes of the persistent calyx greatly thickened below in fruit: nutlets ovate, acute, rounded on the back, dissimilar, three of them muricate-granulate and one larger and smooth or nearly so (fully a line long), fixed to the conical-pyramidal gynobase from base to middle by an ovate-lanceolate excavated scar. — Pacif. R. Rep. ii. 171; Gray, Proc. l. c. — Plains, Western Texas and New Mexico to Nebraska and Saskatchewan. The larger and smooth nutlet, like the similar and only fertile one of *E. Texanum*, appears to be unusually persistent. Short pedicel thickened and indurated with the calyx at maturity, disposed to separate tardily by an articulation.

* * (PREYGIUM.) Nutlets and flowers of the foregoing subsection; but the former (either all or three of them) surrounded by a conspicuous firm-scarious crenate or lobed wing: crests in the throat of the corolla rather small.

E. pterocáryum, Torr. Annual, slender, loosely branching, hirsute: leaves linear, or the lowest spatulate, often hispid: inflorescence at first cymose-glomerate, usually developing a pair of short spikes, mostly bractless: calyx-lobes oblong and in fruit ovate, erect, and with rather prominent midrib: corolla very small (its limb less than a line in diameter): nutlets oblong-ovate, rough or granulate-tuberculate on the rounded back, affixed for nearly the whole length to the filiform-subulate gynobase by a narrow groove which widens gradually to the base; one of them commonly wingless and rounded at the sides; the others with lateral angles extended into a broad radiately striate wing with toothed or crenulate margins. — Wilkes Exp., vii. 415, t. 13; Watson, Bot. King, 245; Gray, l. c. — Dry interior region, from the plains of the Columbia River, Washington Territory, through Nevada and the borders of California to Arizona, New Mexico, and the borders of Texas. Fruiting calyx 2 lines long, rather sparsely hispid, very short-pedicelled, apparently not falling with the fruit. Nutlets a line and a half long, including the surrounding broadly ovate wing.

Var. pectinátum, Gray, l. c., has all the nutlets winged, and the wings pectinately cleft half way down. — S. Utah and Arizona, *Parry, Palmer*.

* * * (PSEUDO-MYOSOTIS.) Nutlets triangular or triquetrous, with acute or even winged lateral angles, attached by half or nearly their whole length to the subulate or slender-pyramidal gynobase: the scar very slender and usually with transversely dilated base: corolla with prominent fornicate crests at the throat, and near the base within annulate: biennials or perennials, mostly with thyriform and leafy-bracteate inflorescence.

+ Tube of the corolla not longer than the calyx and little if any longer than the lobes; a ring of 10 small scales or glands above the base within: anthers oval or oblong: style rather short.

++ Nutlets margined all round with a firm entire wing: plant setose-hispid: corolla small.

E. holópteron, Gray. About a foot high, perhaps from an annual root, loosely paniculate-branched, rather slender: leaves linear, an inch or so long, very rough with the papilliform bases of the rigid short bristles: paniculate spikes rather few- and at length loosely flowered: calyx and corolla about a line (and the former becoming 2 lines) long: immature nutlets ovate-trigonal, a line long, muriculate on the convex back, abruptly wing-margined (the wing nearly the breadth of the dorsal disk), attached for nearly the whole length to the conical-subulate gynobase. — Proc. Am. Acad. xii. 81. — Ehrenberg, Arizona, Palmer. *see also*

E. setosissimum, Gray. Stem robust, 2 feet or more high from an apparently biennial root, nearly simple, very hispid (as is the whole plant) with long and stiff but slender spreading bristles (with or without papilliform base), also cinereous with fine spreading hairs: leaves lanceolate-spatulate, the lower 4 or 5 inches long (including the tapering base or margined petiole): spikes in fruit elongated (3 or 4 inches long), dense and strict in a naked thyrsus: corolla 2 or hardly 3 lines long: anthers on short and thickened inflexed filaments: fructiferous calyx fully 3 lines long; the lobes oblong-lanceolate, carinate by a strong midrib: nutlets obcompressed, almost 3 lines long, broadly ovate in outline, dull, merely scabrous on the back; the conspicuous wing much narrower than the disk and extended round the base; the scar narrow at base: gynobase elongated-subulate. — Proc. Am. Acad. l. c. — Shores of Fish Lake, Utah, at the elevation of 8,700 feet, *L. F. Ward*. Known only in fruiting specimens, which so much resemble *E. glomeratum*, var. *virgatum*, that intermediate forms may occur, and the great size, flatness, narrow-based scar, and conspicuous wing of the nutlets may prove inconstant. *see also*

++ ++ Nutlets acutely triangular, wingless.

E. Jamésii, Torr. A span or two high from a perennial root, rather stout, branched from the hard or lignescent base, canescently silky-tomentose and somewhat hirsute, becoming strigose-hirsute or even hispid in age: leaves oblanceolate or the upper linear, obtuse: spikes somewhat panicled or thyrsoid-crowded, moderately elongating, bracteate: limb of the short and broad corolla about 3 lines wide: fruiting calyx mostly closing over the depressed-globular fruit, which consists of 4 closely fitting very smooth and shining broadly triangular nutlets (hardly higher than wide). — Marcy Rep. 294, & Bot. Mex. Bound. 140; Gray, l. c. *E. multicaule*, Torr. l. c., a more hispid form. *Myosotis suffruticosa*, Torr. in Ann. Lyc. N. Y. ii. 225. — Plains and sandy shores, western borders of Texas and New Mexico to Arizona and Wyoming. — Nutlets almost exact quarters of a sphere, or with angles more acute and sides rather concave, attached by the inner angle, also with a short transverse scar at base.

E. glomerátum, DC. A span to a foot or more high from a biennial root, greyish-hirsute and hispid: leaves spatulate or linear-spatulate: inflorescence thyrsiform and mostly dense; the short and often forked lateral spikes at length commonly exceeding the subtending leaves: calyx very setose-hispid: limb of the corolla 3 to 5 lines in diameter: the crests truncate: nutlets forming an ovoid-pyramidal fruit; each triangular-ovate, sparsely more or less tuberculate-rugose on the back (a line long), with sharp lateral edges, and sulcate ventral angle extending into a broad basal scar. — Watson, Bot. King, 242, t. 23; Gray, l. c. *Cynoglossum glomeratum*, Pursh, Fl. ii. 729. *Myosotis glomerata*, Nutt. Gen. i. 112; Hook. Fl. ii. 82, t. 162. *Rochelia glomerata*, Torr. Ann. Lyc. N. Y. l. c.; Nutt. in Jour. Acad. Philad. vii. 45. *E. glomeratum*, var. *hispidissimum*, Torr. Bot. Mex. Bound. 140, may be taken for nearly the original of Nuttall and Bradbury, of the Upper Missouri. — Plains of Saskatchewan to New Mexico and Utah. Two varieties mark the opposite extremes. *see also*

Var. húmile, Gray. Barely a span high, often tufted on an apparently perennial root: pubescence less hispid and generally canescent, at least the lower leaves; these spatulate, an inch or more long: thyrsus spiciform: pubescence and bristles of calyx either whitish or tawny yellow. — Proc. Am. Acad. x. 61. — Rocky Mountains from the British Boundary to Utah, at 8000 feet, and higher parts of the Sierra Nevada, California. Passing on one hand into the typical form, on the other approaching the next species.

Var. virgátum, Porter. Very hispid, not at all canescent: stem strict, a foot or two high, flowering for most of its length in short and dense nearly sessile clusters, which

are generally much shorter than the elongated linear subtending leaves and forming a long virgate leafy spike: nutlets less or slightly rugose on the back, at most a line and a half long. — Porter & Coulter, Fl. Colorado, 102; Gray, l. c. *E. glomeratum*, Gray in Am. Jour. Sci. ser. 2, xxxiv. 225. *E. virgatum*, Porter in Hayden Rep. 1870, 479. — Along the base and eastern slope of the Rocky Mountains up to 8000 feet, Colorado, Parry, Hall, Porter, &c. A well marked form, clearly biennial.

+ + Tube of the salverform corolla longer than the calyx, and twice or thrice the length of the lobes; the ring within (at base of the tube) inconspicuous and truncate, its glands indistinct; crests of the throat large, often elongated; anthers linear-oblong: style long and filiform: silky-canescens perennials, with contracted thyrsoïd inflorescence. — § *Pseudomyosotis*, A. DC.

E. fulvocanescens, Gray. A span or so high, cespitose: leaves linear-spatulate or oblanceolate, silky-strigose or even tomentose; the lower with bright white and soft hairs; the upper and the thyrsoïd glomerate inflorescence and calyx with fulvous-yellow more hirsute hairs and some hispid bristles: corolla white: nutlets roughish or granulated. — Proc. Am. Acad. x. 91, & Bot. Calif. l. c. *E. glomeratum*, var. ? *fulvocanescens*, Watson, Bot. King, t. 23, fig. 7. — Mountains of New Mexico (Fendler, &c.) to those of Nevada, and north to Wyoming. Habit of the dwarf and hoary forms of the preceding species, with longer corolla, style, and anthers of the next.

E. leucophæum, A. DC. A span to a foot high, many-stemmed from the lignescent base or root: leaves silky-strigose and silvery-canescens, lanceolate and linear, acute: spicate-glomerate inflorescence and calyx hirsute and hispid with spreading whitish or yellowish hairs and slender bristles: corolla cream-colored or yellow: style very long: nutlets ovate-triquetrous, smooth and polished, ivory-like, large ($1\frac{1}{2}$ or 2 lines long): gynobase very slender. — Gray, l. c. *Myosotis leucophæa*, Dougl. in Hook. Fl. ii. 82, t. 163. — Barren grounds, interior of British Columbia and Oregon, Southern Utah, and near Mono Lake, E. California. Anthers (always ?) borne on the tube of the corolla close below the throat.

ROCHELIA PATENS, Nutt. in Jour. Acad. Philad. vii. 44, founded on a specimen collected by Wyeth on "Flat-Head River" in the Rocky Mountains, would seem to be an *Eritrichium*, but has not been identified, nor is the specimen to be found in the Academy's herbarium.

12. AMSÍNCKIA, Lehm. (In memory of Wm. Amsinck, a burgomaster of Hamburg and benefactor of the botanic garden.) — Rough-hispid annuals (W. N. American and one Chilian); with oblong or linear leaves, and scorpioid-spicate flowers, sometimes the lowest and rarely (in the last species) all leafy-bracteate; the corolla yellow, slender, with open throat, either wholly naked or with minute bearded crests. Stout bristles of the herbage commonly with pustulate-dilated base. Calyx-lobes in several species disposed to be occasionally united 2 or 3 together almost to the top. Flowers in most species all heterogone-dimorphous, at least in the insertion of the stamens; when these are high the throat of the corolla is quite naked. — Lehm. Del. Sem. Hamb. 1831, 7; Fisch. & Meyer, Ind. Sem. Petrop. 1835, (1) 26; DC. Prodr. x. 117; Benth. & Hook. Gen. ii. 851.

§ 1. Nutlets (resembling those of *Eritrichium leucophæum*, which is peculiar in its long and yellow corolla) ovate-triquetrous, straight, at maturity very smooth and polished, attached at the lower part of the sharp inner angle by a narrow scar, all three faces plane or nearly so.

A. vernicósa, Hook. & Arn. A foot or more high, erect, sparsely setose-hispid: leaves from linear to ovate-lanceolate: tube of the light yellow corolla slightly longer than the calyx. — Bot. Beech. 370; DC. l. c.; Gray, Proc. Am. Acad. x. 54, & Bot. Calif. i. 525. — California, near the coast, Douglas, Coulter, &c. Nutlets almost 2 lines long, in shape resembling a grain of buckwheat.

Var. grandiflora, Gray. Robust, strongly setose-hispid, remarkably large-flowered, the more exerted and funnelform tube of the corolla almost half an inch long, and the limb ample: nutlets broader, rather concave on the back. — Bot. Calif. l. c. — Lower Sacramento, at Antioch, Kellogg.

§ 2. Nutlets (not unlike those of *Eritrichium* § *Plagiobothrys*) rugose or muricate, dull, ovate-trigonus and somewhat incurved, carinate ventrally down to the short and broad usually somewhat protuberant scar.

* Nutlets crustaceous, tessellate-rugose: calyx-lobes obtuse.

A. tesselláta, Gray. Coarsely and strongly hispid, stout, a foot or two high: leaves from linear-lanceolate to oblong, mostly obtuse: tube of the orange-yellow corolla somewhat longer than the ferruginous-hispid calyx (about 3 lines long) and much longer than the lobes: nutlets very broadly ovate, with narrowed apex and flattish back, thickly covered with granulate-warty projections which fit together in age, forming more or less conspicuous transverse lines or wrinkles; the scar toward the middle of the ventral face. — Proc. Am. Acad. & Bot. Calif. l. c. *A. lycopsoides*, Watson, Bot. King, 240, partly. — Dry grounds, California from the Contra-Costa range through the interior to Nevada and S. Utah. Calyx-lobes either narrowly or rather broadly lanceolate.

* * Nutlets muricate or sharply scabrous, in age sometimes loosely rugose. (Species difficult to discriminate.)

+ Calyx-lobes narrowly linear-lanceolate or linear, acutish, all over hispid and hirsute: leaves linear or lanceolate.

A. echináta, Gray, l. c. Stem strict, 2 or 3 feet high: corolla light yellow, about twice the length of the fulvous-hispid calyx, little dilated at the throat; the limb 2 or 3 lines in diameter: immature nutlets with the strongly convex and carinate back muricate with soft slender prickles and intermediate scabrous points, not rugose. — S. E. California in the Mohave region, *Cooper*.

A. intermédia, Fisch. & Meyer, l. c. A foot or two high, branching: bristles even of the calyx whitish or barely fulvous: leaves from oblong-lanceolate to linear: corolla not above 3 lines long, little exceeding the calyx; the small limb hardly at all plaited: nutlets very convex and carinate on the back, muricate-scabrous and at maturity obliquely more or less rugose. — DC. l. c.; Gray, Bot. Calif. l. c. *A. lycopsoides*, Gray, Proc. Am. Acad. x. 54, in part; and of gardens. *Benthamia lycopsoides*, Lindl. (Introd. Nat. Syst.) in Hort. Soc. Lond. 1828, &c., thence becoming *A. lycopsoides* of cultivation, but probably not of Lehm. — California and W. Nevada to the borders of Brit. Columbia; a common and variable species.

A. spectábilis, Fisch. & Meyer, l. c. Mostly slender, a span (when depauperate) to a foot high: leaves mostly linear: tube of the bright orange corolla twice or thrice the length of the linear lobes of the ferruginous-hispid calyx, nearly half inch long, or sometimes shorter; the throat enlarging, and the limb conspicuously plaited in the bud (a third to half inch wide); anthers when high protruded from the throat: nutlets granulate-rugose, carinate and roundish on the back. — *A. spectabilis* & *A. Douglasiana*, DC. l. c. — Open ground, California from San Diego to Plumas Co.

+ + Calyx loosely enclosing the fruit, more sparsely setose-hispid, greener and soft-herbaceous in texture; the lobes lanceolate or ovate-oblong, mostly obtuse, 2 or 3 of the lobes not rarely united.

A. lycopsoides, Lehm. Loosely branched, soon spreading, sometimes decumbent, sparsely but strongly setose-hispid, the bristles on the foliage at length with very pustulate base: leaves greener, from lanceolate to ovate, the margins commonly undulate-repand: upper flowers mainly bractless: corolla light yellow, about 4 lines long, with tube little or considerably exceeding the calyx; the throat little enlarged and limb 2 or 3 lines in diameter: anthers short, included: nutlets reticulate-rugose. — Del. Sem. Hamb. l. c., name only; DC. Prodr. x. 117; Gray, Bot. Calif. i. 524. — Coast of California, from San Simeon Bay northward to Oregon. Passes into

Var. bracteósa, a smaller-flowered and more decumbent form (corolla 2 or 3 lines long and the limb a line or two broad), with most of the flowers subtended by a foliaceous bract. — *Lithospermum lycopsoides*, Lehm. Pug. ii. 28, & in Hook. Fl. ii. 89, therefore properly the original of *Amsinckia lycopsoides*, Lehm. l. c. — San Francisco Bay to Puget Sound.

13. ECHIDIOCÁRYA, Gray. (*Ἐχίδιον*, a diminutive viper, and *κάρων*, nut, the nutlets with the stalk resembling the head and neck of a snake or other reptile.) — Annuals or biennials of two species, with the habit of *Eritrichium*

§ *Plagiobothrys*, intermediate between that group and *Antiphytum*, hirsute, hardly hispid, branched from the base; the stems or branches diffuse, a span or two high; leaves spatulate-linear, all alternate; scorpioid spikes slender and at length remotely flowered, bractless, or with some scattered foliaceous bracts: white corolla with lobes sometimes almost convolute in the bud. — Gray in Benth. & Hook. Gen. ii. 854; Proc. Am. Acad. xi. 89, xii. 163.

E. Arizónica, Gray, l. c. Lobes of the corolla a line or less long; the throat somewhat narrowed by very small and rather obscure intrusive folds; nutlets attenuate and much compressed at apex, sparsely cristate-muricate, hardly longer than their thick basal stipes, which are united at base in pairs over the prominent receptacle, the pair with a very large excavated scar. — Arizona, on the Verde Mesa, *Dr. Smart*. Also near Tucson, *Greene*.

E. Califónica, Gray. Corolla larger; the orbicular lobes a line or two in length; the throat closed by strong and puberulent intrusive appendages: nutlets smaller (a line long), less acute, coarsely rugose-alveolate and the sharp elevated rugosities often echinulate; the stipes supra-basal, all four wholly distinct, laterally compressed, shorter than the diameter of the nutlet; the small caruncular scar concave. — Proc. Am. Acad. xii. 164. — San Bernardino Co., S. E. California, *Parry & Lemmon*, no. 278, coll. 1876.

14. ANTÍPHYTUM, DC., partly. (*Ἀντί*, opposite, and *φυτόν*, plant; the leaves in the typical species being all opposite, in this unlike most of the order.) — Restricted in Benth. & Hook. Gen. Pl. ii. 859 to Brazilian species, all suffruticose and opposite-leaved, with short-stipitate areola to the nutlets. But the subjoined species exhibit the characters of the genus in a lesser degree. — Gray, Proc. Am. Acad. x. 54. (In separating from the insertion, a delicate funicle-like process, which penetrated a minute central perforation of the scar, persists on the flat gynobase.)

A. heliotropioides, A. DC. Woody perennial? a foot or two high, paniculately much branched, softly strigose-hirsute and at least when young canescent: leaves linear, an inch or less long; the lower mainly opposite: flowers rather small and scattered, on filiform pedicels much longer than the calyx, the lobes of which are oblong-linear: corolla almost rotate, with conspicuous crests in the open throat: stigma capitate: scar of the nutlets large and sessile, but edged with an acute salient margin; the minute perforation above its centre. — Prodr. x. 122; Gray, l. c. *Eritrichium heliotropioides*, Torr. Bot. Mex. Bound. 140, as to the plant of Berlandier only. — San Carlos, on the Mexican side of the Rio Grande, close to Texas. Turgid nutlets only half a line long, not (as in the next) contracted behind the scar.

A. floribúndum, Gray, l. c. Herbaceous from a "perennial" or perhaps biennial root, a foot or two high, paniculately branched above, cinereous with fine and close and with a coarser nearly hispid pubescence: leaves perhaps all alternate, narrowly linear, an inch or so long; the upper gradually diminished to linear-subulate bracts: flowers very short-pedicelled, in short panicle racemes or spikes: lobes of the calyx linear-lanceolate, acuminate: corolla rotate-campanulate (3 lines in diameter), not appendaged in the throat: filaments longer than the anthers: stigma 2-lobed: nutlets granulate, acute; the salient ventral edge terminated a little above the base of the nutlet by the small and protuberant or slightly stipitate scar. — *Eritrichium floribundum*, Torr. l. c. — South-western Texas, on or near the Rio Grande, in the mountains of Puerte de Paysano, *Bigelow*. Flowers sometimes 6-merous.

15. MERTÉNSIA, Roth. (*Francis Charles Mertens*, a German botanist, 1797.) — Perennials, of the cooler parts of the northern hemisphere, either glabrous and remarkably smooth, or with some soft or moderately scabrous pubescence; the leaves commonly broad, and the lowermost petioled; the flowers commonly handsome, blue, purple, or rarely white, paniculate-racemose or cymose,

all pedicellate, the lowest occasionally leafy-bracteate. Fl. spring and summer. — DC. Prodr. x. 87; Gray in Am. Jour. Sci. ser. 2, xxxiv. 339, & Proc. Am. Acad. x. 52; Benth. & Hook. l. c. (Stamens, in all but one of our species, protruding from the throat, but shorter than the limb of the corolla.)

§ 1. STENHAMMÁRIA. (*Steenhammera*, Reichenb., wrongly written.) Nutlets very smooth and shining, acute, fleshy-herbaceous, in age becoming utricular; the scar small: corolla short, 5-lobed; the crests in the throat evident.

M. marítima, Don. Very smooth, pale and glaucous, much branched and spreading: leaves fleshy, ovate, obovate, or spatulate-oblong, an inch or two in length, upper surface sometimes becoming pustulate: flowers small (3 or 4 lines long) on long and slender pedicels: tube of the blue or whitish corolla hardly as long as the limb and shorter than the ovate-triangular lobes of the calyx: filaments rather narrower and much longer than the anthers. — Syst. iv. 320. *Cerinth marítima*, Dill. Elth. t. 65. *Pulmonaria marítima*, L.; Lightfoot, Fl. Scot. i. 134, t. 7; Fl. Dan. t. 65. *P. parviflora*, Michx. Fl. i. 132. *Lithospermum maritimum*, Lehm. Asper. 291. *Steenhammera marítima*, Reich. Fl. Excurs. i. 387. *Stenhammaria marítima*, Fries, Summa, 12 & 192. *Hippoglossum maritimum*, Hartw. ex Lilja in Linnæa, xvii. 111. — Sea-shore, Cape Cod to Hudson's Bay, and Puget Sound to Polar coasts. (Greenland, N. Eu., & Asia.)

§ 2. EUMERTÉNSIA. Nutlets dull and with obtuse angles if any, wrinkled or roughish when dry. (Corolla commonly villous inside near the base, and below sometimes with a 10-toothed ring.)

* Corolla trumpet-shaped, with spreading border nearly entire; the plicate crests in the throat obsolete: filaments slender, much longer than the oblong-linear anthers: hypogynous disk produced into two opposite narrow lobes which become as high as the ovary.

M. Virgínica, DC. Very smooth and glabrous, pale, a foot or two high: leaves obovate or oblong, veiny, or the lowest large and rounded and long-petioled: racemes at first short and corymbose: flowers on nodding slender pedicels: corolla purple and blue, an inch long, between trumpet-shaped and salverform, many times exceeding the short calyx. — *M. pulmonarioides*, Roth, Cat. *Pulmonaria Virgínica*, L.; Sims, Bot. Mag. t. 160. (Trew, Pl. Sel. t. 42.) — Alluvial banks, New York to Minnesota, S. Carolina in the mountains, and Tennessee: fl. spring; not uncommon in gardens.

* * Corolla (blue, rarely white) with conspicuously 5-lobed limb, which above the throat (i. e. the whole expanded upper portion) is usually open-campanulate; the small crests in the throat obvious and commonly puberulent or pubescent.

+ Filaments enlarged, as broad as the anthers and shorter or only a little longer, always inserted in the throat of the corolla nearly in line with the crests: style long and capillary, generally somewhat exserted. (There are traces of some dimorphism as to reciprocal length of filaments and style, at least in one species.)

++ Tube of the corolla twice or thrice the length of the limb and of the calyx.

M. oblongifólia, Don, l. c. A span or so high, smooth or almost so: leaves mostly oblong or spatulate-lanceolate, rather succulent, and veins very inconspicuous: flowers in a somewhat close cluster: lobes of the 5-parted or deeply 5-cleft calyx lanceolate or linear, mostly acute: tube of the corolla 4 or 5 lines long, narrow; the moderately 5-lobed limb barely 2 lines long. — Hook. Kew Jour. Bot. iii. 295; Watson, Bot. King, 238. *Pulmonaria oblongifolia*, Nutt. in Jour. Acad. Philad. vii. 43. *Lithospermum marginatum*, Lehm. in Hook. Fl. ii. 86. — Mountains of Montana to the borders of British Columbia, and south to Nevada, Utah and Arizona, at 6-9,000 feet. On moist slopes; flowering early.

++ ++ Tube of the corolla little or not twice longer than the throat and limb.

= Stems mostly tall, 1 to 5 feet high: leaves ample and mainly broad, veiny: the upper with very acute or acuminate apex; the lowest ovate or subcordate (usually 3 or 4 inches long and long-petioled): calyx deeply 5-parted.

M. Sibírica, Don, l. c. Pale and glaucescent, glabrous and smooth or nearly so, very leafy: cauline leaves oblong or lanceolate-ovate, hirsute-ciliolate: short racemes paniced: calyx-lobes oblong or oblong-linear, obtuse, commonly ciliolate, half or a quarter the length of the tube of the bright light-blue corolla (this and the limb each about 3 lines long). — Gray, l. c. *Pulmonaria Sibírica*, L. Spec. i. 135, not Pall. *P. denticulata*, Rœm. &

Sch. Syst. iv. 746. *P. ciliata*, James in Long Exped.; Torr. in Ann. Lyc. N. Y. ii. 224. *Mertensia denticulata*, Don, l. c. *M. ciliata*, Don, l. c.; DC. Prodr. x. 92. *M. stonatechoides*, Kellogg in Proc. Calif. Acad. ii. 147, fig. 43. — Along mountain streams from the Rocky Mountains in Colorado to the higher parts of the Sierra Nevada, California, and far northward. (E. Asia.)

Var. Drummondii, Gray, l. c. Dwarf, a span high: leaves oblong, sessile, only about an inch long, with barely denticulate-scabrous margins and obsolete veins: corolla only 5 lines long; the tube little if at all longer than the limb and hardly twice the length of the ovate-oblong obtuse lobes of the calyx. — *Lithospermum Drummondii*, Lehm. Pugill. ii. 26, & in Hook. Fl. ii. 86. *Mertensia Drummondii*, Don, Syst. iv. 319. — Arctic sea-shore, Richardson. Formerly and wrongly referred to *M. alpina*; but apparently an arctic variety of *M. Sibirica*.

M. paniculata, Don, l. c. Greener, roughish and more or less pubescent: cauline leaves ovate to oblong-lanceolate: racemes loosely paniced: calyx-lobes lanceolate or linear and mostly acute, hispid-ciliate or throughout hirsute, equalling or only half shorter than the tube of the purple-blue (6 or 7 lines long) corolla. — Gray, l. c. *Pulmonaria paniculata*, Ait. Kew. ed. 1, i. 181; Hook. Bot. Mag. t. 2680. *P. pilosa*, Cham. in Linn. iv. 49. *P. pubescens*, Willd. in Rœm. & Sch. iv. 744? *Lithospermum Kamtschaticum*, Turcz. in Bull. Mosc. 1840, 75. *Mertensia paniculata, pilosa, pubescens?* & *Kamtschatica*, DC. l. c. *M. Sibirica*, Torr. in Wilkes Exp. xvii. 412. *Lithospermum corymbosum*, Lehm. Pugill. ii. 27, therefore *M. corymbosa*, Don, l. c. (Some forms connect with the preceding species, which is on the whole quite distinct.) — Hudson's Bay and Lake Superior, thence to the Rocky Mountains (south to Utah and Nevada), Alaska, Behring Straits. (N. E. Asia.)

Var. nivâlis, Watson, an alpine form, a span or so high, with thicker leaves only an inch long, and rather slender tube to the corolla: ambiguous between this species, *M. oblongifolia*, and the next. — Bot. King, 239. — High mountains of Utah, up to 12,000 feet, Watson.

== Stems from a foot down to a span high: leaves smaller (one or two inches long), nearly veinless, obtuse or barely acute, pale or glaucescent.

M. lanceolata, DC. Either glabrous or hirsute-pubescent, simple or paniculately branched: leaves from spatulate-oblong to lanceolate-linear: racemes at length loosely paniced: calyx-lobes lanceolate, acute, sometimes obtuse, ciliate or hirsute, or rarely glabrous, more or less shorter than the tube of the blue (5 or 6 lines long) corolla, which is hairy near the base within: filaments generally longer than the anthers. — Gray, Proc. Am. Acad. x. 53. *Pulmonaria lanceolata*, Pursh, Fl. ii. 729, rather large form. *P. marginata*, Nutt. Gen. i. 115. *Lithospermum marginatum*, Spreng. Syst. i. 547. *Mertensia alpina*, Gray in Am. Jour. Sci. l. c., in part; Hook. f. Bot. Mag. t. 6178. — Hillsides, along the lower Rocky Mountains and their eastern base, from Dakota and Wyoming to northern New Mexico. A variable species; the largest forms approaching too near the preceding; the smaller extremely different in appearance. Seemingly occurs in two forms as to length of style and filaments, the latter conspicuous in both forms.

Var. Fendleri, Gray, l. c., is a (commonly hirsute) state, with calyx 5-cleft only to the middle. — *M. Fendleri*, Gray in Am. Jour. Sci. l. c. — New Mexico (*Fendler, Palmer*) and Colorado.

+ + Filaments extremely short and narrower than the anthers, inserted either on the margin of the throat or about the middle of the tube (evidently heterogone-dimorphous): style in both kinds included.

M. alpina, Don, l. c. A span or more high, either nearly glabrous and smooth or pubescent: leaves oblong, somewhat spatulate or lanceolate, rather obtuse; the cauline sessile (1 or 2 inches long): flowers in a close or at length loose cluster: calyx 5-parted or deeply 5-cleft; its lanceolate lobes equalling or rather shorter than the tube of the corolla, which hardly ever exceeds its limb: anthers nearly sessile, in the low-inserted form scarcely equalling the conspicuous crests of the corolla: style in this form reaching only to about the base of the anthers, in the other reaching almost to the mouth of the tube. — Gray in Am. Jour. Sci. l. c., mainly, & Proc. Am. Acad. x. 53. *Pulmonaria alpina*, Torr. in Ann. Lyc. l. c. *Mertensia brevistyla*, Watson, Bot. King, 239, t. 23, fig. 1, 2, the form with low anthers and short style. — Colorado Rocky Mountains, at 9–11,000 feet, and at lesser elevation in those of Utah. Corolla 3 or 4 lines long.

16. MYOSÓTIS, L. FORGET-ME-NOT. (From *μῦς*, mouse, and *ὠτός*, *ōtós*, ear, i. e. *mouse-ear*, to which the leaves of some species are likened.) — Low and small or spreading herbs, usually soft-hairy; with sessile cauline leaves, and small mostly blue flowers in at length elongated racemes, destitute of bracts. Stamens and style in the genuine species included. Fl. summer or spring.

* Calyx open in fruit, beset with fine and short appressed hairs, none of them hooked or glandular-tipped: racemes very loose, with widely spreading pedicels: herbage green; the pubescence being rather sparse and short.

M. PALÚSTRIS, Withering. (FORGET-ME-NOT.) Perennial by subterranean stolons: stems soon decumbent, rooting at base: leaves lanceolate-oblong: calyx-lobes triangular, much shorter than the tube: corolla with flat limb (3 or 4 lines in diameter), sky-blue with yellowish throat: nutlets somewhat angled or carinate ventrally. — Koch, Germ. 504; Syme, Engl. Bot. ed. 3, t. 1104. *M. scorpioides*, var. *palustris*, L. &c. — In wet ground, probably only where it has escaped from cultivation, and not indigenous. (Nat. from Eu.)

M. láxa, Lehm. Perennial from filiform subterranean shoots, or perhaps annual: stems very slender, decumbent: pubescence all appressed: leaves lanceolate-oblong or somewhat spatulate: pedicels usually double the length of the fruiting calyx: lobes of the latter as long as the tube: limb of the corolla rather concave (2 or 3 lines broad, paler blue): nutlets about equally convex both sides. — Asper. 83; Gray, Man. ed. 1, 338. *M. cæspitosa*, var. *laxa*, DC. Prodr. x. 105. *M. palustris*, var. *micrantha*, Lehm. in Hook. Fl. ii. 81. *M. palustris*, var. *laxa*, Gray, Man. ed. 5, 365. *M. linguata*, Lehm. Asper. 110; Hook. f. Fl. Brit. Isl. 252 (*M. cæspitosa*, Schultz; Syme, Engl. Bot. l. c. t. 1103), a European form. — In water and wet ground, New York and Canada to Newfoundland. (N. Asia, Eu.)

* * Calyx closed or with lobes erect in fruit, beset with looser and some bristly hairs having minutely hooked tips.

M. sylvática, Hoffm. Perennial, not stoloniferous, hirsute-pubescent, either green or cinereous: stems erect: leaves oblong-linear or lanceolate; the radical conspicuously petioled: pedicels as long as the calyx or longer: calyx almost 5-parted, hirsute with erect hairs mixed near the base with some more spreading and hooked ones; the lobes merely erect or slightly closing in fruit: corolla with (blue or at first purple) flat limb, 3 or 4 lines in diameter: nutlets more or less margined and carinate ventrally at the apex. — Perhaps none of the typical form in N. America. (Eu., N. Asia.)

Var. alpestris, Koch. Stems tufted, 3 to 9 inches high: racemes more dense: pedicels shorter and thicker, ascending, seldom longer than the calyx: nutlets larger. — *M. alpestris*, Schmidt; Lehm. Asper. 86 & in Hook. Fl. l. c.; Syme, Engl. Bot. ed. 3, t. 1106. *M. rupicola*, Smith, Engl. Bot. t. 2559. — Rocky Mountains, from Colorado (in the higher alpine regions) and Wyoming (mainly with short pedicels) northward, and northwest to Kotzebue Sound. (N. Asia, Eu.)

M. arvénsis, Hoffm. Annual or sometimes biennial, loosely hirsute: stem erect, loosely branching, often a foot or more high: leaves oblong-lanceolate: racemes loose, naked and peduncled: pedicels spreading in fruit, longer or twice longer than the equal 5-cleft calyx, which is copiously beset with spreading hooked hairs: corolla blue (rarely white); the concave limb a line or so in diameter: calyx closed in fruit. — Lehm. Asper. l. c.; Syme, l. c. t. 108. *M. scorpioides*, var. *arvensis*, L. *M. intermedia*, Link., DC. — Fields in low grounds, New Brunswick to Louisiana (?), rare, perhaps not native. (Eu., N. Asia.)

M. versicolor, Pers. Annual, slender, hirsute: leaves narrowly oblong: racemes slender, mostly naked at base: pedicels much shorter than the deeply and equally 5-cleft calyx: corolla yellowish, then blue, at length violet, not larger than in the preceding species, which it otherwise resembles. — Smith, Engl. Bot. t. 480; Syme, l. c. t. 1110, not Lehm. in Hook. Fl. — Fields, sparingly introduced (Delaware, *Canby*). (Nat. from Eu.)

M. vérna, Nutt. Annual or biennial, roughish-hirsute or hispid: stems erect, 3 to 9 inches high: leaves spatulate or linear-oblong: racemes strict, leafy at base: pedicels erect or appressed below but spreading toward the apex, equalling or shorter than the 5-cleft hispid unequal calyx: corolla white, small. — Gen. ii. in addit. unpagged; Gray, Man. ed. 5, 365. *Lycopsis Virginica*, L. Spec. i. 139, the plant of Gronov. Virg. *Myosotis stricta*, Gray, Man. ed. 1, not Link. *M. inflexa*, Engelm. in Am. Jour. Sci. xlv. 98. — Dry ground, E. New England to Florida, Texas, Missouri, &c.

Var. macrospérma, Chapm. Taller, looser, often a foot high: pedicels rather more spreading: flowers larger: the calyx sometimes 3 lines long, with lower calyx-lobes twice the length of the upper: nutlets larger in proportion. — Fl. 333. *M. macrospérma*, Engelm. l. c. *M. versicolor*, Lehm. in Hook. Fl. ii. 81. — Florida to Texas: also W. Idaho, Oregon, and British Columbia; sometimes passing into the typical form.

17. LITHOSPÉRMUM, Tourn. GROWELL. (From *λίθος*, a stone, and *σπέρμα*, seed.) — Chiefly herbs; with reddish roots, sessile leaves, and axillary or subaxillary or leafy-bracted flowers, developed in spring and summer, sometimes dimorphous as to length of style and height of insertion of anthers reciprocally. Calyx 5-parted. Stamens in our species with very short filaments. Stigma commonly single and truncate-capitate, sometimes as in § 3, capitate-2-lobed; in *L. arvense* there is a pair of stigmas below a slender bifid apex, a transition toward the mode in *Heliotropiææ*.

§ 1. Annuals, with small at length widely scattered flowers: corolla white or whitish, little longer than the calyx.

L. ARVENSE, L. Slightly canescent with minute appressed hairs: stem loosely branching from the base, erect, a span to 2 feet high: leaves linear or lanceolate, with prominent midrib and obsolete lateral ribs: corolla funnellform, about 3 lines long; the throat with puberulent lines: nutlets dull, coarsely wrinkled and pitted, brownish. — Spec. 132; Fl. Dan. t. 456; Engl. Bot. 123. — Waste sandy grounds, not rare from Canada southward. (Nat. from Eu.)

L. Matamorénse, DC. Hirsute or hispid: stems much branched from the base and diffusely spreading, slender: leaves oblong, very obtuse (an inch or so long), at length rough: pedicels very short: corolla almost campanulate, 2 lines long, a prominent transverse crest at base of each lobe: nutlets at length shining but usually brownish and uneven, also coarsely pitted. — Prodr. x. 76. *L. prostratum*, Buckley in Proc. Acad. Philad. 1861. — Plains and river-banks, Texas, *Berlandier, Wright, &c.*

§ 2. Perennials, with small or rather small flowers: corolla greenish-white or pale yellow, short; its tube hardly if at all longer than the calyx: mature nutlets bony, white and polished.

* Corolla with intruded crests in the throat: flowers sparse, or at least the fruits scattered: nutlets apt to be solitary.

+ Pubescence soft, fine, and short, only the upper face of the leaves becoming scabrous.

L. OFFICINÁLE, L. Copiously branching, 2 or 3 feet high: leaves lanceolate or ovate-lanceolate, acute, pale (2 inches or less long); a pair of lateral ribs more or less manifest: tube of the dull-white corolla considerably longer than the limb: style nearly equalling the stamens: nutlets less than 2 lines long. — Engl. Bot. t. 134; Fl. Dan. t. 1034. — Roadsides, Canada and New England. (Nat. from Eu.)

L. latifolium, Michx. More sparingly and loosely branched: leaves greener, ovate and broadly oblong-lanceolate, gradually acuminate, all acute and the lower tapering at base (2 to 5 inches long), with 2 to 4 pairs of ribbed veins: tube of the corolla little longer than the limb: style shorter than the stamens: nutlets globose-ovate, over 2 lines long. — Fl. i. 131; Jacq. Eclog. t. 136. *L. officinale*, var. *latifolium*, Willd., &c. — Open ground and borders of thickets, Upper Canada to Wisconsin and south to Virginia and Tennessee. Flowers yellowish-white, or sometimes light yellow, when it is *L. lutescens* of N. Coleman in Cat. Pl. Grand Rapids, Michigan, 1874, 29.

+ + Pubescence hispid or rough-hirsute.

L. tuberósum, Rugel. Stem at first low, in age often more than 2 feet high, with some spreading branches: leaves ovate or oblong-lanceolate, or the large radical ones obovate-oblong, mostly obtuse; the upper triple-ribbed, the others nervose-veined; bristles of the upper and even of the lower face at length with pustulate base: flowers short-pedicelled: corolla "yellowish-white," 2 or 3 lines long: nutlets globular, much shorter than the at

length elongated-linear calyx-lobes: "roots bearing oblong tubers." — DC. Prodr. x. 76; Chapm. Fl. 332. — Florida, on rocky river-banks, *Rugel, Chapman.* Texas, *Wright, Lindheimer*, only in fruit. Larger leaves at length 4 to 6 inches long, and calyx-lobes in the Texan plant becoming almost half inch long.

* * Corolla nearly naked at the throat, but obscurely puberulent and thickened under each lobe: inflorescence dense and very foliose.

L. pilosum, Nutt. Soft-hirsute and pubescent, pale or canescent: stems numerous from a stout root, a foot high, strict, mostly simple, very leafy: leaves linear and linear-lanceolate, 2 to 4 inches long, mostly tapering from near the base to apex; the lateral ribs or veins obscure: flowers densely crowded in a leafy thyrus: corolla campanulate-funnel-form, almost half an inch long, silky outside, dull greenish-yellow: style slender: nutlets broadly ovate, acute, smooth and polished, 2 to $2\frac{1}{2}$ lines long. — Nutt. in Jour. Acad. Philad. vii. 43; Wats. Bot. King, 238. *L. Torregi*, Nutt. l. c. *L. ruderdale*, Dougl. in Hook. Fl. ii. 89. — Hills and cañons, Montana and British Columbia to Utah and the eastern borders of California.

§ 3. **BÁTSCHA, Endl. (PUCCOON.)** Perennials, with long and deep red roots (filled with dyeing matter), very leafy stems, and mostly showy flowers: corolla yellow, much exceeding the calyx (except in cleistogenous or depauperate blossoms), more or less appressed-pubescent outside; the lobes commonly undulate or crenulate and sinuses plicate-infolded: pubescent crests in the throat apparent: stigma capitate-2-lobed: nutlets white, smooth and polished, the inner face rather conspicuously carinate. — *Batschia*, Gmelin.

* Corolla light yellow, rather small; later floral leaves reduced to bracts, not surpassing the calyx.

L. multiflorum, Torr. Minutely strigose-hispid: stems virgate, often paniculate at summit, a foot or two high: leaves linear or linear-lanceolate: flowers numerous, short-pedicelled, the later spicate: corolla narrow (5 or 6 lines long), with very short rounded lobes and tube fully twice the length of the calyx; the crests or folds in the throat inconspicuous. — Watson, Bot. King, 233 (remark); Gray, Proc. Am. Acad. x. 51. *L. pilosum*, Gray in Am. Jour. Sci. ser. 2, xxxiv. 256, not Nutt. — Lower Rocky Mountains, Colorado to Arizona and W. Texas. Expanded limb of corolla 5-cleft, the minutely undulate rounded lobes only a line and a half long: ring at base of the tube sparingly bearded. Anthers in all known specimens inserted high in the throat and the style only half the length of the corolla; but a counterpart form may be expected.

* * Corolla bright and deep yellow or orange; the tube from one half to twice longer than the calyx, and the crests at the throat little if at all projecting or arching; the lobes barely undulate or entire: floral leaves or foliaceous bracts large, much surpassing the calyx. (Dimorphism as to height of insertion of stamens and length of style manifest.)

L. Californicum, Gray. Soft-hirsute, a foot high: leaves lanceolate or oblong: corolla hardly an inch long; its proper tube hardly twice the length of the calyx; its funnel-form throat considerably longer than the very short lobes, almost destitute of crests; the glandular ring at base of the tube inconspicuous and naked. — Proc. Am. Acad. l. c., & Bot. Calif. i. 522. *L. canescens*, Torr. in Pacif. R. Rep. iv. 124, not Lehm. — California, in Nevada and Plumas Counties, *Bigelow, Lemmon, Mrs. Austin.* Short-styled and high-stamened form only known.

L. canescens, Lehm. (PUCCOON of the Indians.) More or less canescent when young: stem hirsute, a span to a foot or more high: leaves oblong-linear or the upper varying to ovate-oblong, mostly obtuse, softly silky-pubescent, greener with age but not rough: corolla orange-yellow, with rather ample deeply 5-cleft limb, prominent crests in the throat, and glandular ring at the base naked: flowers nearly sessile. — Gray, Proc. l. c. *L. canescens*, & *L. sericeum*, Lehm. Asper. 305, 306. *Batschia canescens*, Michx. Fl. i. 130, t. 14; Barton, Fl. Am. Sept. t. 58. *Anchusa canescens*, Muhl. Cat. — Plains and open woods, in sandy soil, Upper Canada and Saskatchewan to Alabama, New Mexico, and Arizona. Tube of the corolla 3 or 4 lines long; the well-developed limb about half an inch in diameter; in one form style about the length of the tube and stamens, inserted below its middle. — To this species also belongs *L. sericeum*, Lehm., but not *Anchusa Virginica*, L., which as to the Linnean herbarium is not identified, as to the plant of Clayton's herb. is an *Onosmodium*, as to Morison's is probably *L. hirtum*, and as to Plukenet's may be either of the Puccoons.

L. hirtum, Lehm., l. c. Hispid or hirsute, and at length rough, a foot or two high: leaves lanceolate or the lower linear and floral ovate-oblong: corolla bright orange, with ample and rotate deeply 5-cleft limb and prominent crests in the throat; the ring at base within bearing 10 very hirsute lobes or teeth; flowers mostly pedicelled and linear-lanceolate: calyx-lobes elongated. — *Batschia Carolinensis*, Gmel. Syst. i. 315. *B. Gmelini*, Michx. l. c. *Achusa hirta*, Muhl. Cat. *Lithospermum decumbens*, Torr. in Ann. Lye. N. Y. ii. 225. *L. Bejariense*, DC. l. c. 79. — Pine barrens, &c., Michigan to Minnesota, Virginia, Florida, Texas, and Colorado. — Tube of the intense orange corolla 4 or 5 lines long, the outspread limb sometimes almost an inch in diameter, but often half smaller. In some specimens, the stamens are inserted on the middle of the corolla and the style rises to the throat; in others, the style rises only to the middle and the stamens are in the throat.

* * * Corolla bright yellow, salverform; its tube in well-developed flowers 2 to 4 times the length of the calyx; the crests in the throat conspicuous and arching; the lobes undulate and more or less erose: later flowers cleistogenous. — *Pentalophus*, A. DC.

L. angustifolium, Michx. Erect or diffusely branched from the base, a span to a foot or more high, minutely scabrous-strigose and somewhat cinereous: leaves all linear: flowers pedicelled, leafy-bracted, of two sorts; the earlier and conspicuous kind with tube of the corolla an inch or less in length and the rounded lobes commonly crenulate-erose; later ones, and those of more diffusely branching plants, with inconspicuous or small and pale corolla, without crests in the throat, probably cleistogenous, the style shorter than the nutlets; in these the pedicels are commonly recurved in fruit: nutlets usually copiously impressed-punctate, conspicuously carinate ventrally. — Michx. Fl. i. 130 (the state with inconspicuous flowers); Bebb in Am. Naturalist, vii. 691. *L. linearifolium*, Goldie in Edinb. Phil. Jour. 1822, 319, the same state (unless possibly Goldie's plant is *L. arvense*). *L. breviflorum*, Engelm. & Gray, Pl. Lindh. i. 44, a similar state. Long-flowered plant is *Batschia longiflora* (Pursh, Fl. i. 132), & *B. decumbens*, Nutt. Gen. i. 114. *Lithospermum longiflorum*, Spreng. *L. incisum*, Lehm. l. c.; Hook. Fl. ii. t. 165. *L. Mandanense*, Spreng.; Hook. l. c. t. 166, a small and smaller-flowered form. *Pentalophus longiflorus* & *P. Mandanensis*, A. DC. Prodr. x. 87. — Dry and sterile or sandy soil, prairies and banks of streams, Illinois and Wisconsin to Saskatchewan and Dakota, south to Texas, and west to Utah and Arizona. Root thick and deep, abounding in violet-colored dye. Glandular ring at base of corolla naked. In the state with large and showy flowers, as far as known, the stamens are always borne at the upper part of the tube, and the filiform style is slightly exserted: but perhaps there is some heterogone-dimorphism. There are seemingly all stages between these conspicuous and the cleistogenous blossoms which are produced through the season.

18. ONOSMÓDIUM, Michx. (*"Orosma*, and *εἶδος*, likeness, from the resemblance to the Old-World genus *Onosma*.) — Perennials (of the Atlantic States and Mexico, &c.), rather stout and coarse, rough-hispid or hirsute; with nervose or costate-veined leaves, and leafy-bracteate flowers crowded in scorpioid spikes or racemes, when fruiting more separated; the bracts resembling the leaves. Fl. spring and summer, strongly proterogynous, the style early exserted. Corolla greenish-white or yellowish-green: a glandular 10-lobed ring adnate to the base of the tube within. Nutlets as in most *Lithosperma*. — Michx. Fl. i. 132. *Onosmodium* and *Macromeria* in part, Don; DC. Prodr. x. 68; Benth. & Hook. Gen. ii. 859. True *Macromeria* (*exserta*) has versatile anthers on capillary and long exserted filaments.

§ 1. **MACROMERIOIDES.** Corolla 3 or 4 times the length of the calyx, narrow; the sinuses plane: filaments slender, longer than the linear-oblong obtuse anthers. — *Macromeria*, Don, & DC. partly. (One or two Mexican species have the anthers promptly versatile or transverse; in ours they remain erect.)

O. Thúrberi. Somewhat sparsely strigose-hispid with short bristles (at least on the foliage) and minutely appressed-pubescent or when young canescent: stem simple, 2 or 3 feet high: leaves pinnately 5-7-ribbed; the cauline oblong-lanceolate or oblong (4 or 5

inches long), passing into ovate bracts (at length an inch or two long) : leafy-racemose inflorescence in age elongated, many-flowered : pedicels 4 or 5 lines long : calyx parted to the base into narrow linear lobes (often an inch long) : corolla narrowly trumpet-shaped, 2 inches long, whitish and densely villous outside, yellow inside; the lobes oblong-ovate, obtuse, nearly equalled by the erect anthers. — *Macromeria viridiflora*, Torr. Bot. Mex. Bound. 139, not DC., according to Ic. Mex. t. 904, which has broadly subcordate-ovate and acute corolla-lobes, giving the appearance of "excised sinuses," shorter and versatile anthers, &c. — New Mexico, *Thurber, Bigelow, Wright*. Arizona, in dry woods, *Rothrock*. The portions of base of the corolla lobes which are interior in the bud are roundish-auriculate.

§ 2. *ONOSMODIUM* proper. Corolla seldom twice the length of the calyx; the lobes somewhat conduplicate in the bud; the sinuses gibbous-inflexed: filaments shorter (in our species very much shorter) than the mostly sagittate glandular-mucronulate or acuminate anthers: leaves pinnately nervose-ribbed. — *Onosmodium*, Michx.

O. Bejariense, DC. Stems 1 to 3 feet high, rather stout, hispid with spreading bristles: leaves oblong-lanceolate, 5-7-ribbed (the lower obtuse, upper acutish); upper surface appressed strigose-hispid, the lower more or less canescent with fine and soft pubescence: flowers short-pedicelled: corolla funnelform (6 to 9 lines long), about twice the length of the calyx, white; the greenish ovate-triangular acuminate lobes about one quarter the length of the tube, minutely pubescent externally and with some long hirsute hairs. — Prodr. x. 70. *O. Carolinianum*, Torr. Bot. Mex. Bound. l. c., not DC. — Border of thickets, nearly throughout Texas; first coll. by *Berlandier*.

O. Carolinianum, DC., l. c. Stout, 2 or 3 feet high, shaggy-hispid: leaves ovate-lanceolate and oblong-lanceolate, acute, 5-9-ribbed, generally hairy both sides: flowers nearly sessile: corolla short (4 or 5 lines long), yellowish-white, oblong-funnelform; its ovate-triangular acute lobes very hairy outside, and nearly half the length of the tube. — *Lithospermum Carolinianum*, Lam. Ill. & Dict. Suppl. ii. 837. *Purshia mollis*, Lehm. Asper. 383. — Alluvial grounds, Upper Canada to Georgia and Texas.

Var. mólle. A foot or two high; the pubescence shorter and less spreading or appressed: leaves mostly smaller (about 2 inches long), when young softly strigose-canescient beneath. — *Onosmodium molle*, Michx. Fl. i. 133, t. 15; Gray, Man. ed. 5, 362. *Purshia mollis*, Lehm. Asper. 382. — Illinois to Saskatchewan, Utah, and Texas.

O. Virginianum, DC., l. c. Strigulose-hispid throughout with mostly appressed short bristly hairs: stems rather slender, a foot or two high, often paniculate: leaves narrowly oblong or somewhat lanceolate, obtuse (1 to 2½ inches long), 3-5-ribbed: corolla yellowish, small (4 lines long); the lobes lanceolate-subulate, sparingly long-bristly outside, little shorter than the cylindraceous tube. — *O. hispidum*, Michx. l. c. *Purshia hispida*, Lehm. l. c. *Lithospermum Virginianum*, L. — Hillsides and banks, New England to Florida and Louisiana. The specific names conferred by Michaux on this and the preceding species were replaced in the Prodrômus by earlier ones under *Lithospermum*; which may be agreed to, Michaux's *O. hispidum* being far less hispid than *O. Carolinianum*, and *O. molle* is a misnomer except for the western variety (which cannot be separated) on which Michaux's species is founded.

19. SÝMPHYTUM, Tourn. COMFREY. (Ancient Greek and Latin name.) — Coarse perennial herbs; with large and thick bitterish roots, mucilaginous juice, and loose or nodding racemose flower-clusters: bracts small or none. Fl. early summer. All of the Old World.

S. OFFICINÁLE, L. (COMFREY.) Two or 3 feet high from very thick roots, branching, rather soft-hirsute: cauline leaves long-decurrent on the branches, ovate-lanceolate and narrower, large: corolla yellowish-white, half inch long: style exserted: nutlets wrinkled or almost smooth. — Escaped from gardens into moist grounds sparingly in N. Atlantic States. (Nat. from Eu.)

S. ASPÉRRIMUM, Sims, a Caucasian species, with almost prickly stems, very scabrous leaves, and blue-purple flowers, is cultivated both as an ornamental and as a forage plant, and is not unlikely to run wild.

20. LYCÓPSIS, L. BUGLOSS. (*Λυός*, wolf, and *ὄψις*, face or likeness; from some fanciful resemblance.) — Coarse setose-hispid annuals, of the Old World, small-flowered and leafy-bracted, one species sparingly introduced into the Eastern Atlantic States.

L. ARVÉNSIS, L. Rough and inelegant weed, a foot or two high, with spreading bristly hairs at length pustulate at base: leaves lanceolate, undulate-margined: flowers more or less racemose: corolla blue, or at first purple; the tube not longer than calyx; lobes barely a line long. — Dry waste grounds, Canada to Virginia: scarce. (Nat. from Eu.)

21. ÉCHIUUM, Tourn. VIPER'S BUGLOSS, BLUEWEED. (Old Greek name, from *ἔχίς*, a viper; the shape of the nutlets likened to a snake's head.) — Biennials (or rarely shrubs), of the Old World; flowering in summer. One species an introduced weed.

E. VULGÁRE, L. Rough-hispid herb, a foot or two high: leaves lanceolate, or the upper linear, sessile: flowers in short lateral spikes disposed in a raceme-like thyrsus: corolla almost an inch long, showy, purple changing to deep blue (rarely pale). — Roadsides and meadows of the Middle Atlantic States. (Nat. from Eu.)

ORDER XCIV. CONVULVULACEÆ.

Herbs or shrubs, with stems generally twining or trailing, and many with milky juice; the leaves alternate and petioled, destitute of stipules; peduncles truly axillary, 1-flowered or cymosely 3-many-flowered; flowers regular and perfect, 5-merous or rarely 4-merous, except as to the gynœcium which is almost always 2-carpellary; calyx mostly of distinct and imbricated sepals, persistent; corolla either plicate and the plaits convolute, or induplicate-valvate, or sometimes imbricated in the bud, the limb either lobed or entire; stamens as many as the corolla-lobes and alternate with them, usually inserted low down on the tube; hypogynous disk commonly annular and manifest; ovary 2-celled or rarely 3-celled, with a pair of erect anatropous ovules in each cell, or spuriously 4-6-celled (each cell being more or less divided into a pair of 1-ovuled half-cells by a false partition), or rarely 2-4-parted from above around the style in the manner of *Borraginaceæ*; style single or once or twice divided; stigmas terminal or introrse; fruit capsular or sometimes fleshy; seeds comparatively large, filled by a crumpled or plaited embryo involving or partly surrounded by a little mucilaginous or fleshy albumen, its cotyledons ample and foliaceous, or in *Cuscuta* a spiral embryo and no cotyledons. *Cuscuta* moreover is leafless. *Nolaneæ* form an exceptional tribe with several or many indehiscent carpels, narrow cotyledons, &c., but are all South American, and connect with the following order. The present large order is well distinguished from all its allies by the character of the solitary or geminate seeds, size and nature of the embryo, and inferior radicle, along with the usually twining or trailing growth, alternate leaves, &c.

TRIBE I. DICHONDREÆ. Ovary divided into 2 or 4 carpels or almost separate lobes, surrounding a pair of basilar styles.

1. DICHONDRA. Corolla deeply 5-cleft or 5-parted, not plicate; the lobes imbricated in the bud. Filaments and anthers short. Ovary 2-parted, forming 2 indehiscent or irregularly bursting utricles in fruit: styles 2 or at base united into one, filiform: stigmas capitate. Seed by abortion solitary, globular, smooth. Embryo biplicate: cotyledons elongated-oblong. Creeping herbs.

TRIBE II. CONVULVULÆ. Ovary entire. Plants with ordinary foliage, not parasitic.

- * Corolla plicate at the sinuses and the plaits dextrorsely convolute: cotyledons broad, often emarginate.
- 2. *IPOMŒA*. Style undivided, terminated by a single capitate or 2-3-globose stigma. Corolla from salverform or funnelform to nearly campanulate. Capsule globular, 4-6- (or by abortion fewer-) seeded, 2-4-valved.
- 3. *JACQUEMONTIA*. Style undivided: stigmas 2, ovate or oblong, thick but somewhat flattened. Otherwise as *Ipomœa* and *Convolvulus*, and intermediate between the two.
- 4. *CONVOLVULUS*. Style undivided or 2-cleft only at the apex: stigmas 2, from linear-filiform to subulate or ovate, when broad always thin and flat. Stamens included. Corolla from funnelform to campanulate. Capsule globose, 2-celled, or sometimes imperfectly 4-celled by spurious partitions between the two seeds, or by abortion 1-celled, mostly 2-4-valved.
- 5. *BREWERIA*. Style 2-cleft or 2-parted; the divisions simple, each bearing a capitate stigma. Corolla, stamens, and capsule of *Convolvulus*.
- 6. *EVOLVULUS*. Styles 2, distinct or sometimes united below, each 2-cleft: stigmas linear-filiform or somewhat clavate. Corolla from funnelform to almost rotate. Otherwise like *Convolvulus* on a small scale, not twining.
- * * Corolla not plicate in the bud, 5-cleft: cotyledons linear, biplicate, entire.
- 7. *CRESSA*. Styles 2, distinct, entire: stigmas capitate. Calyx of 5 nearly equal sepals, equalling the oblong-campanulate tube of the corolla; the limb of the latter 5-parted into oblong-ovate lobes, lightly convolute-imbricate and somewhat induplicate in the bud. Filaments filiform, exerted from the throat of the corolla. Ovary 2-celled, 4-ovuled. Capsule by abortion often 1-seeded. Stems not twining.

TRIBE III. CUSCUTÆ. Ovary entire. Leafless parasitic twining herbs, destitute of foliage and of all green color; the spirally coiled filiform embryo even destitute of cotyledons. Corolla imbricated in the bud, appendaged below the stamens.

8. *CUSCUTA*. The only genus.

1. *DICHONDRA*, Forst. (Formed of $\delta\acute{\iota}\varsigma$, double, and $\chi\acute{o}\rho\delta o\varsigma$, grain or roundish mass, from the twin fruit.) — Small prostrate and creeping perennials (found almost all round the warmer parts of the world, but most in America); with filiform stems, slender petioles to the reniform or round-cordate entire leaves, and naked peduncles bearing a single small flower. Corolla greenish or yellowish-white. Carpels pubescent. — Char. Gen. 39, t. 20. The following may be the only species.

D. répens, Forst. Soft-pubescent or slightly sericeous, but green or greenish: leaves mostly with a deep basal sinus: sepals obtuse, at length obovate with narrowed base or spatulate: corolla-lobes ovate, nearly glabrous. — Lam. Ill. t. 183; Smith, Ic. Ined. t. 8. *D. sericea*, Swartz, Prodr. 54, & Fl. Ind. Occ. t. 11, a small and silky form. *D. Carolinensis*, Michx. Fl. i. 136, a large and greener form. *D. repens, macrocalyx*, & *sericea*, Meissn. in Mart. Fl. Bras. vii. 357. — Wet ground, Virginia to Texas, near the coast, and Arizona. (Trop. & S. Am., Asia, Oceanica, Australia, S. Africa.)

D. argentea, Willd. Canescently sericeous and silvery: leaves mostly with a shallow sinus or even truncate, and with comparatively short petioles: sepals from oblong-oval to lanceolate: corolla-lobes oblong-lanceolate, acutish, villous outside. — Hort. Berol. 297, t. 81; Meissn. l. c. — S. Texas to Arizona. (Mex., S. Amer.)

2. *IPOMŒA*, L. MORNING GLORY. (According to Linnæus, composed of $\dot{\iota}\psi$, $\dot{\iota}\pi\acute{o}\varsigma$, and $\acute{\alpha}\mu o i o\varsigma$, like; but $\dot{\iota}\psi$ is a worm.) — A large genus, mainly of twining herbs, some prostrate, diffuse, or even erect: fl. summer. Calyx not bracteate at base, but the outer sepals commonly larger. Limb of the corolla entire or barely 5-angulate, or slightly 5-lobed. Valves of the capsule usually septifragal. Cotyledons broad, commonly 2-lobed. Genus here taken in the

extended sense, as in Meissn. in Mart. Fl. Bras. vii. 215, & Benth. & Hook. Gen. ii. 870.

I. LEUCANTHA, Jacq., a South American species, is mentioned by Choisy in DC. Prodr. as having been collected by Charpentier in Arkansas; but we have it not.

I. CAROLINA, L. (Catesb. Car. ii. t. 91), belongs to the Bahamas and other West Indies, not Carolina.

ANISEIA AUREA, Kellogg, in Proc. Calif. Acad. iii. 229, with plate, is a 5-foliolate *Ipomœa* of Lower California, perhaps undescribed, and the same as no. 81 in the collection of Xantus, in the same district, which was referred to *I. sinuata*, var. *julius integris*, in Proc. Am. Acad. v. 165.

§ 1. *CALONYCTION*, Griseb. Corolla salverform, ample, with very long tube, flat limb, and throat not dilated; in æstivation contorted: sepals herbaceous, becoming coriaceous, the outer sometimes cornute-tipped: style capitate-didymous: ovules 4, geminate in 2 cells, or commonly solitary in 4: flowers white, opening at evening and for one night, fragrant. — *Calonyction*, Choisy.

I. BONA-NÓX, L. Extensively twining, glabrous: stem lactescent, usually becoming muricate-tuberculose: leaves from ovate-cordate to hastate, entire or 3-5-lobed, acuminate: peduncles 1-7-flowered: outer sepals commonly with an infraterminal cusp or horn: corolla with slender tube 3 or 4 inches long and limb 4 or 5 inches wide, green externally between the plaits: stamens and style short-exserted: capsule ovate-conical, acute: seeds glabrous. — Andr. Bot. Rep. t. 403; Bot. Mag. t. 752. *Calonyction speciosum*, Choisy, Convolv. 59, & in DC. Prodr. ix. 345. — S. Florida, perhaps indigenous: cult. for ornament, especially southward. (Mex., W. Ind., S. Amer., and scattered through most tropical regions.)

§ 2. *QUAMOCLIT*, Meissn., &c. Corolla salverform or with somewhat funnelliform but narrow tube; the limb not contorted in the bud: sepals membranaceous or herbaceous: stamens and style more or less exserted: ovules solitary in the 4 cells, i. e. the 2 cells bilocellate by a spurious partition: flowers red, opening by day. (Ours glabrous annuals.) — *Quamoclit*, Tourn., Choisy.

I. QUAMOCLIT, L. (CYPRESS-VINE.) Slender: leaves pinnately parted into linear-filiform divisions, short-petioled or sessile: peduncles few-flowered: corolla over an inch long, scarlet-red; the tube narrowly funnelliform above; lobes ovate: sepals merely mucronate or blunt. (Hybridizes with the following.) — Lam. Ill. t. 104; Bot. Mag. t. 214. *Quamoclit vulgaris*, Choisy, &c. — Cult. and sparingly spontaneous in S. Atlantic States. (Trop. Amer., &c.)

I. COCCÍNEA, L. Rather tall-climbing: leaves slender-petioled, cordate, or with somewhat sagittate or hastate base, conspicuously acuminate, entire, or angulate, or 3-5-toothed: peduncles few-several-flowered: corolla 9 to 20 lines long, scarlet or verging to orange; the tube clavate; limb obscurely lobed, half to two-thirds inch wide: sepals mostly with slender appendage below the tip. — Sims, Bot. Mag. t. 221; Andr. Bot. Rep. t. 499. *I. luteola*, Jacq. Ic. Rar. t. 35, with orange-colored corolla. *Quamoclit coccinea*, Mench, Meth. 453; Choisy in DC. — River-banks, &c., Middle and S. Atlantic States (apparently introduced, but well naturalized), and New Mexico and Arizona, where it is probably indigenous. (Trop. Amer., &c.)

Var. hederifolia. Leaves from angulate (or the earlier quite entire) to 3-lobed or even 3-parted, or sometimes pedately 5-parted: corolla usually rather larger. — *I. hederifolia*, L.; Meissn. in Fl. Bras. vii. t. 76, fig. 1. *I. sanguinea*, Vahl, Symb. iii. 33; Bot. Reg. t. 9; Bot. Mag. t. 1769. *Quamoclit hederifolia*, Choisy. — W. Texas to Arizona. (Trop. Amer.)

§ 3. *EUPOMŒA*. Corolla funnelliform or nearly campanulate: stamens and style not exserted. — *Ipomœa*, *Batatas*, *Pharbitis*, & *Aniseia*, Choisy. *Ipomœa* & *Pharbitis*, Meissn.

* (MORNING GLORY.) Lobes of the stigma and cells of the ovary 3 (rarely varying to 2): sepals long and narrow, acuminate or attenuate upward, herbaceous, mostly hispid or hirsute below: corolla funnelliform, purple, blue, and white: seeds glabrous. — *Pharbitis*, Choisy.

+ Root annual: flowers opening early in the morning, soon closing under sunshine. (All included under *Convolvulus hederaceus*, L., Hort. Cliff. & Spec. ed. 1.)

- I. hederácea, Jacq.** Leaves deeply 3-lobed and deeply cordate; the lobes ovate or ovate-lanceolate, and the middle one narrowed at base, lateral ones sometimes repand-2-lobed: peduncles either short or very short, 1-3-flowered: pedicels none or hardly any: sepals (two-thirds to near an inch long) linear-attenuate from a dilated and densely long villous-hirsute base, in age the upper part recurved-spreading: corolla short-funnelform, sky-blue with whitish tube, less than 2 inches long. — Ic. Rar. t. 36; Bot. Reg. t. 85; Meissn. l. c. 228; but not the *Convolvulus hederaceus*, L. Spec. ed. 2, 219, at least as to the cited figures of Dill. Elth., but clearly *C. Nil*, L. l. c., as to the lower figure cited (fig. 92), and therefore of Amer. authors. *I. barbata*, Roth, Cat. i. 37. *Pharbitis hederacea*, Choisy, l. c. — Waste and cult. grounds, Penn. to Florida and Louisiana, barely naturalized northward, perhaps indigenous far southward. (Trop. Amer. and now widely dispersed.)

I. Nil, Roth, Cat. i. 16, and of most botanists who distinguish *I. hederacea*, (*Convolvulus Nil*, L. l. c., only as to fig. 91 in Dill. Elth., & Bot. Mag. t. 188, and doubtless *C. hederaceus*, L., as to Dill. Elth. t. 81, fig. 93), is an Old World species with larger and longer corolla (2 or 3 inches long), attenuate and erect calyx-lobes an inch long, the peduncle and pedicels short but distinct, the leaves less lobed, &c. To this belongs *Pharbitis triloba*, Miq., and *P. Nil*, var. *limbata*, Hook. f. Bot. Mag. t. 5720, a cultivated plant. To it properly belongs the Oriental name *Nil*.

- I. Mexicána.** Slender: earlier leaves angulate-3-lobed or some entire; the others as in *I. hederacea*, or the middle lobe often broadest at base: peduncles slender (from half inch to 3 inches long), commonly equalling or even surpassing the petiole: fruiting pedicels (1 to 3) as long as the calyx: sepals (only half inch long) lanceolate, rather sparsely hirsute or hispid with comparatively short hairs, erect: corolla violet-purple, only an inch long, and limb an inch or so in diameter. — *Convolvulus flore purpureo*, &c., Dill. Elth. t. 83, fig. 96, therefore in part *C. hederaceus*, L.: it might have taken this specific name had not another of the confused species been early taken up by Jacquin in *Ipomœa*. *I. Nil*, var. *diversifolia*, Choisy in DC. Prodr. ix. 343, viz. *Pharbitis diversifolia*, Lindl. Bot. Reg. t. 1988. *I. Nil*, Meissn. in Fl. Bras. l. c. 228, in part, & t. 79, fig. 1. — New Mexico and Arizona, *Fendler*, *Wright*, *Thurber*, &c. (Mex., &c.) Nearer to the following than to the preceding.

- I. purpúrea, Lam.** (COMMON MORNING GLORY.) Leaves cordate, entire: peduncles elongated (2 to 5 inches long), 1-5-flowered: umbellate pedicels fully twice the length of the calyx, thickened and usually refracted in fruit: sepals lanceolate, half inch long, less hirsute: corolla about 2 inches long, violet, purple, or pink, varying to white and diversely variegated. — *Convolvulus purpureus*, L.; Sims, Bot. Mag. t. 113, 1005, 1682. *Pharbitis hispida*, Choisy, l. c. — Cult. grounds, an escape from cultivation in the Atlantic States. Texas, *Berlandier*. San Diego Co., California (*Cleveland*), where it may be indigenous. (Mex., &c., and widely dispersed.)

+ + Root perennial: flowers more diurnal?

- I. Lindheimeri.** Finely appressed-pubescent (the stem retrorsely so), when young canescent: leaves deeply 5-cleft or 5-parted, all or the 3 interior lobes ovate or ovate-lanceolate with a much contracted base, the contracted portion often half the length of the dilated lobe: peduncle slender, 1-2-flowered (1 to 3 inches long): pedicels a quarter to half inch long: sepals lanceolate-linear from an at length broadish base, fully an inch long, erect, sparsely hirsute (all alike): corolla light blue, elongated-funnelform with narrow tube, about $3\frac{1}{2}$ inches long. — *I. heterophylla*, Torr. Bot. Mex. Bound. 149, not Ortega. — Rocky soil, W. Texas to New Mexico, *Lindheimer*, *Wright*. (Adjacent Mex., *Gregg*.)

- I. cathártica, Poir.** Glabrous or nearly so, even to the calyx: leaves cordate, acuminate, entire, or some of them 3-lobed or deeply cleft: peduncles equalling the petiole, 1-5-flowered: outer sepals larger and ovate-lanceolate, the inner narrowly lanceolate, all long-acuminate: corolla $2\frac{1}{2}$ or 3 inches long, pink-purple or crimson. — Dict. Suppl. iv. 633; Griseb. Fl. W. Ind. 473. *I. fastigiata*, Chapm. Fl. 433, not Sweet. *Convolvulus pudibundus*, Lindl. Bot. Reg. t. 999. *Pharbitis cathartica*, Griseb. l. c. — S. Florida, *Blodgett*, *Palmer*. Perhaps introduced. (Bahamas to Brazil.)

* * Stigma 2-lobed or entire: ovules only 4 and proper cells of the ovary only 2, but these in some divided by cellular matter forming an additional partition between the two seeds: sepals membranaceous, or rather fleshy, or becoming coriaceous, mostly very much imbricated.

+ Creeping (or at least prostrate and not twining) perennials, glabrous or nearly so: flowers rather large, opening at morning.

I. Pes-cápœæ, Sweet. Herbage succulent: leaves orbicular, mostly emarginate at both ends, 2-glandular at base, fleshy, pinnately many-veined, 2 or 3 inches long, about equalled by the petiole: sepals oval, obtuse: corolla (nearly 2 inches long) broadly short-funnelform, purple: mature capsule 2-celled: seeds rusty-pubescent. — "Hort. Lond. ed. 2, 289;" Roth, Nov. Pl. 109; Desc. Ant. ii. t. 130. *I. maritima*, R. Br.; Bot. Reg. t. 319. *I. orbicularis*, Ell. Sk. i. 257. *Convolvulus Pes-capræ* & *Brasiliensis*, L. — Drifting sands of the coast, Georgia to Texas. (Most tropical coasts.)

I. acetosæfólia, Rœm. & Sch. Stem slender, extensively creeping and freely rooting: leaves slightly succulent, slender-petioled, exceedingly various; the earlier oblong or subcordate, or emarginate at both ends, either entire or panduriform or 3-lobed; the others sometimes linear, sometimes deeply 3-5-lobed or parted, and the lobes narrowed at base; lobes obtuse: peduncles 1-flowered: sepals oblong, mucronate or acuminate: corolla oblong-funnelform, white with yellowish throat, $1\frac{1}{2}$ to 2 inches long: capsule globose, thin-walled, half inch broad, 4-celled: seeds densely villous-woolly, globular. — Syst. iv. 246; Desc. Ant. ii. t. 145; Meissn. in Fl. Bras. vii. 255, t. 94. *I. carnosa*, R. Br. Prodr., ex Benth. Fl. Austr. iv. 420. *Convolvulus littoralis*, L. *C. acetosæfolius*, Vahl, Ecl. i. 18. *C. stoloniferus*, Desr. in Lam. Diet. iii. 550; Cyr. Pl. Rar. i. 14, t. 5. *C. obtusilobus*, Michx. Fl. i. 139; Ell. l. c. *Batatas acetosæfolia* & *littoralis*, Choisy in DC. Prodr. ix. 338, excl. syn. *I. longifolia*, Benth. — Sandy sea-coast, S. Carolina to Texas. (Most tropical shores.)

I. longifólia, Benth. Prostrate stems stout, 6 to 10 feet long: leaves thickish, short-petioled, pinnately-veined, from linear- to oblong-lanceolate, entire, merely obtuse at base, mucronate at tip, 2 to 5 inches long: peduncle 1-flowered: sepals broadly oblong or oval, very obtuse: corolla very broadly open-funnelform, white with purple throat, 4 inches long, or when widely expanded 3 or 4 inches in diameter: capsule ovate, 2-celled, with firm-coriaceous valves, an inch long: seeds oblong, rather minutely hairy at the angles. — Pl. Hartw. 16; Lindl. Bot. Reg. xxvi. t. 21; Torr. Bot. Mex. Bound. 149. *I. Shumardii*, Torr. in Marcy Rep. 191. — S. E. Arizona, *Thurber*, *C. Wright*. (Adjacent Mex.)

I. BATÁTAS, Lam., the SWEET POTATO of cultivation, belongs here, although it has the fleshy roots of the following, and the stems trail rather than creep: the leaves vary from cordate-hastate to deltoid, and from nearly entire to lacinate-lobed or parted. Origin unknown, unless from *I. fastigiata* of Trop. Amer.

+ + Twining, or at first trailing, but not creeping: leaves cordate or sagittate, or with divisions broader than linear.

+ + Perennials, with immense fleshy-farinaceous roots: leaves cordate, entire, or some of them 3-5-lobed: peduncles one-several-flowered: sepals oblong or ovate, obtuse or merely mucronate, over half inch long: corolla over 2 inches long.

I. Jalápa, Pursh. Freely twining from a napiform or thick fusiform root (white, sometimes weighing 40 or 50 pounds), tomentulose-pubescent, at least the lower face of the shallow-cordate plicate-veiny repand or sometimes lobed leaves (these 3 to 5 inches long): corolla "opening at night," 3 or 4 inches long, white or light pink-purple; the narrow tube and throat 3 or 4 times longer than the calyx and deep purple: ovary imperfectly 4-celled: seeds densely clothed with long villous wool. — Fl. i. 146; Bot. Reg. t. 342, 621; Griseb. l. c. *Convolvulus Jalapa*, L. Mant. 43; Desf. in Ann. Mus. Par. ii. 126, t. 40, 41; Sims, Bot. Mag. t. 1572. *Ipomœa macrorrhiza*, Michx. Fl. i. 141. *Convolvulus macrorrhizus*, Ell. Sk. i. 352. *Ipomœa Mechoacan*, Nutt. in Am. Jour. Sci. v. 289. *I. Michauxii*, Sweet, l. c.; Chapm. Fl. 343. *I. Purshii*, Don, Syst. l. c. *Batatas Jalapa*, Choisy, Convolv. & DC. l. c. 338. — Light sandy soil along the coast, S. Carolina to Florida. (Mex., W. Ind., &c.) Apparently same as the Mexican false or Mechoacan Jalap, but root of the U. S. plant hardly purgative.

I. panduráta, Meyer. Glabrous or nearly so: stems trailing or twining: root very long and large (at length weighing 10 to 20 pounds): leaves (2 to 4 inches long) usually cordate and entire, or some of the later angulate or panduriform-cordate, occasionally hastate-3-lobed: corolla rather broadly funnelform, 2 or 3 inches long, white with a dark-purple throat: ovary only 2-celled: seeds woolly on the angles. — Esseq. 100, as to name only; Ker, Bot. Reg. t. 588; Choisy, l. c. 381. *Convolvulus megalorrhizus*, etc., Dill. Elth. 100, t. 85, fig. 99. *C. panduratus*, L.; Sims, Bot. Mag. t. 1939; Ell. l. c.; Barton, Med. t. 23. *C. candicans*, Solander in Bot. Mag. t. 1603, with some minute pubescence of leaves. Var.

rubescens, Choisy, l. c., is merely a longer-flowered form, from Kentucky; and *Convolvulus ciliolatus*, Michx. l. c., from Knoxville, Tennessee, is probably the same. — Dry ground, Upper Canada to Florida and Texas. There is a double-flowered state.

++ ++ Perennial with a thick root: leaves all sagittate: peduncle mostly 1-flowered: sepals as of the preceding but barely half inch long: corolla proportionally very large.

- I. *sagittata*, Cav. Glabrous: stems slender: leaves deeply sagittate, otherwise entire, acute or acuminate; some with linear-lanceolate lobes; some (at least the earlier) larger and broader, with ovate-lanceolate outline and oblong obtuse basal lobes: corolla pink-purple, 2 or 3 inches long; the tube with the narrowish throat very much exceeding the calyx: seeds somewhat villous on the back or sides. — Ic. ii. 4, t. 107; Desf. Fl. Atl. i. 177. *I. sagittifolia*, Ker, Bot. Reg. t. 437; Chapm. Fl. 344. *Convolvulus Carolinensis*, &c., Catesb. Car. i. 35, t. 35. *C. speciosus*, Walt. Car. 93. *C. sagittifolius*, Michx. Fl. i. 138. — Salt marshes on the coast, N. Carolina to Texas. (Cuba, Spain and Barbary.)

++ ++ ++ Perennials with roots not very large and thick, or annuals: corolla an inch and a half long or smaller.

= Calyx almost an inch long, large for the size of the corolla.

- I. *sinuata*, Ortega. Root perennial: stem (rather woody at base) and petioles hirsute with long spreading hairs from a papilliform base: leaves nearly or quite glabrous, 7-parted; the divisions lanceolate or narrowly oblong, sinuately and laciniately pinnatifid or incised: calyx equalling the throat of the open-funnelform corolla (white with purple eye): seeds glabrous. — Dec. vii. 84; Choisy, l. c.; Chapm. l. c. *I. dissecta*, Pursh, not Willd. *Convolvulus dissectus*, L. Mant. 204; Jacq. Obs. iv. t. 28, & Vind. ii. t. 159. — Near the coast in Georgia to Texas. (Trop. Amer.)

= = Calyx in fruit over half inch long, setose-hispid.

- I. *barbatisépala*. Apparently annual, glabrous except the calyx: leaves pedately 5-7-parted; the divisions lanceolate with narrowed base, an inch or two long, or the lateral ones mostly short, entire: peduncles 1-2-flowered, not longer than the petiole: sepals attenuate-linear from a broader base, nearly equal, in fruit 7 or 8 lines long, a third longer than the 2-celled 4-seeded globular capsule, the back strongly hispid with long and stout spreading bristles: corolla purple, less than an inch long: stigmas 2, globose: seeds glabrous or minutely scurfy. — W. borders of Texas; declivity of mountain near El Paso, Wright (1849, no. 507). Calyx nearly as of *I. hederacea*, Jacq., but with stiffer beard.

= = = Calyx 5 to 9 lines long, completely glabrous: root perennial.

- I. *Thúrberi*. Glabrous throughout, apparently with only low twining stems from a thickened root or tuber: leaves palmately or pedately and deeply 5-7-cleft (an inch or more in diameter); the widely divergent lobes triangular-lanceolate, or the one or three middle ones somewhat candately prolonged, the narrow tip obtuse: peduncle short, 1-flowered, clavate in age: corolla, &c., not seen: sepals in fruit 8 or 9 lines long, lanceolate-attenuate from a broader base, nearly twice the length of the 4-celled 4-valved globular coriaceous capsule: seeds clothed with fine brownish somewhat furfuraceous pubescence. — South-eastern border of Arizona, near Santa Cruz, Thurber (no. 966), Wright.

- I. *trífida*, Don. Much resembles *I. commutata*; but the root perennial, the pubescence shorter and softer, peduncles longer, and calyx glabrous. — *Convolvulus trifidus*, HBK. Nov. Gen. & Spec. iii. 107. (Trop. Amer.)

Var. *Torreyána*. Nearly glabrous throughout, freely twining: leaves cordate, about 2 inches long; some entire or merely angulate; most 3-cleft, with ovate lobes, the lateral externally rounded: peduncles surpassing the leaves, umbellately 3-10-flowered: pedicels in age muriculate-scabrous: sepals oblong-ovate or ovate-lanceolate, mucronate-acuminate, chartaceous, 5 lines long, not at all ciliate: corolla funnelform, pink or lilac-purple, over an inch long: capsule globular, chartaceous, simply 2-celled, either glabrous or sparingly pilose at tip, about equalling the calyx: seeds glabrous and very smooth. — *I. commutata*, Torr. Bot. Mex. Bound. 149, not Rœm. & Sch. *I. fastigiata*? Torr. l. c., not Sweet. — W. and S. Texas, Wright, Bigelow, Lindheimer, Schott.

Var. *Berlandiéri*. Perhaps only a depauperate form: leaves smaller and deeper cleft, some almost 3-parted; the middle lobe lanceolate or ovate-lanceolate and longer, giving a somewhat hastate outline; the lateral divisions often 2-lobed or 2-3-cleft and their lobes acute: peduncles only an inch long. — Bejar, Texas, *Berlandier*. Referred by Choisy to *I. commutata*.

== == == == Calyx 3 to 6 lines long, thinnish, pilose or at least ciliate with some long and soft hairs rising from a more rigid or papilliform base, more or less longer than the small and thin-walled globular 2-celled capsule, which is sparsely pilose but sometimes glabrate at the upper part: seeds glabrous: stems freely twining: root annual.

I. commutata, Rœm. & Sch. Hirsute-pubescent or glabrate: leaves (2 or 3 inches long), cordate, some entire, some strongly 3-lobed with middle lobe ovate-lanceolate and acuminate; the lateral usually shorter and broader, sometimes again 2-lobed: peduncles slender, $1\frac{1}{2}$ to 3 inches long, 1-3-flowered: sepals oblong, acuminate, 5 lines long: corolla an inch or more long, purple or pink. — Syst. iv. 228; Choisy, l. c. *Convolvulus Carolinus*, L. Spec. i. 154 (Dill. Elth. 100, t. 84, fig. 93); Michx. Fl. i. 139. *Ipomœa Carolina*, Pursh, Fl. i. 145, not L., which is W. Indian. *I. trichocarpa*, Ell. Sk. i. 258, which slightly antedates the name *commutata*, but is misleading, the fruit being not rarely glabrate or glabrous. — Dry or low grounds, S. Carolina to Texas.

I. lacunosa, L. Slightly pubescent or hirsute, or nearly glabrous: leaves as the preceding or less lobed, more commonly ovate-cordate and entire, conspicuously acuminate: peduncles shorter: sepals commonly broader and mostly naked, except the long-ciliate margins: corolla half inch or so in length, narrow-funnelform, white or with a purple acutely 5-angulate border: globose capsule more turgid and pilose. — Spec. i. 161 (Dill. l. c. t. 87, fig. 102); Michx. l. c.; Ell. l. c. *Convolvulus micranthus*, Riddell, Syn. Fl. W. States, 70. — River banks and low grounds, Penn. to Illinois, S. Carolina, and Texas.

I. triloba, L. Stems slender, sparsely pubescent: leaves usually glabrous, very deeply 3-lobed or almost 3-parted; the divisions mostly entire; the middle ovate or lanceolate-ovate with narrowed base; the lateral semicordate: peduncles usually elongated: sepals 3 lines long, oblong-ovate: corolla narrow, two-thirds inch long, resembling that of the preceding, but purple. — Choisy, l. c. 333; Chapm. Fl. 343. — Key West, Florida; perhaps introduced. (Trop. Amer.)

== == == == Calyx only 2 lines long, naked and glabrous, shorter than the glabrous simply 2-celled thin-walled capsule: herbage glabrous throughout: root not seen.

I. Wrightii. Stems very slender: leaves all digitately divided into 5 narrowly lanceolate entire leaflets (all 12 to 18 lines long, or the lateral shorter, obtuse or acutish and mucronulate): peduncles slender, 1-flowered, not exceeding the petiole: sepals ovate, very obtuse, equal: corolla pink or purple, narrowly funnelform, half inch long: capsule ovoid, 4 lines long: seeds globular, minutely and densely puberulent. — Texas, *Wright*, probably from the southern part of the State. Habit of *I. quinquefolia*, but leaves, corolla, &c., different. A plant resembling it was collected by Dr. Palmer on the Yaqui River, in the north-western part of Mexico, in which the leaves seem to be pedate, and the long filiform peduncles coil in the manner of tendrils.

I. cardiophylla. Very glabrous: leaves broadly cordate and with basal lobes somewhat incurved, entire, acuminate, an inch or two long: peduncles mostly 1-flowered and shorter than the slender petiole: sepals ovate, acute, thickish but scarious-margined, more or less muriculate-glandular on the back: corolla purple, three-fourths inch long, campanulate-funnelform above the narrow tube, which barely equals the calyx: capsule ovoid, half inch long; the thin valves finely lineolate: seeds oval, brownish-puberulent. — Western borders of Texas, in the mountains near El Paso, *Wright*. In calyx and foliage considerably resembling *I. violacea*.

+ + + Stems erect or diffuse, feebly if at all twining, never creeping or even prostrate: leaves or their divisions all linear or narrower and entire.

++ Leaves simple and entire: flowers large: root perennial, immense, weighing from 10 to 100 pounds.

I. leptophylla, Torr. Very glabrous: stems erect or ascending (2 to 4 feet high), and with recurring slender branches: leaves linear (2 to 4 inches long, 2 or 3 lines wide), short-petioled, acute: peduncles short, 1-2-flowered: calyx 3 or 4 lines long; the sepals broadly ovate, very obtuse, outer ones shorter: corolla pink-purple, funnelform, about 3 inches long: capsule ovate, an inch long: seeds rusty-pubescent. — Frœm. Rep. 95, & Emory Rep. 148, t. 11. *Convolvulus Caddoensis*, Buckley in Proc. Acad. Philad. 1862. — Plains of Nebraska and Wyoming to Texas and New Mexico: a striking and showy species, first collected, in Long's Expedition, by Dr. E. James, who singularly mistook it for an annual. Torr. in Ann. Lyc. N. Y. ii. 223. (*Convolvulus*.)

++ ++ Leaves palmately or pedately divided or parted,

= Almost sessile and the divisions all simple: root perennial, an oblong tuber.

I. muricáta, Cav. A span or two high, erect, loosely branched, glabrous, slender: leaves of 5 (or sometimes pedately 7) narrowly linear or filiform mucronate-acute divisions or leaflets (6 to 10 lines long): peduncles shorter than the leaves, 1-flowered: sepals lanceolate-ovate, tuberculate-muricate on the back or midrib: corolla narrowly funnelform, crimson-purple, an inch long: capsule globose, nodding, hardly 3 lines long: seeds almost glabrous. — Ic. v. 52, t. 478, fig. 2; Torr. Bot. Mex. Bound. 150. *Convolvulus capillaceus*, HBK. Nov. Gen. & Spec. iii. 97. — New Mexico and Arizona. (Mex., &c.)

= = Leaves distinctly petiolate: root annual: stems diffuse, filiform.

I. leptótoma, Torr. Diffuse or procumbent and feebly twining, a foot or two long, glabrous up to the pedicels: leaves pedately 5-7-parted into narrowly linear attenuate-acuminate or acute divisions; the middle and longer one an inch or two long: peduncles slender, equalling or exceeding the leaf, 1-2-flowered: pedicels and lanceolate attenuate-acuminate 3-nerved sepals hirsute: corolla funnelform, purple, over an inch long: capsule globose-ovoid, shorter than the calyx: seeds glabrous. — Bot. Mex. Bound. 150. — Arizona, *Thurber, Wright, Palmer.*

I. costelláta, Torr. l. c. Erect and diffuse, at length procumbent or slightly twining, glabrous or minutely hirsute: leaves pedately 7-9-parted into linear or somewhat spatulate (or the upper into filiform) divisions of somewhat equal length (half to an inch long): peduncles filiform, surpassing the leaf, 1-3-flowered: sepals ovate-lanceolate or oblong, acute, glabrous (as is the pedicel), carinately 1-nerved or obscurely 3-nerved; the keel of the outer ones salient and often undulate-cristate or tuberculate: corolla narrowly funnel-form, approaching salverform, a third or hardly half inch long, twice or thrice the length of the calyx, pink-purple or paler, with 5 short mucronate-pointed lobes: capsule globular, as long as the calyx: seeds minutely puberulent. — S. Texas to Arizona. (Mex.)

3. JACQUEMÓNTIA, Choisy. (*Victor Jacquemont*, a French naturalist and traveller, died in India.) — A rather small genus, tropical or subtropical, mostly with the aspect of *Convolvulus*. Fl. summer. Seeds in ours roughish.

J. ABUTILÓIDES, Benth., to which belongs Dr. Kellogg's *Aniseia azurea*, is of Lower California. It is doubtful if either of the following are indigenous.

J. violácea, Choisy. Twining, pubescent or almost glabrous: leaves cordate or ovate-lanceolate, cuspidate-acuminate: peduncles slender, umbellately or cymosely several-flowered: sepals ovate, acuminate; the outer larger and subcordate: corolla short-funnel-form, half inch long, violet. — Chapm. Fl. 344. *Convolvulus violaceus*, Vahl. *C. pentanthos*, Jacq. Ic. Rar. ii. t. 316; Bot. Mag. t. 2151. — Key West, Florida, *Blodgett.* (Trop. Amer.)

J. tamnifólia, Griseb. Erect or at length twining, fulvous-hirsute: root annual: leaves cordate and ovate, long-petioled, pinnately veiny: peduncles elongated, capitate many-flowered: glomerate cluster involucre with foliaceous bracts: sepals subulate-linear, ferrugineous-hirsute, 5 lines long, nearly equalling the violet corolla. — Fl. W. Ind. 474; Meissn. in Fl. Bras. vii. 302. *Ipomœa tamnifolia*, L. (Dill. Elth. t. 318, fig. 414.) *Convolvulus ciliatus*, Vahl. *C. tamnifolius*, Ell. Sk. i. 258. — Cult. and waste grounds, from S. Carolina and Arkansas southward. (Trop. Amer.)

4. CONVÓLVULUS, L. BINDWEED. (From *convolvere*, I entwine.) — Herbs or somewhat shrubby plants (of many species, most of them in the Old World), either twining, erect, or prostrate; with small or rather large flowers (in summer), some opening at dawn, some in bright sunshine. — *Convolvulus* & *Calysetigia*, R. Br.; Benth. & Hook. Gen. ii. 874.

§ 1. **CALYSTÉGIA.** Stigmas from ovate or oval to oblong, very flat: solitary flower involucrellate by a pair of persistent membranaceous-foliaceous broad bracts, which are close to the calyx and enclose or exceed it: corolla open in sunshine: ovary and capsule commonly somewhat one-celled by the imperfection of the par-

tition: perennials, with filiform creeping rootstocks. — *Calystegia*, R. Br., Hook. & Benth., &c.

CALYSTEGIA PARADOXA, Pursh, Fl. ii. 729, which was described from Sherard's herbarium, and supposed to come from Virginia or Carolina, is not recognizable, and is certainly no true *Calystegia*.

C. Soldanella, L. Glabrous, fleshy: stems low and mostly short, creeping or trailing: leaves reniform, entire or obscurely angulate, often emarginate, an inch or two wide, long-petioled: bracts roundish and obscurely cordate, not longer than the sepals: corolla pink-purple, 12 to 18 lines long, short-funnel-form: stigmas ovate. — Spec. i. 159; Engl. Bot. t. 314; Gray, Bot. Calif. i. 533. *Calystegia Soldanella* & *C. reniformis*, R. Br. Prodr. 433. — Sands of the Pacific coast, Puget Sound to California. (Most Pacific shores, Eu., &c.)

C. spithameus, L. Soft-pubescent or tomentose: stem erect or ascending, or sometimes decumbent, a span to 2 feet long, mostly simple and not twining: leaves short-petioled, oblong, with rounded or subcordate or sometimes short-sagittate base: bracts ovate, not auricled at base: corolla white, campanulate-funnel-form, $1\frac{1}{2}$ to 2 inches long: stigmas oval. — Spec. i. 158; Ell. Sk. i. 251. *C. stans*, Michx. Fl. i. 136. *Calystegia spithamea* & *C. tomentosa*, Pursh, Fl. i. 434. *C. spithamea*, Hook. Exot. t. 97, but stigmas too narrow. — Dry and sandy or rocky soil, Canada to Wisconsin and south to Florida.

C. sepium, L. Glabrous, or more or less pubescent, freely twining: leaves slender-petioled, deltoid-hastate and triangular-sagittate (2 to 5 inches long), acute or acuminate; the basal lobes or auricles either entire or angulate-2-3-lobed: peduncles mostly elongated: bracts cordate-ovate or somewhat sagittate, commonly acute: corolla broadly funnel-form, 2 inches long, white or tinged with rose-color: stigmas from oval to oblong. — Curt. Fl. Lond. t. 32; Engl. Bot. t. 313; Fl. Dan. t. 458. *Calystegia sepium*, R. Br. Prodr. 483; Reichenb. Ic. Germ. xviii. t. 1340. — Moist alluvial soil, or along streams, Canada and N. Atlantic States to Utah. (Eu., &c.)

Var. Americæus, Sims. Corolla pink or rose-purple: bracts obtuse. — Bot. Mag. t. 732. *C. sepium* of Am. authors in large part. *Calystegia sepium*, var. *rosea*, Choisy in DC. Prodr. ix. 433. — Canada to Carolina and Oregon. (N. Asia.)

Var. répens. Corolla from almost white to rose-color: bracts from very obtuse to acute: herbage from minutely to tomentose-pubescent: sterile and sometimes flowering stems extensively prostrate: leaves more narrowly sagittate or cordate, the basal lobes commonly obtuse or rounded and entire. — *Convolvulus repens*, L. Spec. i. 158 (as to pl. Gronov., excl. syn. Plum. & Rheede); Michx. l. c. *Calystegia sepium*, var. *pubescens*, Gray, Man. ed. 5, 376. *C. Catesbeiana*, Pursh, Fl. ii. 729; Choisy, l. c. — Canada? to Texas, and west to Dakota and New Mexico, on banks and shores. Sometimes with almost glabrous and thickish leaves; *Calystegia sepium*, var. *maritima*, Choisy, in part. (The species widely diffused over the world and variable.)

§ 2. Stigmas linear or oblong-linear, flat: bracts at the base of the calyx as in the preceding section or smaller, or various at the base of a short pedicel. Californian species.

C. occidentális, Gray. Glabrous or minutely pubescent: stems freely twining: leaves slender-petioled, from angulate-cordate with a deep and narrow sinus to sagittate or the upper hastate; the posterior lobes often 1-2-toothed: peduncles elongated, surpassing the leaf, sometimes proliferously 1-3-flowered: bracts at base of calyx ovate or obscurely cordate, membranaceous, equalling it or rather longer, mostly obtuse: corolla campanulate-funnel-form, white or pinkish, 12 to 18 lines long: stigmas linear. — Proc. Am. Acad. xi. 89, & Bot. Calif. i. 533. — Dry hills, W. California, from San Francisco Bay to San Diego.

Var. tenuissimus, Gray, l. c., a form with narrowly hastate or sagittate leaves (only an inch or two long), the middle and mostly the basal lobes narrowly lanceolate: bracts ovate-oblong or ovate-lanceolate, acute or acuminate. — Santa Barbara and San Diego, Nuttall, Cooper, &c.

C. Califórnicus, Choisy. Minutely and often densely pubescent: stems very short and erect from filiform rootstocks, flowering close to the ground, or at length with prostrate branches a span or even a foot long: leaves slender-petioled, from ovate or round-obovate to deltoid or subcordate and obtuse, or the later somewhat sagittate or hastate and acute

(an inch or so long) : peduncles shorter than the petiole : bracts at base of calyx oblong, obtuse, about equalling and somewhat resembling the outer very obtuse sepals : corolla broadly funnelform, $1\frac{1}{2}$ to 2 inches long, white, cream-color, or flesh-color : stigmas linear-oblong. — DC. Prodr. ix. 405; Gray, l. c. *Calystegia subacaulis*, Hook. & Arn. Bot. Beech. 363. — W. California, on hills, &c., from San Francisco Bay southward.

C. villósus, Gray, l. c. Densely velvety-tomentose throughout, mostly silvery-white, low : stems decumbent or prostrate, feebly if at all twining : leaves slender-petioled, from reniform-hastate to sagittate, an inch or less long ; the basal lobes often angulate-toothed : peduncles shorter than the leaf : bracts at base of and equalling the calyx, oval or ovate, white-tomentose : corolla campanulate-funnelform, cream-color, an inch long : stigmas narrow-linear. — *Calystegia villosa*, Kellogg in Proc. Calif. Acad. v. 17. — Dry and sandy soil, California, Monterey Co., and Plumas Co. to Tejon.

C. lutéolus, Gray, l. c. Glabrous or soft-pubescent : stems a span or two long and ascending or more elongated and twining : leaves slender-petioled, from triangular- or deltoid-hastate to sagittate, an inch or two long : peduncles equalling or surpassing the leaves : bracts about their own length distant from the calyx, narrowly oblong varying to linear-lanceolate, 2 to 4 lines long, much smaller than the chartaceo-coriaceous very obtuse unequal sepals, a second flower rarely in the axil of one of them (occasionally the bracts alternate) : corolla 12 to 18 lines long, campanulate-funnelform, pale yellow (sometimes purplish or fading to purple ?) : stigmas linear. — *Ipomœa sagittifolia*, Hook. & Arn. Bot. Beech. 151 (as to Calif. plant) ; Torr. in Pacif. R. Rep. iv. 127, the stigmas certainly linear! *Convolvulus Californicus*, Benth. Pl. Hartw. 326, not Choisy. — California, from around San Francisco Bay northward, and in the foothills of the Sierra Nevada.

Var. fulcrátus, Gray, l. c. Soft-pubescent : bracts foliaceous, hastate or sagittate, and short-petioled, resembling diminutive leaves, 3 to 6 lines long, about their length distant from the calyx or sometimes closely subtending it. — *Convolvulus arvensis*, var. *villosus*, Torr. l. c. — Foothills of the Sierra Nevada from the Stanislaus southward.

§ 3. Stigmas filiform or narrowly linear : no bracts at or near the base of the calyx.

* Procumbent or low-twining perennials : bracts of the 1-3-flowered peduncle small or minute and subulate : corolla an inch or less long, broadly short-funnelform.

+ Introduced species, nearly glabrous : leaves broad and entire.

C. ARVÉNSIS, L. Mostly procumbent : leaves oblong-sagittate or somewhat hastate, an inch or two long ; the basal lobes short and acute : bracts a pair at the base of the pedicel, small, subulate : corolla white, commonly tinged with rose : stigmas filiform. — Fl. Dan. t. 459; Reichenb. Ic. Germ. xviii. t. 1337. — Old fields, N. Atlantic States. (Sparingly nat. from Europe.)

+ + Indigenous Texan species, cinereous-pubescent or canescent : leaves commonly lobed or dentate : flowers opening in afternoon sunshine : corolla ferrugineous-silky-hirsute outside in the bud.

C. hermannioides. Sericeous-tomentulose : stems 3 to 5 feet long, mainly procumbent : leaves oblong or oblong-lanceolate, obtuse, and with sagittate or narrowly cordate base, $1\frac{1}{2}$ to 3 inches long, repand- or sinuate-dentate, sometimes obsoletely so, rather short-petioled ; the veins not plicate-impressed above nor prominent beneath : peduncles rather longer than the leaves, 1-2-flowered : sepals half inch long or nearly so, oval-oblong, mucronate and obtuse or barely acute : corolla white, an inch long, the border merely angulate. — *C. Hermannii*, Choisy in DC. l. c. as to Texan plant ; Torr. Bot. Mex. Bound. 148, not of L'Her., which is Peruvian and Chilian. — Texas, in dry prairies. Narrow-leaved forms approach the next.

C. incánus, Vahl. Cinereous or canescent with a close and short silky pubescence (rarely greener and glabrate) : stems filiform, 1 to 3 feet long, mainly procumbent : leaves polymorphous ; some simply lanceolate- or linear-sagittate or hastate (1 or 2 inches long, 2 or 3 lines wide, obtuse and mucronate, entire, and with the narrow elongated basal lobes entire or 2-3-toothed) ; some pedate, having narrowly 2-3-cleft lateral lobes or divisions, some more coarsely 3-5-parted, with lobes entire or coarsely sinuate-dentate ; some of the early ones ovate- or oblong-cordate and merely sinuate-dentate : peduncles 1-2-flowered, as long as the leaf : sepals a quarter inch long, oval, obtuse, or merely mucronate-tipped :

corolla white or tinged with rose, half inch long, the angles salient-acuminate. — Symb. iii. 23 (1790). *C. Bonariensis* & *C. dissectus*, Cav. Ic. v. t. 480 (1799). *C. equitans*, Benth. Pl. Hartw. 16. *C. hastatus*, Nutt. in Trans. Am. Phil. Soc. ser. 2, v. 194. *C. lobatus*, Engelm. & Gray, Pl. Lindh. i. 44. *C. glaucifolius*, Choisy in DC. Prodr. ix. 412, but probably not *Ipomœa glaucifolia*, L., viz. Dill. Elth. t. 87, fig. 101, which is "glaucous and glabrous." — Dry prairies and hills, Arkansas and S. Colorado to Texas and Arizona. (Mex., Extra-trop. S. Amer.)

* * Erect and much branched feebly twining perennial, glabrous throughout, small-leaved.

C. longipes, Watson. Stems slender, loosely much branched, a foot to a yard high: leaves mostly linear-hastate, short-petioled (an inch or two long, a line or two wide), thickish, veinless, entire, cuspidate-mucronate, the upper gradually reduced to linear-subulate bracts; these on the 1-flowered peduncles mostly alternate: sepals ovate, obtuse, often mucronulate, the outer shorter: corolla fully an inch long, broadly funnelform, glabrous throughout, white or cream-color: stigmas very narrowly linear: seeds globular, minutely tuberculate. — Am. Naturalist, vii. 302; Gray, Bot. Calif. i. 534; Rothrock in Wheeler Rep. t. 20. — Arid desert region, S. Nevada and S. E. California, *Lieut. Wheeler, Dr. Horn, Palmer.*

5. BREWÉRIA, R. Br. (*Samuel Brewer*, an English Botanist or amateur of the 18th century.) — Chiefly perennial herbs, some suffruticose, of the warmer parts of the world, resembling *Ipomœa* and *Convolvulus*; with simple entire and usually short-petioled leaves, and the corolla mostly silky-pubescent or silky-hirsute outside in the bud, with angulate or obscurely lobed border: fl. summer and autumn. — Prodr. 487; Benth. & Hook. Gen. ii. 877. *Stylisma*, Raf. in Ann. Sci. Phys. viii. 268; Choisy in DC. Prodr. ix. 450. *Bonamia*, Gray, Proc. Am. Acad. v. 336, & Man. ed. 5, 376, not Thouars, in which the corolla is lobed and not plicate.

* Procumbent: peduncles very short and 1-flowered: capsule large: seed glabrous.

B. ovalifolia. Sericeous-canescens: leaves ovate or oval, mostly subcordate, an inch long: style 2-cleft above the middle: capsule globose, half inch in diameter, about the length of the broadly ovate sepals, by abortion 1-seeded. — *Evolvulus*? *ovalifolius*, Torr. Bot. Mex. Bound. 150. — S. W. borders of Texas, on the Rio Grande (the Mexican side) below San Carlos, *Parry*. Corolla not seen.

* * Procumbent slender perennials: peduncles slender and elongated, 1-5-flowered: flowers small: corolla almost campanulate: capsule small. — *Stylisma*, Raf., &c.

B. humistrata. Sparsely pubescent or glabrate: leaves from elliptical and subcordate to narrowly linear (an inch or two long), mucronate, and the broader emarginate: peduncles 1-7-flowered: bracts shorter than the pedicels: sepals glabrous or almost so, oblong-ovate, acuminate: corolla white, half inch long: filaments hairy: styles united at base. — *Convolvulus humistratus*, Walt. Car. 94. *C. patens*, Desr. in Lam. Dict. iii. 547. *C. trichosanthes*, Michx. Fl. i. 137, partly. *C. Sherardi*, Pursh, Fl. ii. 730? *C. tenellus*, Lam. Ill. i. 459; Ell. Sk. i. 250. *Evolvulus*? *Sherardi*, Choisy. *Stylisma evoluloides*, Choisy, l. c., in part. *S. humistrata*, Chapm. Fl. 346. *Bonamia humistrata*, Gray, Man. ed. 5, 376. — Dry pine barrens, Virginia to Louisiana.

B. aquática. Soft-pubescent or cinereous-tomentulose: leaves from elliptical to subcordate-lanceolate, very obtuse, seldom over an inch long: peduncles 1-3-flowered: sepals strongly sericeous-pubescent, acute or acuminate: corolla rose-purple: filaments glabrous: styles distinct nearly to base. — *Convolvulus aquaticus*, Walt. l. c.; Ell. l. c. *C. trichosanthes*, Michx. l. c., partly. *C. erianthus*, Willd. in Spreng. Syst. i. 610. *Stylisma aquatica*, Chapm. l. c. *Bonamia aquatica*, Gray, l. c. — Wet pine barrens and margin of ponds, North Carolina to Texas.

B. Pickeringii. Pubescent, or the leaves glabrate: these from narrowly spatulate-linear with acute and subsessile base to filiform-linear: peduncles seldom surpassing the leaves, 1-3-flowered: bracts foliaceous and exceeding the flowers: sepals villous-sericeous, ovate, obtuse, half the length of the ovate-conoidal capsule: corolla white, a third of

an inch long, equalled by the almost glabrous filaments and the moderately 2-cleft style. — *Convolvulus Pickeringii*, Torr.; M. A. Curtis in Bost. Jour. Nat. Hist. i. 129; Gray, Man. ed. 1, 349. *Stylisma evolvuloides*, var. *angustifolia*, Choisy in DC. l. c. *S. Pickeringii*, Gray, Man. ed. 2, 335; Chapm. l. c. *Bonamia Pickeringii*, Gray, Man. ed. 5, 376. — Dry pine barrens and prairies, New Jersey to North Carolina; Louisiana and Texas; also W. Illinois, H. N. Patterson.

6. EVÓLVULUS, L. (From *evolveo*, I unroll, the name a counterpart of *Convolvulus*.) — Low and small herbaceous or suffrutescent plants (of the warm parts of the world, largely American); with erect or commonly diffuse or prostrate stems, not twining, entire leaves, one-few-flowered and sometimes paniculate peduncles, and small flowers, produced in summer and autumn. Corolla in ours almost rotate, white, rose-colored, or blue.

E. MUHLENBÉRGII, Spreng. Pugill. i. 27, habitat not given, is something not identified, and by "peduncles opposite the leaves" not of this order.

* Peduncles filiform, 1-3-flowered, mostly longer than the leaves: either perennials or annuals?

E. alsinoides, L. Villous or hirsute, commonly with some long and spreading hairs: stems slender, diffuse or decumbent, a foot or two long: leaves from oval or oblong to lanceolate, somewhat petioled: pedicels at length nodding or refracted on the peduncle: corolla about 3 lines broad. — (Founded on the Asiatic plant, Burm. Zeyl. ii. t. 6, fig. 1, & t. 9, fig. 1, and Rheede, Malab. xi. t. 64, apparently also indigenous to the New World, and diverse.) *E. alsinoides*, var. *hirticaulis*, Torr. Bot. Mex. Bound. 150. *E. diffusus*, Chapm. Fl. 345. — S. Florida and Texas, *Blodgett, Berlandier, Wright, &c.* (All trop. regions?)

E. linifolius, L. Too like narrow-leaved and slender forms of the preceding, but the fine sericeous pubescence all appressed: leaves small and linear-lanceolate, nearly sessile: blue corolla only 2 or 3 lines in diameter. — Spec. ed. 2, i. 392, founded on *Convolvulus herbaceus, erectus*, &c., P. Browne, Jam. 152, t. 10, fig. 2, not Choisy in DC. — S. Arizona, near Tucson, *Greene*. (Mex., W. Ind., &c.)

E. Arizónicus. Minutely sericeous or cinereous with fine appressed pubescence, paniculately branched: stems very slender, erect and diffuse or decumbent-spreading: leaves lanceolate or linear-lanceolate, subsessile or short-petioled (6 to 12 lines long, 2 or 3 wide); the upper reduced to bracts so that the inflorescence becomes paniculate: peduncles mostly 1-flowered: sepals ovate-lanceolate, acute: corolla blue or bluish, half inch in diameter when expanded. — *E. alsinoides*, Torr. l. c., partly. *E. holosericeus*, var. *obtusatus*, Torr. l. c., partly, excl. syn. — Sandy or dry prairies, Arizona and New Mexico; a common species of the region. (Adjacent Mex.)

E. mucronátus, Swartz. Glabrate and green, or when young sparsely villous-sericeous with appressed pubescence: stems decumbent or prostrate: leaves thickish, oval or round-obovate (about half inch long), short-petioled, the obtuse or retuse apex mucronate: peduncles barely surpassing or some shorter than the leaves: corolla pale blue or white, 4 lines in diameter. — Griseb. Fl. W. Ind. 475; Meissn. l. c. 345. *E. glabriusculus*, Choisy, Conv. 156, & in DC. l. c. 448; Chapm. l. c. — South Florida, *Blodgett*. Perhaps *E. nummularius*, Nutt. Gen. i. 174 (not L.), on the Mississippi below New Orleans. (Trop. Amer.)

* * Peduncles or rather pedicels (bibracteolate at base, solitary and one-flowered) short, usually very short; the lower sometimes half the length of the leaf, recurved in fruit: very low perennials.

+ Upper surface of the leaves green and glabrous, otherwise sericeous: corolla white or pale blue.

E. sericeus, Swartz. Stems slender or filiform, a span or two high: leaves subsessile, lanceolate or linear-lanceolate (6 to 10 lines long), erect or ascending, mucronate-acuminate or acute; silky pubescence fine and close-pressed, sometimes short, whitish or fulvous: sepals ovate-lanceolate: corolla 3 or 4 lines in diameter. — Prodr. 55, & Fl. Ind. Occ. i. 576; Nutt. Gen. i. 174; Chapm. l. c.; Choisy, l. c.; Meissn. in Fl. Bras. vii. 353. *Convolvulus erectus, herbaceus*, &c., P. Browne, Jam. 153, t. 10, fig. 3. *E. holosericeus*, Torr. l. c. partly, not HBK. — Pine woods, &c., Florida to Louisiana, Texas, and Arizona. The western forms with looser and longer hairiness. (Mex., W. Ind., S. Amer.)

E. DISCOLOR, Benth. (*E. holosericeus*, var. *obtusatus*, Choisy, l. c.), of Mexico, with shorter and procumbent or prostrate stems, ovate or oblong obtuse leaves, more villous pubescence and larger corolla, seems to be a good species, as Meissner also supposes; but is not found on our immediate borders. Dr. Torrey's plant so referred is mainly *E. Arizonicus*.

— Both sides of the leaves, stems, and calyx densely silky-villous.

***E. argenteus*, Pursh.** Stems numerous from a lignescent base, rather stout and rigid, erect or ascending, a span or so high, very leafy: dense pubescence sometimes silvery-canescenscent, usually fulvous or ferruginous: leaves from spatulate and obtuse to linear-lanceolate and acute (a quarter to half inch long): pedicels very short: sepals lanceolate-subulate: corolla purple or blue (not "yellow" as says Pursh), 3 to 6 lines in diameter. — Fl. i. 187, not R. Br.; Choisy, l. c.; Torr. l. c. *E. pilosus*, Nutt. Gen. i. 174 (as additional name), & in Trans. Am. Phil. Soc. ser. 2, v. 195, not Lam. *E. Nuttallianus*, Røem. & Sch. Syst. vi. 198. — Sterile plains and prairies, Nebraska to Texas and west to Arizona. Pine Key, Florida, *Blodgett*, in small and insufficient specimens. (Adjacent Mex.)

7. CRÉSSA, L. (Greek name for a female Cretan.) — Genus apparently of a single but very variable and widely diffused species.

***C. Crética*, L.** Low canescent perennial, much branched from a lignescent base, erect or diffuse, a span or two high, very leafy: leaves entire, from oblong-ovate to lanceolate, sessile, 2 to 4 lines long: flowers subsessile or short-pedicelled in the upper axils, or the upper crowded as if in a leafy-bracteate spike: corolla white, 2 or 3 lines long, sericeous-pubescent outside. — Lam. Ill. t. 183; Sibth. Fl. Græca, t. 256. (S. Eu., Afr., S. Asia, Australia, &c.)

Var. *Truxillénsis*, Choisy. A more silky-villous and stouter form, mostly larger-leaved: capsule larger, 2 or 3 lines long. — Choisy in DC. l. c. 440; Torr. l. c. *C. Truxillénsis*, HBK. Nov. Gen. & Spec. iii. 119. — On or near the sea-shore or in saline soil, California, and from Arizona to S. Texas. (Hawaiian Islands, S. Amer., &c.)

8. CÚSCUTA, Tourn.* DODDER. (Name said to be of Arabic derivation.) — Flowers 5-merous, rarely 4-merous, white or whitish, small, in loose or dense cymose clusters, usually produced late in the season. Calyx cleft or parted. Corolla from campanulate or somewhat urceolate to short-tubular, with the mostly spreading lobes between convolute and imbricated in the bud, not plicate, marcescent-persistent either at base or summit of the capsule. Stamens inserted in the throat of the corolla above as many scale-like lacerate appendages (scales); these rarely absent. Ovary globular, 2-celled, 4-ovuled. Styles distinct, or rarely united, persistent: stigmas globose, or in Old-World species filiform. Capsule 1-4-seeded, circumscissile or transversely bursting, or indehiscent. Seeds large, globular, or angular by mutual pressure. Embryo filiform, spirally coiled in the firm-fleshy albumen, wholly destitute of cotyledons, but the apex, or plumule, often bearing a few alternate scales, germinating in the soil, but not rooting in it, developing into filiform and branching annual stems of a yellowish or reddish hue, which twine dextrorsely upon herbs or shrubs, and become parasitic by means of suckers which penetrate the bark in contact, the base soon dying away. Small scales of the same color as the stem take the place of leaves and bracts. — Choisy in Mem. Genev. 1841 (cited "Cusc.") & DC. Prodr. ix. 452 (1845); Engelm. in Am. Jour. Sci. xliii. (1842), 333, Gray, Man., & Trans. St. Louis Acad. i. 453 (1859), here cited as "Cusc."

§ 1. **GRÁMMICA, Engelm. l. c.** Styles (more or less unequal) terminated by peltate-capitate stigmas. — *Grammica*, Loureiro. (Comprises the greater part of the species of this large genus, almost all of them American and Polynesian.)

* Contributed by Dr. GEORGE ENGELMANN.

* (CLISTOGRAMMICA, Engelm. l. c.) Capsule indehiscient.

+ Calyx gamosepalous.

++ Ovary and capsule depressed-globose.

= Flowers in dense or globular clusters: corolla with short and wide tube, in age remaining at base of the capsule: styles mostly shorter than the ovary.

C. obtusiflora, HBK. Stems orange-colored, coarse: lobes of calyx and corolla rounded, as long as the tube: scales various. — Nov. Gen. & Spec. iii. 122; Engelm. Cusc. 491. (Cosmop.)

Var. **glandulosa**, Engelm. l. c., the only form in our flora, has all parts of the flower (1 to $1\frac{1}{2}$ lines long) dotted: scales large, equalling or exceeding the tube, deeply fringed. — Wet places, Georgia to Texas, on *Polygonum*, &c. (W. Ind.)

C. chlorocarpa, Engelm. Stems coarse, orange-colored: lobes of calyx and corolla acute, often longer than the tube: scales small, 2-cleft, often reduced to a few teeth. — Gray, Man. ed. 1, 350, ed. 5, 378; & Cusc. 494. *C. Polygonorum*, Engelm. in Am. Jour. Sci. xliii. 342, t. 6, fig. 26-29. — Wet places in the Mississippi Valley from Arkansas to Wisconsin; also in Penn. and Delaware, often on *Polygonum*. Flowers white, 1 to $1\frac{1}{2}$ lines long; the thin capsule pale greenish-yellow.

C. arvensis, Beyrich. Stems pale and slender, low: flowers smaller (scarcely a line long): calyx-lobes obtuse, mostly very broad: those of corolla acuminate, longer than the tube, with inflexed points: scales large, deeply fringed. — Engelm. in Gray, Man. ed. 2, 336, ed. 5, 378, Cusc. 494, & Fl. Calif. i. 535. Calyx often large and angled (var. *pentagona*, Engelm. l. c., & *C. pentagona*, Engelm. in Am. Jour. Sci. l. c. 340, t. 6, fig. 22-24), sometimes smaller and papillose or glandular-verrucose (var. *verrucosa*, & *C. verrucosa*, Engelm. l. c. fig. 25), and in a western form (var. *calycina*, Engelm. l. c.) larger-flowered, approaching the preceding species. — Rather dry soil, on various low plants, New York to Florida and Texas, Illinois and Missouri, California and Oregon: the varieties principally in Texas. (Mex., S. Amer.)

= = Flowers in panicate often compound cymes: styles slender, mostly longer than the ovary.

C. tenuiflora, Engelm. Stems coarse and yellow, usually rather high-climbing: flowers (a line or less long) on short thick pedicels, often 4-merous: lobes of calyx and corolla oblong, obtuse; the latter mostly shorter than the slender deeply campanulate tube: scales shorter than the tube, fringed: marcescent corolla capping the large capsule. — Gray, Man. ed. 1, 350, ed. 5, 378, & Cusc. 497. *C. Cephalanthi*, Engelm. in Am. Jour. Sci. l. c. fig. 1-6. — On tall herbs or shrubs, such as *Cephalanthus*, in wet places, Penn. (Porter) to Wisconsin, north to Saskatchewan, and south to Texas and Arizona. Readily distinguished from small-flowered forms of *C. Gronovii* by the depressed capsule covered by the corolla.

C. Californica, Choisy. Capillary stems low: flowers rather small, delicate, in loose cymes: lobes of the calyx acute: those of corolla lanceolate-subulate, as long as the campanulate tube or longer: scales none or rudimentary. — Cusc. 183; Hook. & Arn. Bot. Beech. 364; Engelm. Cusc. 498, & Bot. Calif. i. 535. (Independently published, in the same year, 1841, by Choisy and by Hook. & Arn.) — California, on arid herbs, *Eriogonum*, &c., in dry soil. Among various forms the following are the extremes.

Var. **breviflora**, Engelm. l. c. Flowers scarcely over a line long, on shorter pedicels: calyx-lobes acuminate, equalling or surpassing the tube of the corolla: filaments and anthers short: style hardly longer than ovary: corolla marcescent at base of or around the 2-4-seeded capsule. — From the coast at Monterey, &c., to the Sierra Nevada.

Var. **longiloba**, Engelm. l. c. Flowers longer-pedicelled and larger ($1\frac{1}{2}$ to $2\frac{1}{2}$ lines long): calyx-lobes often with recurved tips: corolla-lobes often twice the length of the tube: filaments and anthers more slender: styles much longer than ovary: capsule mostly 1-seeded, enveloped by the corolla. — Principally S. California and Arizona.

++ ++ Ovary and capsule pointed; the latter enveloped or capped by the marcescent corolla.

= Flowers short-pedicelled or clustered.

C. salina, Engelm. Stems slender, low: flowers ($1\frac{1}{2}$ to $2\frac{1}{2}$ lines long) delicate white: calyx-lobes ovate-lanceolate, acute, as long as the similar but mostly broader and overlapping denticulate lobes and as the shallow-campanulate tube of the corolla: filaments about as long as the oval anthers: fringed scales mostly shorter than the tube, sometimes

incomplete: styles equalling or shorter than the ovary: capsule surrounded (not covered) by the marcescent corolla, mostly 1-seeded. — Bot. Calif. i. 536. *C. subinclusa*, var. *abbreviata*, & *C. Californica*, var. ? *squamigera*, Engelm. Cusc. 499, 500. — Saline or brackish marshes of the Pacific coast, on *Salicornia*, *Suaeda*, &c., California to Brit. Columbia, and eastward to Arizona and Utah. Intermediate between the preceding and following, distinguished from the former by larger flowers and the presence of infra-stamineal scales; from the latter by less crowded flowers, more open, and of more delicate texture.

C. subinclusa, Durand & Hilgard. Stems rather coarse: flowers sessile or short-pedicelled, at length in large (half to full an inch thick) and compact clusters, $2\frac{1}{2}$ to $3\frac{1}{2}$ or 4 lines long: calyx cupulate, fleshy; its lobes ovate-lanceolate, overlapping, much shorter than the cylindrical tube of the corolla: lobes of the corolla ovate-lanceolate, minutely crenulate, much shorter than the tube: oval anthers nearly sessile: scales narrow, fringed, reaching only to the middle of the tube: slender styles longer than the ovary: capsule capped by the marcescent corolla, mostly 1-seeded. — Jour. Acad. Philad. ser. 2, iii. 42, & Pacif. R. Rep. v. 11; Engelm. Cusc. 500, & Bot. Calif. l. c. — California, the most common species throughout the State, on shrubs and coarse herbs. The long and narrow tube of the corolla, only partially covered by the thick and mostly reddish calyx, readily distinguishes this species.

C. denticulata, Engelm. Low stems capillary: flowers (about a line long) on short pedicels, in small clusters: tube of the broadly campanulate corolla included in the round-lobed denticulate calyx, and as long as its round-ovate lobes: oval anthers on very short filaments: scales reaching to the base of the stamens, denticulate at the rounded tip: styles as long as the ovary: stigmas very small, not much thicker than the style: capsule covered by the marcescent corolla, 1-2-seeded. — Am. Naturalist, ix. 348, & Bot. Calif. i. 536. — South-western Utah, in dry soil, on herbs and low shrubs, *Parry*.

== Flowers more pedicelled, in paniculate cymes.

a. Acute tips of corolla-lobes inflexed or corniculate.

C. decora, Choisy (but name altered). Stems coarse: flowers fleshy and more or less papillose: lobes of the calyx triangular, acute; those of the broadly campanulate corolla ovate-lanceolate, minutely crenulate, spreading: scales large, deeply fringed: capsule enveloped by the remains of the corolla: seeds usually 4. — Engelm. Cusc. 502; Gray, Man. ed. 5, 378, & Bot. Calif. l. c.; the negative prefix in *C. indecora*, Choisy, omitted. (U. S. to Brazil.)

Var. pulcherrima, Engelm. l. c. The larger form, with coarser stems, and conspicuous flowers $1\frac{1}{2}$ to $2\frac{1}{2}$ lines long and wide: anthers and stigmas yellow or deep purple. — *C. pulcherrima*, Scheele in Linn. xxi. 750. *C. neuropehala*, Engelm. in Am. Jour. Sci. xlv. 75. — Wet prairies, on herbs and low shrubs, principally *Leguminosæ* and *Compositæ* (the largest-flowered forms in brackish soil on the Texan coast), Florida and especially in Texas, north to Illinois, and west to Arizona and California. (W. Ind., Mex., Brazil.)

Var. indecora, Engelm. l. c. Stems lower and more slender: flowers smaller, in looser paniculate clusters, often warty (*C. verrucosa*, Engelm. in Am. Jour. Sci. l. c. xliii. 341, fig. 25) or papillose-hispid (*C. hispidula*, Engelm. l. c. xlv. 75). *C. indecora*, Choisy, Cusc. 182, t. 3, fig. 3, & DC. l. c. 457. — Texas, &c., first collected by *Berlandier*.

C. inflexa, Engelm. Similar to the preceding: flowers of the same structure, but smaller (only a line long), generally 4-merous: corolla deeper, with erect lobes, finally capping the capsule: scales reduced to a few teeth. — Cusc. 502, & Gray, Man. ed. 5. *C. Coryli*, Engelm. in Am. Jour. Sci. xliii. 337, fig. 7-11. *C. umbrosa*, Beyrich, in part; Engelm. in Gray, Man. ed. 1, 351. — Open woods and dry prairies, on shrubs (hazels, &c.) or coarse herbs, S. New England to Arkansas, and Nebraska.

C. racemosa, Martius, var. *Chiliana*, Engelm. Stems coarse: flowers ($1\frac{1}{2}$ to 2 lines long) in loose panicles, thin in texture: tube of corolla deeply campanulate, widening upward; the spreading lobes shorter, acutish: scales large, deeply fringed. — Cusc. 505, & in Bot. Gazette, ii. 69. *C. suaveolens*, Seringe; Gay, Fl. Chil. iv. 448. *C. corymbosa*, Choisy, Cusc. 180, not R. & P. *C. Hassiaca*, Pfeiffer in Bot. Zeit. i. 705. — Introduced into California with seeds of *Medicago sativa*, as also 40 years ago into Europe, whence, after causing much damage for several years, it has now disappeared. (Adv. from Chili.)

b. Obtuse lobes of the corolla spreading.

C. Gronovii, Willd. Stems coarse, often climbing high: corolla-lobes mostly shorter than the deeply campanulate tube: scales copiously fringed: capsule globose, umbonate.

— Willd. Rel. ex Rœm. & Sch. vi. 205; Choisy, Cusc. t. 4, fig. 1; Engelm. Cusc. 507, & in Gray, Man. ed. 5, 379. *C. Americana*, L. Spec. i. 124, as to pl. Gronov. Virg. *C. vulgivaga*, Engelm. in Am. Jour. Sci. xliii. 338, t. 6, fig. 12-16. *C. umbrosa*, Beyrich, ex Hook. Fl. ii. 78. — Wet shady places, Canada to Iowa and south to Florida and Texas; the commonest and most diffused Atlantic species. Flowers sometimes 4-merous (from less than a line to 2 lines long, usually about $1\frac{1}{2}$ lines): calyx usually thick and warty, and corolla glandular-dotted, very variable in size and compactness of clusters (sometimes 2 inches thick), and size of capsule (mostly 2 lines, sometimes 3 lines in diameter).

Var. latiflora, Engelm. l. c., is a form with flowers of more delicate texture, and shorter tube and longer lobes to the corolla. — *C. Saururi*, Engelm. in Am. Jour. Sci. l. c. fig. 17-21. — Common northward.

Var. calyptrata, Engelm. l. c., distinguished by the corolla eventually capping the capsule. — Louisiana and Texas.

Var. curta, Engelm. l. c., perhaps a distinct species, representing *C. Gronovii* west of the Rocky Mountains, and imperfectly known, has smaller flowers, with broad lobes of the corolla and calyx half the length of its tube, very short bifid scales, and styles much shorter than the ovary. — *C. umbrosa*, Hook. l. c., in part.

C. rostrata, Shuttleworth. Similar to the preceding: flowers larger (2 or 3 lines long), more delicate and whiter: lobes of the corolla and calyx shorter than its tube: slender styles longer: ovary bottle-shaped: capsule long-pointed. — Engelm. in Bost. Jour. Nat. Hist. Soc. v. 225, Cusc. 508; & Gray, Man. ed. 5, 379. — Shady valleys in the Alleghanies, from Maryland and Virginia southward, on tall herbs, rarely on shrubs.

+ + Calyx of 5 distinct and largely overlapping sepals, surrounded by 2 to 5 or more similar bracts: styles capillary: scales of corolla large and deeply fringed: capsule mostly 1-seeded, capped by the marcescent corolla.

+ + Flowers on bracteolate pedicels, in loose panicles.

C. cuspidata, Engelm. Stems slender: flowers ($1\frac{1}{2}$ to $2\frac{1}{4}$ lines long) thin, membranaceous when dry: bracts and sepals ovate-orbicular and oblong lobes of the corolla cuspidate or mucronate, rarely obtuse, shorter than the cylindrical tube: styles many times longer than the ovary, at length exserted. — Bost. Jour. Nat. Hist. Soc. v. 224, & Cusc. l. c. — Wet or dry prairies, on *Ambrosia*, *Iva*, some *Leguminosæ*, &c., Texas to Nebraska, occasionally straying down the Missouri as far as St. Louis (*H. Eggert*). The northern form has laxer inflorescence and fewer bracts under the calyx.

+ + Flowers closely sessile in densely compact clusters.

= Bracts and sepals concave and appressed.

C. squamata, Engelm. Orange-colored stems slender: glomerules few-flowered, often contiguous: flowers white, membranaceous when dry ($2\frac{1}{2}$ to 3 lines long), cuspidate or obtuse sepals and lanceolate acute lobes of the corolla, both shorter than the cylindrical upwardly widening tube: styles many times longer than ovary. — Cusc. 510. — W. Texas and New Mexico. Common in the bottomlands on the Rio Grande from El Paso to Presidio del Norte. — Similar to the last, but the larger and whiter flowers are closely sessile.

C. compacta, Juss. Stems coarse: flowers (nearly 2 lines long) at length in continuous and often very thick clusters: orbicular bracts and sepals crenulate, nearly equalling or shorter, and ovate-oblong lobes much shorter than the cylindrical tube of the corolla: styles little longer than the ovary. — Choisy, Cusc. t. 4, fig. 2, & in DC. Prodr. ix. 458; Engelm. l. c. *C. remotiflora* & *C. fruticum*, Bertol. Misc. x. 29. — Canada to Alabama along and west of the Alleghany Mountains, west to Missouri and Texas, in damp woods, almost always on shrubs. The original *C. compacta* of Jussieu's herbarium is a slender form, with smaller flowers and more exserted corolla: it is found from N. New York southward along the Alleghanies. The var. *adpressa*, Engelm. Cusc. 511 (*Lepidanche adpressa*, Engelm. in Am. Jour. Sci. xlv. 77, and probably *C. acaulis*, Raf. Ann. Nat. 1820, 13), is the common form westward.

= = Bracts (8 to 15) and sepals with recurved-spreading and crenate tips.

C. glomerata, Choisy. Stems coarse, orange-colored, soon withering away, leaving dense flower-clusters closely encircling in rope-like masses the stems of the foster plant: sepals nearly equalling and its oblong obtuse lobes much shorter than the cylindrical upwardly widening tube of the corolla: styles several times longer than the ovary. — Cusc.

184, t. 4, fig. 1, & DC. l. c.; Engelm. Cusc. 510. *C. paradoxa*, Raf. l. c.? *Lepidanche compositarum*, Engelm. in Am. Jour. Sci. xliii. 344, fig. 30-35. — Wet prairies, Ohio to Wisconsin, Kansas and Texas, mostly on *Helianthus*, *Vernonia*, and other tall *Compositæ*. The rope-like twists, half to three-fourths inch thick, of white flowers with golden yellow anthers imbedded in a mass of curly bracts, have a singular appearance and justify Rafinesque's name, which probably belongs here.

* * (EUGRAMMICA, Engelm. Cusc. 476.) Capsule more or less regularly circumscissile, usually capped by the remains of the corolla: styles capillary and mostly much longer than the depressed ovary.

— Lobes of the corolla acute.

C. odontolepis, Engelm. Stems slender: flowers conspicuous ($2\frac{1}{2}$ to 3 lines long), on short pedicels in large clusters: lobes of the campanulate calyx and of the tubular corolla ovate, acute, rather shorter than the cylindrical tube: scales hardly reaching to the base of the anthers, incisely dentate toward their rounded apex. — Cusc. 486. — Arizona, Wright, on *Amaranthus*. A large-flowered species, distinguished from the large-flowered Mexican forms of *C. corymbosa* by its circumscissile capsule.

C. leptantha, Engelm. l. c. Stems low and capillary: flowers (2 to $2\frac{1}{2}$ lines long), 4-merous, on slender fascicled pedicels: papillose calyx and lanceolate lobes of the corolla much shorter than the slender tube: scales incisely dentate and much shorter than the tube. — Mountains of W. Texas, on a prostrate *Euphorbia (albo-marginata)*, Wright. The only N. American species (as far as known) with uniformly 4-merous flowers.

C. umbellata, HBK. Stems low and capillary: flowers ($1\frac{1}{2}$ to 2 lines long) few together in umbel-like clusters, usually shorter than their pedicels: acute calyx-lobes and lanceolate-subulate lobes of the corolla longer than its shallow tube: scales deeply fringed and exceeding the tube: styles mostly little longer than the ovary. — Nov. Gen. & Spec. iii. 121; Engelm. Cusc. 487. — Dry places, on low herbs (*Portulaca*, &c.), from S. E. Colorado to Texas and Arizona. (Mex., &c.)

— Lobes of the corolla broad and obtuse.

C. applanata, Engelm. Stems low and slender: flowers (a line or rather more in length) clustered on short pedicels: rounded lobes of calyx and corolla thin in texture, as long as the wide and shallow tube: scales deeply fringed, often exceeding the tube: styles scarcely longer than the ovary: marcescent corolla enveloping the depressed capsule. — Cusc. 479. — On weeds, such as *Ambrosia*, *Mirabilis*, &c., S. Arizona, Wright. Glomerules 3 or 4 lines thick, often strung together like beads. Capsule much broader than high.

C. AMERICANA, L. (Sloane, Jam. 85, & Hist. i. 201, t. 128, fig. 4, and the plant in herb. L.) Coarse stems climbing high: flowers (a line or two long) very abundant, on short pedicels in globose clusters: calyx globular-empulate, almost enclosing the corolla; the lobes of which are much shorter than the slender tube: anthers globular and almost sessile: scales short, more or less dentate: seed usually solitary. This S. American and West Indian species, easily known by its proportionally large calyx and small corolla, is here characterized because it may be looked for in South Florida.

§ 2. **MONOGYNELLA, Engelm.** l. c. Styles united into one: stigmas capitate: capsule circumscissile. — *Monogynella*, Desmoulins. (Consists of few species, of the largest size, mostly Asiatic, extending to Europe, S. Africa and N. America.)

C. exaltata, Engelm. Stems thick, climbing high: lobes of the fleshy calyx and corolla orbicular, the former covering and the latter half the length of the corolla-tube: anthers sessile: scales small, bifid or reduced to a few lateral teeth: styles two-thirds united. — Cusc. 513. — S. W. Texas, from the Colorado to the Rio Grande, on trees, such as *Diospyros Texana*, *Ulmus crassifolia*, Live Oak, &c. Stems a line or two thick, climbing 10 to 20 feet high. Flower 2 lines long. Capsule $3\frac{1}{2}$ to 5 lines long.

§ 3. **EUCUSCUTA, Engelm.** l. c. Styles distinct, equal, bearing elongated stigmas: capsule circumscissile. (Old-World species.)

C. EPFLINUM, Weihe. Stems slender, low: globular flowers (half line long) sessile in dense heads: corolla short-cylindrical, scarcely exceeding the broadly ovate acute calyx-lobes, surrounding the capsule: scales short and broad, denticulate: stigmas longer than the

styles. — Archiv. Apoth. viii. 54; Reichenb. Ic. Crit. t. 693; Choisy, l. c. *C. densiflora*, Soyer-Willem. in Act. Soc. Linn. Par. iv. 281. — Flax-fields of Europe, doing much injury, occasionally appearing in those of the Atlantic States. (Adv. from Eu.)

ORDER XCV. SOLANACEÆ.

Herbs, shrubs, or even trees, commonly rank-scented, with watery juice, alternate leaves and no stipules; the inflorescence properly terminal and cymose, but variously modified, sometimes scorpioid-racemiform in the manner of *Borraginaceæ* and *Hydrophyllaceæ*, the pedicels either not accompanied by bracts or not in their axils; flowers perfect and regular (or only slightly irregular) and 5-4-merous; the stamens as many as and alternate with the corolla-lobes; these induplicate-valvate or plicate (rarely merely imbricate) in the bud; ovary wholly free, normally 2-celled with indefinitely many-ovuled axile placentæ, and surmounted by an undivided style: stigma entire or sometimes bilamellar; ovules anatropous or amphitropous; fruit either capsular or baccate; embryo terete and incurved or coiled, or sometimes almost straight, in fleshy albumen, the cotyledons rarely much broader than the radicle. The leaves, although never truly opposite, are often unequally geminate, so as to appear so. Obviously distinguished from *Convolvulaceæ* by the greater number and the character of the seeds, less definitely so from *Scrophulariaceæ* by the regular flowers with isomerous stamens and plicate or valvate aestivation of the corolla, and centrifugal inflorescence, but in the last tribe nearly confluent with that order by the imperfection or abortion of one or three of the stamens, and some obliquity and bilabiate imbrication of the limb or lobes of the corolla. *Nicandra* has a regularly 3-5-celled ovary; that of *Lycopersicum*, &c., becomes several-celled in cultivation; that of *Datura* is spuriously 4-celled.

BASSOVIA? НЕБЕРОДА, Dunal in DC. Prodr. xiii. 407, characterized from a specimen communicated to De Candolle by Teinturier of New Orleans, in fruit only, is a mere riddle. It is said to resemble *Bassovia lucida*.

WITHANIA MORISONI, Dunal, l. c., is doubtless not a Virginian or even a Mexican plant. From the figure it is likely to have been *W. somnifera*, as Dunal suggested.

TRIBE I. SOLANEÆ. Corolla (mostly short) with the regular limb plicate or valvate in the bud, usually both, i.e. the sinuses or what answers to them plicate and the edges of the lobes induplicate. Stamens (normally 5) all perfect. Fruit baccate or at least indehiscent, sometimes nearly dry. Seeds flattened: embryo curved or coiled, slender; the semiterete cotyledons not broader than the radicle.

* Anthers longer than their filaments, either connivent or connate into a cone or cylinder: corolla rotate: calyx mostly unchanged in fruit: parts of the flower 5 or varying to more, especially in cultivation.

1. **LYCOPERSICUM.** Anthers connate into a pointed cone, tipped with an empty closed acumination; the cells dehiscent longitudinally down the inner face. Otherwise as in the next, but leaves always pinnately compound.

2. **SOLANUM.** Anthers connivent or lightly connate: the cells opening at the apex by a pore or short slit, and sometimes also longitudinally dehiscent even to the base; the connective inconspicuous or obsolete.

* * Anthers unconnected, mostly shorter than their filaments, destitute of terminal pores, dehiscent longitudinally.

+ Calyx not investing the fruit, nor much changing under it.

3. **CAPSICUM.** Calyx short, either truncate or merely 5-6-dentate. Corolla rotate, deeply 5-6-cleft, valvate in the bud, not plicate. Anthers oblong or somewhat cordate. Berry, or juiceless and thin-coriaceous pericarp, acrid-pungent, girt only at base by the nearly unchanged calyx.

4. **SALPICHROA**. Calyx 5-parted or 5-cleft; the divisions narrow, herbaceous. Corolla from tubular to (in ours) short-urceolate, 5-lobed; the lobes short, valvate-induplicate in the bud. Stamens inserted high on the tube of the corolla! Berry globular or oblong.
5. **ORYCTES**. Calyx deeply 5-cleft; the lobes narrow, herbaceous. Corolla short-tubular or oblong, 5-toothed; the triangular lobes plicate in the bud, apparently erect. Stamens inserted on the base of the corolla, included: filaments filiform, unequal: anthers didymous. Berry apparently dry, globose, 10-20-seeded. Embryo apparently of this tribe, but not seen mature.

+ + Calyx herbaceous and closely investing the fruit or most of it, not angled.

6. **CHAMÆSARACHA**. Corolla rotate, 5-angulate, plicate in the bud. Filaments filiform: anthers oblong. Berry globose, filling the investing calyx, and its summit usually more or less naked. Pedicels solitary in the axils, refracted or recurved in fruit.

+ + + Calyx becoming much enlarged and membranaceous-inflated, enclosing the fruit, reticulate-veiny,

+ + Five-toothed or lobed, vesicular in fruit: ovary 2-celled.

7. **PHYSALIS**. Corolla rotate or rotate-campanulate, plicate in the bud, 5-angulate or obscurely 5-lobed. Stamens not connivent. Calyx in fruit 5-angled or 10-costate, and the teeth or short lobes connivent, completely and loosely enclosing the juicy berry. Pedicels solitary.

8. **MARGARANTHUS**. Corolla urceolate-globose and 5-angular-gibbous above a short narrow base, and with minutely 5-toothed contracted orifice, including the connivent stamens. Otherwise as *Physalis*.

+ + Five-parted calyx connivent-vesicular in fruit: ovary 3-5-celled.

9. **NICANDRA**. Corolla open-campanulate, with entire or obscurely lobed border, strongly plicate in the bud. Filaments filiform, included, dilated into a pubescent scale at base. Calyx strongly 5-angled; the scarious-membranaceous and reticulated divisions cordate-sagittate, the deflexed auricles at the sinuses acuminate. Fruit globose, dry or nearly so at maturity. Pedicels solitary, recurved.

TRIBE II. **ATROPEÆ**. Corolla with the regular limb imbricated in the bud, the sinuses little or not at all plicate. Stamens (4 or 5) all perfect. Baccate fruit and seeds as in the preceding.

10. **LYCIUM**. Calyx campanulate, irregularly 3-5-toothed or cleft, or somewhat truncate, valvate or nearly so in the bud. Corolla from campanulate to tubular-funnelform or salverform; the lobes oblong or roundish, plane. Stamens often exserted: filaments filiform: anthers short. Style filiform: stigma capitate or broadly 2-lobed. Berry globular or oblong, subtended by the calyx, few-many-seeded, rather dry. Seeds reniform or rounded, flattened. Flowers either 5-merous or 4-merous.

TRIBE III. **HYOSCYAMÆ**. Corolla with the limb either plicate or imbricated in the bud. Stamens (5) all perfect. Fruit a capsule. Seeds and embryo as in the preceding tribes.

11. **DATURA**. Calyx prismatic or tubular, 5-toothed, in ours at length circumsessile near the base, the base remaining as a peltate border under the fruit (rarely splitting lengthwise). Corolla funnelform, with ample spreading border 5-10-toothed, convolute-plicate in the bud. Stamens included or slightly exserted: filaments long and filiform. Style long: stigma bilamellar. Capsule muricate or prickly (rarely smooth), commonly firm and 4-valved from the top, sometimes fleshy and bursting irregularly at the top, 2-celled; the large many-seeded placenta projecting from the axis into the middle of the cells and connected with the walls by an imperfect false partition, so that the ovary and fruit are 4-celled except near the top, and the placenta as if borne on the middle of the abnormal partitions. Seeds large, reniform-orbicular.

12. **HYOSCYAMUS**. Calyx urceolate or tubular-campanulate with a 5-lobed limb, enlarged and persistent, becoming many-costate and reticulate-veiny, enclosing the capsule. Corolla short-funnelform, with an oblique 5-lobed limb, plicate-imbricated in the bud; the lobes sometimes conspicuously unequal, those of one side being smaller! Stamens more or less exserted and declined. Style filiform: stigma capitate-dilated. Capsule membranaceous, circumsessile towards the summit, which separates as a lid. Seeds less flattened.

TRIBE IV. **CESTRINEÆ**. Corolla (usually elongated) with the regular limb induplicate-valvate or induplicate-imbricated in the bud. Stamens (mostly 5) all perfect. Fruit either baccate or capsular. Seeds little or not at all flattened. Em-

bryo either straight or only slightly curved ; the cotyledons usually broader than the radicle.

13. **CESTRUM.** Corolla salverform or tubular-funnelform ; the short lobes induplicate-valvate in the bud. Filaments filiform : anthers short, explanate after dehiscence. Ovary usually short-stipitate, few-ovuled. Fruit a rather dry globular berry. Seeds few, or by abortion solitary, with a smooth testa : cotyledons usually broad and flat.
14. **NICOTIANA.** Corolla funnelform or salverform, plicate and somewhat imbricate in the bud. Filaments filiform, mostly included : anthers ovate or oblong, often explanate after dehiscence. Ovary normally 2-celled, with large and thick placenta, bearing very numerous ovules and seeds. Style filiform : stigma depressed-capitate and often 2-lobed. Fruit a capsule, more or less invested by the persistent calyx, septicidal and also usually loculicidal at summit ; the valves or teeth thus becoming twice as many as the cells, i.e. usually 4. Seeds very small, with granulate or rugose-foveolate testa : cotyledons little broader than the radicle.

TRIBE V. SALPIGLOSSIDÆ. Corolla with lobes (either regular or somewhat irregular) plicate or induplicate and also more or less bilabiate imbricated, the two superior external. Stamens 5, conspicuously unequal, four being didynamous and the fifth smaller, the latter (and even one pair of the others) sometimes imperfect or abortive. Seeds globular or angular, not compressed. Embryo curved or nearly straight, with cotyledons usually broader than the radicle. (Transition to *Scrophulariaceæ*.)

* Stamens all five perfect (or rarely the fifth wanting), inserted low down on the funnel-form or salverform corolla, included.

15. **PETUNIA.** Calyx 5-parted. Anther-cells distinct. Hypogynous disk fleshy. Stigma dilated-capitate, unappendaged. Capsule with 2 undivided valves, parallel with and separating from the placentiferous dissepiment.
16. **BOUCHETIA.** Calyx oblong-campanulate, 5-cleft, with narrow lobes. Corolla short-funnelform. Anthers connivent ; their cells somewhat confluent at summit. Hypogynous disk none or obscure. Stigma transversely dilated, somewhat reniform. Capsule at length 4-valved. Seed-coat minutely reticulated.

* * Stamens 4, didynamous, the fifth a sterile filament, included in the throat of the long-tubed corolla.

17. **LEPTOGLOSSIS.** Calyx 5-cleft or 5-toothed. Corolla salverform, with slender tube and more or less gibbous ventricose throat, at base of which the stamens are inserted. Anthers somewhat reniform, confluent at summit ; the upper pair much smaller, sometimes imperfect. Stigma or the style under it petaloid-dilated. Capsule membranaceous, 2-valved ; the valves at length 2-cleft.

1. **LYCOPÉRSICUM**, Tourn. TOMATO, &c. (*λύκος*, wolf, *περσικόν*, peach.) — Chiefly annuals, natives of the warmer parts of America ; with once or twice pinnate leaves, rounded petiolulate leaflets, racemes (so called) of small flowers becoming lateral or opposite the leaves, articulated pedicels reflexed in fruit, and red or yellow pulpy berries, in cultivation esculent and often becoming several-celled.

L. ESCULÉNTUM, Mill., var. **CERASIFÓRME**. (CHERRY-TOMATO.) Annual, hirsute on the branches and more or less glandular : leaves interruptedly 1-2-pinnate ; the larger leaflets incised and toothed, the interposed small ones rounder and often entire : calyx little shorter than the yellow corolla : inflorescence bractless : berry globose and even, small. — *L. cerasiforme*, DuRoi. *Solanum Lycopersicum*, var., L. *S. Pseudo-Lycopersicum*, Jacq. Vind. t. 11. — The normal form, probably, of the Tomato of the gardens : spontaneous on the southern borders of Texas (*Berlandier*, &c.) : introduced from Trop. Amer.

2. **SOLÁNUM**, Tourn. NIGHTSHADE, &c. (Late Latin name of Nightshade, probably from *solamen*, solace.) — Herbs or sometimes shrubs, of various habit ; with the leaves (as in many other genera of the order) often geminate, the proper leaf being accompanied by a smaller lateral or extra-axillary (rameal)

one, and the peduncles also extra-axillary or lateral. Flowers cymose, mostly after the scorpioid manner, or by unilateral suppression in appearance racemose, or rarely solitary, sometimes polygamous through the abortion of the pistil of many of the flowers. A vast genus, generally diffused over the temperate and warmer parts of the world, but sparingly represented in North America.

S. VIRGINIANUM, L. (founded on Dill. Elth. t. 267, and Pluk. Alm. t. 62, fig. 3), is some one of the very prickly exotic species and not of Virginian origin.

S. MAMMOSUM, L., a West Indian species, attributed to Virginia by Linnæus and succeeding authors, is unknown in the country. The less hairy *S. aculeatissimum* may sometimes have been taken for it. In Chapman's Flora a form of *S. Melongena* seems to represent it.

S. TEXANUM, Dunal in DC. Prodr. xiii. 359, is probably not Texan, although raised from seed said to have been collected there. It is a plant of the *Melongena* (Aubergine or Egg-Plant) type, and is probably *S. integrifolium*, Poir. (*S. Æthiopicum*, Jacq. Vind. t. 2, not L.), and according to Tenore his *S. Lobelii*. It has a 7-8-cleft calyx, and the fruit (from a solitary fertile flower) 5-10-celled.

S. FLORIDANUM, Dunal, l. c. 306, taken up from an imperfect specimen so named by Shut-tleworth in herb. DC., collected by Rugel at St. Mark's, Florida, is not identified, is probably some waif of ballast ground, and, having long-hairy and retrorse-prickly stems and pinnately parted leaves, cannot be a variety of *S. Carolinense*, to which Chapman referred it.

§ 1. Fruit naked, i. e. not enclosed in the accrescent calyx (in one species somewhat so): stamens all alike.

* Tuberiferous-perennial, pinnate-leaved: anthers blunt.

S. tuberósum, L. (POTATO-PLANT), var. *boreále*. Low, more or less pubescent: tubers about half an inch in diameter, sending off long creeping subterranean stolons: leaflets 5 to 7, ovate or oval, and with only one or two interposed small ones, or sometimes none at all: peduncle few-flowered: corolla blue or sometimes white, angulate-5-lobed.—*S. Fendleri*, Gray in Am. Jour. Sci. ser. 2, xxii. 285; Torr. Bot. Mex. Bound. 151.—New Mexico, especially in the mountains, and southward: apparently not specifically distinct from the Potato-plant, which extends along the Andes to Chili and Buenos Ayres.

S. Jamésii, Torr. Low, a span or so in height: leaflets 5 to 9, varying from lanceolate to ovate-oblong, smoothish; the lowest sometimes much smaller, but no interposed small ones: peduncle cymosely few-several-flowered: corolla white, at length deeply 5-cleft: otherwise as in the last.—Ann. Lyc. N. Y. ii. 227; Gray, l. c.—Mountains of Colorado to New Mexico and Arizona. (Mexico, probably under several names.) Seems on the whole distinct; but Fendler's no. 669 belongs here, at least in part.

* * Annuals (at least in our climate), simple-leaved, never prickly, but the angles of the stem sometimes minutely denticulate-asperate: anthers blunt: pubescence when present simple: flowers and globose berries small.

+ Leaves deeply pinnatifid.

S. triflorum, Nutt. Green, slightly hairy or nearly glabrous, low and much spreading: leaves oblong and pinnatifid, with wide rounded sinuses; the lobes 7 to 9, lanceolate, 3 or 4 lines long, entire or sometimes 1-2-toothed: peduncles lateral, 1-3-flowered: pedicels nodding: corolla small, white, a little longer than the 5-parted calyx: berries green, as large as a small cherry.—Gen. i. 128.—Plains from Saskatchewan to New Mexico, chiefly as a weed near habitations and in cultivated ground.

+ + Leaves varying from coarsely toothed to entire: flowers in small pedunculate umbel-like lateral cymes: corolla white and sometimes bluish: berries usually black when ripe, rarely red or yellowish, only as large as peas. (Section *Morella*, Dunal.)

S. nigrum, L. Low, green and almost glabrous, or the younger parts pubescent: leaves mostly ovate with a cuneate base, irregularly sinuate-toothed, repand, or sometimes entire, acute or acuminate: calyx much shorter than the corolla.—Includes many and perhaps most of the 50 and more species of Dunal in the Prodromus, weeds or weedy plants, widely diffused over the world, especially the warmer portions. A. Braun's characters for several species, founded on the hairiness or smoothness of the filaments, length of the anthers and of the style, and whether the calyx is loosely appressed to the ripe berry or reflexed, do not hold out. Our common form, the true *S. nigrum*, has corolla only

3 or 4 lines in diameter, filaments more or less hairy inside, style little if at all projecting, and fruiting calyx merely spreading. To this belongs mainly the following, referred to N. America by Dunal: viz. *S. pterocaulon*, Dunal. (Dill. Elth. t. 275, fig. 356), *S. crenato-dentatum*, *ptycanthum*, and probably *inops*, DC. — Common in damp or shady, especially cultivated and waste grounds, appearing as if introduced. (Cosmopolite.)

Var. villósum, Mill. Low, somewhat viscid-pubescent or villous: leaves conspicuously angulate-dentate, small: filaments glabrous to the base: berries yellow. — *S. villosum*, Lam. — Ballast-grounds, Philadelphia, &c. — **Var. alátum** (*S. alatum*, Mœnch, *S. minutum*, Benth.), a similar form, but with angled branches and red berries, has reached the shores of San Francisco Bay, California. (Adventive from S. Eu.)

Var. Dillénii. Taller and leaves mostly entire or merely repand: filaments more or less bearded, at least at the base: style exserted or sometimes not exceeding the stamens. — Dill. l. c. fig. 355. *S. Dillenii*, Schult., Dunal, l. c.; A. Braun, Ind. Sem. Hort. Berol. 1853. — Florida to S. America. Entire-leaved forms differ from the next only in the hairy filaments. *S. Americanum*, Mill. Dict., with glabrous leaves, should be the same, but *S. Besseri*, Weinm., to which Dunal refers it, is a canescently-puberulent variety, with rather large and entire leaves. (*S. Americanum*.)

Var. nodiflorum. Slender, often tall: leaves entire, rarely few-toothed, acuminate: filaments glabrous: style generally exserted: calyx in fruit reflexed. — *S. nodiflorum*, Jacq. Ic. Rar. t. 326. — Texas and New Mexico to S. America. Seems to pass into

Var. Douglásii, Gray. Either herbaceous and annual, or southward decidedly with lignescence stem 3 to 5 or even 10 feet high: leaves variously angulate-toothed, or some nearly entire: flowers larger: corolla 5 to 8 lines in diameter, white, or sometimes light blue: filaments hairy inside: fruiting calyx erect. — Bot. Calif. i. 538. *S. Douglasii*, Dunal in DC. l. c. 48. *S. umbelliferum*, var. *trachycladon*, Torr. Pacif. R. Rep. vii. 17, a remarkably large form. — W. California.

S. GRÁCILE, Link. Cinereous-pubescent or puberulent, rather tall (2 or 3 feet high), with virgate spreading branches: leaves ovate and ovate-lanceolate, acutish or obtuse, entire or nearly so: corolla white or bluish (about 5 lines in diameter): filaments slightly hairy inside: style exserted beyond the anthers: stigma rather large: calyx somewhat appressed to the (black) berry. — Hort. Berol.; Dunal, l. c. 54, not Sendt. — Coast of N. Carolina, Curtis. Ballast-grounds near Philadelphia. (Nat. or adv. from Extra-trop. S. Amer.)

* * * Perennial and more or less woody, at least the base, never prickly: anthers merely oblong or linear-oblong, not tapering but very blunt at apex: leaves rarely geminate.

+ Pubescence of simple or in one species of branching hairs, never stellate: cells of the anther opening by a short vertical slit at the apex, which extends downward usually for the whole length.

++ Corolla 5-parted: pedicels solitary or few in a lateral fascicle: common peduncle hardly any: berry large, scarlet.

S. PSEUDO-CÁPSICUM, L. (JERUSALEM CHERRY.) Low erect shrub, with spreading branches, very leafy, glabrous: leaves oblanceolate or oblong, often repand, bright green and shining, narrowed at base into a short petiole: corolla white: berry globose, scarlet, rarely yellow, half inch or so in diameter. — Cult. for ornament, nat. in Florida, &c., from Madeira, where probably it is not indigenous.

++ ++ Corolla 5-parted or deeply cleft, violet, purple, or sometimes white: peduncles slender, terminal or soon lateral, bearing several flowers in a paniculate or umbel-like cyme; the pedicels nodose-articulated at base: stems or branches mostly sarmentose or flexuous: leaves inclined to be cordate and often 3-lobed: berries small, red.

S. DULCÁMARA, L. (BITTERSWEET.) More or less pubescent: shrubby stems climbing and somewhat twining several feet high: leaves ovate and acuminate, mostly slightly cordate, some with an auriculate lobe on one or both sides at base, which are sometimes nearly separated into small leaflets: corolla half inch in diameter: berry oval. — Curt. Lond. ii. t. 5; Bigel. Med. t. 18. — Near dwellings and in low grounds, Northern Atlantic States. (Nat. from Eu.)

S. triquétrum, Cav. Nearly glabrous: stems suffruticose, flexuous or sarmentose, hardly at all climbing, a foot to a yard high: branches angled but hardly triquetrous: leaves deltoid-cordate (and the larger 2 inches long), varying to hastate, and in smaller forms to hastate-3-lobed or even 5-lobed, with the middle lobe lanceolate or linear and prolonged (an inch or only half an inch long): cymes commonly umbellately few-

-flowered: pedicels in fruit clavate-thickened at summit: corolla nearly as the preceding: berry globose. — Ic. iii. 30, t. 259; Dunal, l. c. 153, with the small-leaved variety. *S. Lindheimerianum*, Scheele in Linn. xxi. 766. — Low grounds and thickets, W. Texas (Berlandier, Lindheimer, Wright, &c.) to Arizona? Coulter. (Mex.)

++ ++ ++ Corolla angulate-5-lobed, ample and widely rotate, blue or violet, varying to white: peduncles mostly short, terminal or becoming more or less lateral, thickened often as if into a cupulate node at the articulation of the slender pedicels: "berries purple," the base covered by the appressed moderately accrescent calyx.

S. Xánti, Gray. Herbaceous nearly to the base, viscid-pubescent with simple hairs, or glabrate: branches slender: leaves ovate or ovate-oblong, thinnish, entire or undulate-repand, occasionally auriculate-lobed at the base, which is obtuse or rounded, or some of the upper acute, or the larger subcordate: cyme often forked: corolla about an inch in diameter. — Proc. Am. Acad. xi. 90, & Bot. Calif. i. 539. — California, throughout the length of the State and into the borders of Nevada: confused in collections with the following species. Calyx lobes (as in that) ovate or triangular, equalling or shorter than the short and broad tube. Style much exserted. Pubescence of jointed viscid hairs, some of them gland-tipped.

Var. Wallacei, Gray, l. c. Leaves and flowers much larger; the former sometimes 4 inches long, and the violet corolla fully an inch and a half in diameter: branches and the forking cyme villous. — Island of Santa Catalina off San Pedro, California, *Wallace*. (Coulter's no. 586, without flowers, may be a glabrous form of this.)

S. umbelliferum, Esch. Woody below, tomentose-pubescent and cinereous with short many-branched hairs, sometimes glabrate: flowering branchlets mostly short and leafy: leaves rarely ovate and acute, commonly obovate and oblong, obtuse, entire, half inch to an inch or two long, more or less acute or narrowed at base, or the lower and larger ones rounded, on short petiole: umbels short-peduncled, few-several-flowered: corolla about three-fourths inch in diameter. — Esch. in Mem. Acad. Petrop. x. 281. *S. Californicum* & *S. genistoides*, Dunal in DC. l. c. 86; the latter a starved and twiggy very small-leaved form, of arid soil or the dry season. — California, common from the foot-hills to the coast, producing handsome blue (rarely white) flowers throughout the season.

+ + Pubescence of stellate hairs or down: cells of the anther opening only by a short terminal transverse slit or hole: corolla 5-parted, downy outside: peduncles usually terminal, erect, rather long and stout, bearing a many-flowered cyme.

S. verbascifolium, L. Shrub erect, very soft-tomentose throughout: leaves ovate, rounded at base (4 to 10 inches long), entire, very hoary beneath: corolla white, its lobes ovate: ovary woolly. — Jacq. Vind. i. t. 13. — Key West, Florida; also in Mexico near the Texan borders. (Tropics.)

S. Blodgettii, Chapm. Shrub spreading, with rather slender branches, hoary with a fine somewhat furfuraceous and roughish pubescence: leaves narrowly oblong, obtusish at both ends (3 to 5 inches long), greenish and roughish above, soft and canescent beneath, entire: cyme twice or thrice forked: pedicels as long as the flower, erect in fruit: corolla white, deeply 5-parted, its lobes lanceolate (4 lines long): ovary glabrous: berry green, turning red. — Fl. 349. — Key West, &c., South Florida, *Dr. Hasler, Blodgett, Palmer*. Perhaps merely an unarmed form of some normally prickly species, allied to *S. lanceæfolium* and *S. igneum*.

* * * * Perennials, or one or two introduced weeds here annuals, more or less prickly: anthers more or less elongated and tapering at the apex; the cells opening only by a terminal hole: berries in all our species glabrous.

+ Corolla deeply 5-parted and not plaited: leaves entire: scurfy down stellate: calyx 5-toothed: peduncles terminal or soon lateral: berries red.

S. Bahamense, L. Shrubby, beset with straight and subulate tawny prickles: leaves lanceolate-oblong, obtusely pointed or obtuse (2 to 4 inches long), sometimes repand, stellate-scurfy with a minute roughish pubescence, which is denser but scarcely canescent beneath: flowers racemose, on slender pedicels which are recurved in fruit: divisions of the purplish or whitish corolla (3 or 4 lines long) linear with tapering tips, a little hairy. — Dill. Eth. t. 271, fig. 250. *S. radula*, Chapm., l. c. not Vahl. — Keys of Florida, *Blodgett, Palmer*. (W. Ind.)

+ + Corolla 5-parted and not plaited: leaves sinuate-lobed or pinnatifid: no scurf, and the pubescence all of simple hairs: calyx deeply 5-cleft: anthers broadly lanceolate: peduncles

lateral, short, few-flowered: berries smooth, becoming red or yellow. (Tropical American, sparingly introduced as weeds on and near the coast of Southern Atlantic States, growing as annuals.)

- S. ACULEATISSIMUM**, Jacq. Villous with scattered long and weak jointed hairs, or soon nearly glabrate, beset (even to the calyx) with slender-subulate straight prickles: leaves pretty large, membranaceous, ovate or slightly cordate, mostly sinuate-pinnatifid: corolla white, its lobes ovate-lanceolate: berry globose: seeds very flat and thin, with a membranaceous border. — Jacq. Ic. Rar. t. 41. — Waste grounds, a weed near dwellings, from N. Carolina to Florida and Texas. (Nat. from tropics.)

+- +- Corolla 5-cleft or angulate-5-lobed, plicate in the bud: pubescence all or partly stellate.

++ Indigenous perennials, a foot or two high, with deep running rootstocks: corolla violet, rarely white: anthers lanceolate or linear-lanceolate: pedicels recurved or reflexed in fruit: mature berries naked, merely subtended by the calyx.

- S. elæagnifolium**, Cav. Silvery-canescient all over by the dense and close scurf-like pubescence, composed of many-rayed stellate hairs: stems often woody at base: prickles small and acicular, sometimes copious, sometimes nearly or wholly wanting: leaves lanceolate and varying to oblong and to linear, rather obtuse, sinuate-repand or entire: cymes at first terminal, short-peduncled, few-flowered: pedicels rather long: calyx 5-angled, with slender lobes fully as long as the tube: corolla moderately 5-lobed, about an inch in diameter; the lobes triangular-ovate: ovary white-tomentose: berry globose, seldom half an inch in diameter, yellowish, or at length black. — Ic. iii. t. 243. *S. leprosum*, Ort. Dec. ix. 115; Dunal, Sol. t. 12, a prickly and sinuate-leaved form. *S. flavidum*, Torr. in Ann. Lyc. N. Y. ii. 227. *S. Hindsianum*, Benth. Sulph. 39. *S. Texense*, Engelm. & Gray, Pl. Lindh. i. 45. *S. Ræmsonianum*, Scheele in Linn. xxi. 767. — Prairies and plains, Kansas to Texas, and west to S. Arizona. (Lower Calif., Mex., Extra-trop. S. Amer.)

- S. Torrèryi**, Gray. Cinereous with a somewhat close furfuraceous pubescence composed of about equally 9-12-rayed hairs: prickles small and subulate, scanty along the stem and midribs, or sometimes nearly wanting: leaves ovate with truncate or slightly cordate base, sinuately 5-7-lobed (4 to 6 inches long); the lobes entire or undulate, obtuse, unarmed: cymes at first terminal, loose, 2-3fid: lobes of the calyx (often 6) short-ovate with a long abrupt acumination: corolla an inch and a half in diameter; its lobes broadly ovate: berry globose, an inch in diameter, yellow when mature. — Proc. Am. Acad. vi. 44. *S. platyphyllum*, Torr. in Ann. Lyc. N. Y. ii. 227, not HBK. *S. mammosum*? Engelm. & Gray, Pl. Lindh. i. 46. — Prairies, &c., Kansas and Texas. — Anthers 4 to 5 lines long. Flowers large and handsome.

- S. Carolinense**, L. Hirsute or roughish-pubescent with 4-8-rayed hairs, many of them with the central division elongated: prickles stout and subulate, yellowish, copious or rarely scanty: leaves oblong or sometimes ovate, obtusely sinuate-toothed or lobed or sinuate-pinnatifid: cymes or racemes simple, soon lateral, loose, few-several-flowered: lobes of the calyx acuminate: corolla an inch or less in diameter, light blue or rarely white, the lobes ovate: berries about half inch in diameter, globose. — (Dill. Elth. t. 269; but the fig. of Jacq. Ic. Rar. t. 331 is dubious.) — Sandy soil and waste grounds, Connecticut and S. Illinois to Florida and Texas. Southward a troublesome weed in cult. grounds. Var. *Floridanum*, Chapm. Fl. 349, is a mere form with deep-lobed leaves.

Var. **hirsutum** (*S. hirsutum*, Nutt. in Jour. Acad. Philad. vii. 109, *S. pumilum*, Dunal, l. c.), judging from an imperfect original specimen, is a depauperate and more hirsute variety, little prickly, with leaves merely repand and tapering to the base, as in the lowest leaves of *S. Carolinense*. *S. Pleei*, Dunal, l. c., may be a more developed state of the same. — Milledgeville, Georgia, Boykin, &c.

++ ++ Introduced annuals or more enduring and woody in the tropics, with partly simple pubescence: anthers lanceolate: racemose fructiferous pedicels merely spreading: berry wholly or partly enveloped by the loose calyx.

- S. sisymbriifolium**, Lam. Green, stout, villous-pubescent with simple more or less glandular and viscid hairs, mixed on the leaves with some few-rayed stellate hairs (their middle division elongated), much armed even to the calyx with long-subulate straight prickles: leaves deeply pinnatifid and the oblong lobes sinuate or even again somewhat pinnatifid: flowers several or numerous in terminal or soon lateral pedunculate racemes: corolla light blue or white, an inch or more in diameter, 5-lobed: lobes of the 5-parted calyx lanceolate, becoming ovate-lanceolate and at length loosely and completely or incompletely surrounding the globose red berry: seeds minutely reticulate-pitted. — Dunal in DC. l. c. *S. vis-*

cosum, Lag. *S. inflatum*, Hornem. *S. bracteifolium*, Jacq. Ecl. t. 7. *S. decurrens*, Balbis. *S. Balbisii*, Dunal; Hook. Bot. Mag. t. 2828, 3954. *S. Subeanum*, Buckley in Proc. Acad. Philad. 1862. — Waste grounds, Alabama, Georgia, Florida, and Texas: adventive or escaped from cultivation. (Brazil and Buenos Ayres.) — Calyx not greatly accrescent and not enclosing the berry in waste specimens, and in some later flowers of cultivated plants.

§ 2. **ANDRÓCERA**. Fruit enclosed by the close-fitting and horridly prickly calyx and even adhering to it: stamens and especially the style much declined: anthers tapering upwards, linear-lanceolate, dissimilar; the lowest one much longer and larger, and with an incurved beak: seeds thickish, coarsely undulate-rugose: racemose pedicels erect in fruit: leaves 1–3-pinnatifid: annuals, sometimes woody below, armed with straight prickles. — *Androcera*, Nutt. Gen. i. 129. *Nycterium*, Vent. in part, but not the typical one, which has a naked fruit.

S. heterodóxum, Dunal. Pubescent with glandular-tipped simple hairs, with a very few 5-rayed bristly ones on the upper face of the irregularly or interruptedly bipinnatifid leaves; their lobes roundish or obtuse and repand: corolla violet, an inch and a half or less in diameter, somewhat irregular, 5-cleft; the lobes ovate-acuminate: four anthers yellow, and the large one tinged with violet. — Sol. 235, t. 25 (small-flowered form cult. at Montpellier); IIBK. Nov. Gen. & Spec. iii. 47; Jacq. Ecl. ii. t. 101. *S. (Nycterium) citrullifolium*, Braun, Ind. Sem. Frib. 1849; Torr. Bot. Mex. Bound. 152. — W. Texas and New Mexico. (Mex.) Leaves Watermelon-like in form and division.

S. rostrátum, Dunal. Somewhat hoary or yellowish with a copious wholly stellate pubescence, a foot or two high: leaves nearly as in the foregoing or less divided, some of them only once pinnatifid: corolla yellow, about an inch in diameter, hardly irregular, the short lobes broadly ovate. — Sol. 234, t. 24, & in DC. l. c. 329. *S. heterandrum*, Pursh, Fl. i. 156, t. 7. *S. Bejariense*, Moricand in DC. l. c. *Androcera lobata*, Nutt. Gen. i. 129. — Plains of Nebraska to Texas. (Mex.) *S. cornutum*, Lam., of Tropical Mexico, should be known by its simple pubescence.

3. **CÁPSICUM**, Tourn. CAYENNE PEPPER. (Name conjectured to come from *καπτώ*, to gulp down, alluding to the pungency of the fruit used as a condiment, or from *capsa*, a pod, the pericarp of the larger-fruited species being dry at maturity and almost capsular.) — Herbs or shrubs, originally all American and nearly all tropical, green and commonly glabrous; with many-times forking stems, ovate and entire or merely repand thin and usually acuminate leaves, and small solitary or cymose flowers on slender (or when the fruit is recurved stouter) pedicels: corolla mostly white: anthers generally bluish; the red or yellowish berries (or in some cultivated forms vesicular pod-like fruits) charged with a very pungent aromatic acidity. — Fingerhuth, Mon. Caps. 1832.

C. FRUTÉSCENS, L. Shrub 2 to 4 feet high, with flexuose branches: berry ovate-oblong, obtuse, half an inch or more long, on an erect or inclined peduncle. — Key West, Florida. (Nat. from Trop. Amer.)

C. baccátum, L. (BIRD PEPPER.) Shrubby, a foot or two high, with slender divergent branches: leaves slender-petioled: calyx more or less toothed in the flower, truncate in fruit: berry elliptical-globular or globose: peduncles in fruit erect. — Fingerh. l. c. 19, t. 4, fig. 6. *C. microphyllum*, Dunal in DC. l. c. 421 (sometimes small-leaved). — S. Texas to Arizona, indigenous. S. Florida, doubtless introduced. (Trop. Amer. and other tropical regions.)

4. **SALPICHRÓA**, Miers. (*Σάλπιγξ*, trumpet, and *χρῶς*, complexion or color, the typical species having trumpet-shaped and handsome corolla; but in some it is urceolate and rather short, in ours especially so.) — South American, except the dubious

S. Wrightii. Low herb, apparently perennial, pubescent with rather slender simple hairs: leaves membranaceous, ovate, entire (an inch or more long), slender-petioled: pedi-

cels solitary or sometimes 2 or 3 together, soon deflexed: calyx hirsute (a line and a half becoming in fruit 2 or 3 lines long), divided to the base; the divisions lanceolate: corolla oblong and hardly longer than the calyx, naked within: dry berry globose, 4 lines in diameter: seeds flat, rugose, oval, with excised hilum. — Arizona on the Sonoita, *Wright* (no. 1692), with mature fruit and some undeveloped flower-buds; from the habit, calyx, seeds, and high insertion of the stamens referred to the present genus.

5. **ORÝCTES**, S. Watson. (*Ὀρύκτης*, a digger, name given to this dubious plant because it grows in the country of the Digger Indians.) — A single species, known only from incomplete materials.

O. Nevadénsis, Watson. A low and insignificant winter-annual, 2 to 4 inches high, when young somewhat scurfy or pruinose-pubescent, rather viscid: leaves oblong-ovate or lanceolate, undulate, tapering at base into a petiole: pedicels 3 or 4 in a lateral fascicle, shorter than the flower: calyx-lobes lanceolate, obtuse, rather shorter than the corolla, about the length of the globose berry, loose: corolla 3 lines long, narrow, apparently cylindraceous, blue or purplish; the sinuses deeply induplicate in the bud: filaments somewhat hairy, inclined to be unequal in length; the longer ones and the filiform style nearly equalling the corolla: seeds orbicular, flattened, foveolate-reticulated. — Bot. King, 274, t. 28, fig. 9, 10; Benth. & Hook. Gen. ii. 893; Gray, Bot. Calif. i. 542. — W Nevada, at the eastern base of the Virginia mountains, near the Big Bend of the Truckee, under *Artemisia* bushes, in spring, *Watson*.

6. **CHAMÆSÁRACHA**, Gray. (*Saracha* is a tropical American genus, dedicated by Ruiz & Pavon to *Isidore Saracha*, a Spanish Benedictine: the prefix *χῆμα*, on the ground, makes the meaning *low Saracha*.) — Texano-Californian depressed perennials; with mostly narrow leaves, either entire or pinnatifid, and tapering into margined petioles, filiform naked pedicels, and either white, ochroleucous, or violet-tinged corolla; the close-fitting calyx in fruit obscurely if at all veiny. — Benth. & Hook. Gen. ii. 891. *Saracha* § *Chamæsaracha*, Gray, Proc. Am. Acad. x. 62.

* Stems branching, diffuse or at length depressed-procumbent: fruiting calyx almost globose: seeds thickish, rugosely favose.

C. Corónopus, Gray. Green, almost glabrous, or beset with some short and roughish hairs, diffusely very much branched: leaves lanceolate or linear with cuneate-attenuate base, varying from nearly entire to lacinate-pinnatifid: peduncles elongated: calyx more or less hirsute (the hairs often 2-forked at tip). — Bot. Calif. i. 540. *Solanum Coronopus*, Dunal in DC. Prodr. l. c. 64. *Withania*? *Coronopus*, Torr. Bot. Mex. Bound. 155. *Saracha* (*Chamæsaracha*) *Coronopus*, Gray, Proc. Am. Acad. x. 62. — Clayey soil, Texas to southern parts of Colorado and west to Arizona. (Adjacent Mex.) Corolla (yellowish), berry (nearly white), and fruiting calyx nearly as in the next species, with which some specimens seem to connect. To this probably belongs *Saracha acutifolia*, Miers in Ann. & Mag. Nat. Hist. 1849, & Ill. S. Am. Pl. ii. 19, described from an incomplete specimen in Coulter's collection, from California, or probably Arizona.

C. sordida, Gray, l. c. Much branched from the root or base, somewhat cinereous with short viscid or glandular pubescence, which occasionally becomes furfuraceous, also more or less villous with longer hairs: leaves from obovate-spatulate or cuneate-oblong to oblanceolate, and from repand to incisely pinnatifid (or even with the lobes sinuate-incised): calyx when young viscid-villous. — *Withania*? *sordida*, Dunal in DC. l. c. 456, Torr. l. c. *Solanum cinoides*, Moricand ex Dunal, l. c. 64. *S. Linsecumii*, Buckley in Proc. Acad. Philad. *Saracha* (*Chamæsaracha*) *sordida*, Gray, Proc. Am. Acad. l. c. — Dry or clayey soil, Texas and South-western Kansas to Arizona. (Adjacent Mex.) Corolla dull pale yellow or sometimes violet-purple, about half inch in diameter. Berry the size of a pea, all but the summit closely invested by the herbaceous calyx. Dunal's two plants are the same, both being rather hoary and less hairy forms of a very variable species.

* * Stems very short and tufted on a branching rootstock: fruiting calyx hemispherical, open: seeds very flat, smoothish and minutely punctate.

C. nana, Gray. Seldom a span high, sometimes nearly acanulescent, minutely cinereous with appressed pubescence, not viscid: leaves crowded and large in proportion, oblong-ovate and ovate-lanceolate, mostly acute, entire or undulate, an inch or two long, and with the roundish or cuneate base abruptly contracted into a margined petiole of about equal length: peduncles mostly shorter than the petioles: rotate corolla white or bluish, 7 to 9 lines wide. — *Saracha* (*Chamæsaracha*) *nana*, Gray, Proc. l. c. — Sierra Co., California, at about 5,000 feet in the Sierra Nevada, *Bolander, Lemmon*.

7. PHÝSALIS, L. GROUND CHERRY. (*Φυσάλis*, a bladder, from the bladdery-inflated fruiting calyx which characterizes the genus.) — Herbs, chiefly American or of probably American origin; with entire, toothed, or lobed leaves, very commonly geminate, and solitary or sometimes geminate (rarely ternate) drooping or nodding pedicels; the flowers small or middle-sized, white, yellow, or violet-purple: berries greenish, red, or yellow, often edible. — Gray, Proc. Am. Acad. x. 62.

§ 1. **CHAMÆPHYSALIS, Gray, l. c.** Young parts sparsely (or on stalks and calyx densely) scurfy-granuliferous, otherwise quite glabrous: some leaves sinuate-pinnatifid: corolla flat-rotate: anthers short, yellow: seeds comparatively few and large, thickish and somewhat rugose-tuberculate round the back. (Habit nearly of *Chamæsaracha*, but fruiting calyx of true *Physalis*.)

P. lobáta, Torr. Low and small, diffusely branched from a perennial root: leaves oblong-spatulate or obovate, from repand to sinuate-pinnatifid (an inch or two long), the base cuneately tapering into a margined petiole: pedicels commonly geminate, longer than the flower: corolla violet (probably never "yellow"), 6 to 9 lines in diameter, the centre with a 5-6-rayed white-woolly star: globular-inflated fruiting calyx strongly 5-angled, half inch or more long, with short bluntish teeth. — Ann. Lyc. N. Y. i. 226 (1826) & Bot. Mex. Bound. 152. *P. Sabeaná*, Buckley in Proc. Acad. Philad. 1861. *Solanum luteoliflorum*, Dunal in DC. Prodr. l. c. 64, at least as to var. *subintegrifolium*. — Plains, Texas to Colorado and W. Arizona.

§ 2. **PHYSALIS proper.** Not granulose-scurfy: leaves never pinnatifid: corolla mostly rotately spreading from a somewhat campanulate throat or base: seeds with a thin and even margin.

P. ALKEKENGI, L., the Winter Cherry of the south of Europe, with white 5-lobed corolla and a red berry in a calyx which turns red also, and

P. PERUVIANA, L., the Cape Gooseberry, with greenish-yellow corolla spotted by a brown-purple star in the centre, and a yellow berry, — both perennial-rooted species, — were introduced into cultivation several years ago, for their esculent fruit, under the name of Strawberry Tomato. But they have now mainly disappeared.

P. CARPENTÉRII, Riddell, Cat. Fl. Ludov. (N. O. Med. & Surg. Jour. viii. 758, 1852, name only), referred to *Withania Morisoni*, in Bot. Gazette, iii. 11, is some adventitious *Atheuea*.

* Corolla pure white or tinged with blue, wholly destitute of any dark centre, tomentose at the throat, proportionally large, widely rotate, with border almost entire: pubescence simple: fruiting calyx ovate-globose.

P. grandiflora, Hook. Annual, with stout erect stem 2 feet or more high, viscid-pubescent and young parts villous with some long and slender viscid hairs: leaves oblong-ovate or lanceolate-ovate, acute or acuminate, mostly entire: pedicels often in threes, shorter than the flower: calyx-lobes lanceolate: corolla often an inch and a half in diameter: anthers yellow, commonly with a tinge of violet: fruiting calyx less than an inch long, well filled and distended by the berry, the angles therefore obsolete, and the summit open. — Fl. ii. 90; Gray, Man., & Proc. Am. Acad. x. 63, 381. — S. shore of Lake Superior to the Saskatchewan district, springing up in new clearings. Connects with *Chamæsaracha* through *C. nana*.

P. Wrightii, Gray. Annual, a span high, widely branched, nearly glabrous; the appressed and rather sparse pubescence on pedicels and young parts very short and minute: leaves oblong or lanceolate-oblong, sinuate-toothed or repand, acute at base, about an inch long: pedicels filiform, longer than the flower and the fruiting calyx: corolla over half inch in diameter, apparently pure white: anthers with or without a tinge of violet: fruiting calyx half inch long, nearly filled by the berry. — S. W. Texas, on prairies of the San Pedro, *Wright*.

* * Corolla lurid greenish-white or yellow, mostly darker-colored or brownish in the centre, with or without a brown-purple eye, small or middle-sized, 3 to 10 lines in diameter.

+ Strictly annuals, glabrous or nearly so; the pubescence if any minute, and neither viscid nor stellate: anthers violet.

++ Corolla small, 3 to 6 lines broad: fruiting calyx at first acutely angled and inflated, closing over, but at full maturity nearly replete with the greenish-yellow berry: stem and branches conspicuously angular: petioles long and slender.

P. obscura, Michx. Branches widely diffuse: leaves broadly deltoid-ovate, mostly with truncate or subcordate base, unequally dentate, abruptly acuminate, membranaceous ($1\frac{1}{2}$ to 3 inches long): slender pedicels about half an inch long: corolla (3 or 4 lines broad) pale yellow with a dark eye: calyx deeply 5-cleft into lanceolate-subulate lobes, in fruit ovate-pyramidal and acuminate (over an inch long), very smooth, with 5 strong keeled angles which are hardly obliterated at maturity, the 5 intermediate nerves much less distinct. — Gray, Proc. Am. Acad. x. 64. *P. obscura*, var. *glabra*, Michx. Fl. i. 149. *P. pruinosa*, Ell. Sk. i. 279, not L. *P. Brasiliensis*, Sendtner in Mart. Fl. Bras. x. 133? — “Carolina,” Michaux. Key West, Florida, *Blodgett*. Near Houston, Texas, *E. Hall*, no. 503.

P. angulata, L. Erect, or at length declined or spreading, 2 to 4 feet long: leaves mostly ovate-oblong and with somewhat cuneate base, coarsely and laciniately toothed (2 to 5 inches long): slender pedicels an inch or more long: corolla (3 to 6 lines broad) greenish-white or yellowish and with no distinct eye: calyx-lobes shorter than the tube, triangular: fruiting calyx at first ovate-pyramidal and 10-angled, the 5 principal angles sharply keeled, at full maturity nearly replete and globose-ovate. — Dill. Elth. i. 13, t. 12. — Open rich grounds, through the Middle and Southern Atlantic States. (Widely diffused over tropical regions.)

Var. Linkiana, Gray, l. c. Leaves with margin more lacinate-dentate; the irregular salient teeth lanceolate-subulate: calyx-lobes longer and narrower. — *P. Linkiana*, Nees in Linn. vi. 471. (Moris. Hist. iii. 526, sect. 13, t. 3, fig. 22, exaggerated.) — S. Atlantic States. (Trop. Amer.)

P. æquata, Jacq. f. Erect, much branched, a foot or two high, the younger stems and branches a little hairy or pubescent: leaves ovate or oblong, repand or sinuate-toothed (an inch or two long or rarely larger): pedicels very short (a line or two long): corolla (3 to 5 lines broad) light yellow with a brownish eye: calyx-lobes short and broadly ovate-triangular: fruiting calyx ovate-globose at maturity, about equally 10-nerved, an inch or considerably less in length. — Eclog. ii. t. 137; Nees, l. c.; Dunal, l. c. *P. Philadelphica*, var. *minor*, Dunal, l. c. 450. — Waste grounds, S. Texas and New Mexico to the border of California or near it. (Mex., W. Ind.)

++ ++ Corolla larger, 7 to 10 or sometimes 12 lines broad: fruiting calyx at maturity replete and distended with the large reddish or purple berry, and open at the mouth, sometimes bursting.

P. Philadelphica, Lam. Erect stem and branches angled, 2 or 3 feet high: leaves obliquely ovate or oblong, repand-angulate and sometimes few-toothed (2 to 4 inches long): corolla greenish or yellowish with a dark eye: calyx-lobes broadly ovate or triangular, not longer than the tube; fruiting calyx globular, an inch in diameter. — Dict. ii. 101. *P. chenopodiifolia*, Willd., not Lam. “*P. atriplicifolia*, Jacq. Fragn. t. 85.” — In fertile soil, Pennsylvania to Illinois and Texas: sometimes cult. for the esculent fruit.

+ + Annuals or perennials, strong-scented, villous or pubescent with viscid or glandular simple hairs: fruiting calyx ovate-pyramidal and carinately 5-angled at maturity, closed, loosely enveloping the green or at length yellow berry: leaves ovate or cordate.

++ Root annual: anthers violet.

P. pubescens, L. A foot or two high, with at length widely spreading branches: leaves ovate or cordate, varying from nearly entire to coarsely and obtusely repand-toothed, sometimes becoming nearly glabrous except on the midrib and veins (commonly about 2 inches long): corolla barely half inch in diameter when expanded, dull yellow with a

purplish brown eye: pedicels (3 to 5 lines long) much shorter than the fruiting mostly pubescent and viscid (inch to almost 2 inches long) calyx. — (Moris. Hist. iii. 527, sect. 13, 4, 3, fig. 24; Dill. Elth. t. 9, fig. 9.) *P. obscura*, var. *viscido-pubescent*, Michx. l. c. *P. hirsuta* & *P. pubescens*, Dunal in DC. l. c. *P. viscosa*? Ell. Sk. i. 279. *P. pruinosa*, L. (from N. America?), is most probably a form of this with long pedicels and yellowish anthers, same as Dill. Elth. t. 9. — Low grounds, New York to Iowa, Florida, and westward from Texas to the borders of California. (Trop. Amer., &c.)

++ ++ Perennial: anthers mostly yellow.

P. Virginiana, Mill. A foot or so high from slender and deep creeping subterranean shoots, at length spreading or decumbent, pubescent or hirsute-villous with (usually more or less viscid) many-jointed hairs: leaves ovate, occasionally subcordate, either repandly or saliently few-toothed or some nearly entire: corolla from three-fourths to a full inch in diameter, dull sulphur-yellow with a brownish centre: calyx-lobes narrowly triangular: pedicels half to an inch long, equalling or shorter than the fruiting calyx. — Dict. no. 4, & Fig. Pl. 138, t. 206, fig. 1; Gray, Proc. Am. Acad. x. 65 (by mistake "*P. Virginica*"). *P. heterophylla*, Nees in Linn. vi. 463, excl. syn. Walt. "*P. nutans*, Walt. Car. 99?" ex Nees, l. c.; but no such name in Walter. *P. heterophylla*, *nyctaginea*, & *viscido-pubescent*, Dunal, l. c. *P. viscosa*, Gray, Man., not L. — Light or sandy soils, Upper Canada to Florida and Texas. This early name of Miller, taken up for the present species in Proc. Am. Acad. l. c., must from the size of the flower belong to it, or to a broad-leaved and hairy form of *P. lanceolata*. Miller's remark that "the root does not creep in the ground," is most applicable to the latter; but the color as well as size of the corolla and the "pale yellow" fruit, also the diffuse growth, best accord with this common species.

Var. ambigua, Gray, l. c. A coarse and very villous form with anthers violet! — *P. pennsylvanica*, Hook. Fl., at least in part. — Wisconsin (*Lapham*) to Saskatchewan, *Bourgeau*, *Drummond*, &c.

P. hederæfolia, Gray, l. c. A foot or less high, erect or at length diffuse from a thick perennial stock or root, densely viscid-pubescent or on young parts more or less villous, not unpleasantly scented: leaves roundish-cordate or almost reniform, or sometimes ovate, coarsely and obtusely angulate-toothed (three-fourths to an inch and a half in diameter): corolla half an inch in diameter: anthers yellow: calyx-lobes triangular: pedicels (2 to 4 lines long) shorter than the flower, much shorter than the fruiting calyx. — *P. Alkekengi*? var. *digitalifolia* & *P. mollis*, in part, Torr. Bot. Mex. Bound. 153. — Rocky hills, New Mexico to S. W. Texas, Arizona, and adjacent parts of Mexico. "Herbage destitute of the nauseous odor of the common viscid species, rather sweet-scented," Wright.

Var. pubérula, Gray, l. c. Pubescence short and minutely glandular, less viscid: stems inclined to be procumbent and leaves smaller. — Western borders of Texas, Wright.

P. Palmeri. A span or two high from a thickish perennial stock, erect, viscid-pubescent with short jointed hairs: leaves ovate or deltoid-ovate, or the lowest rotund (rarely even subcordate), angulate-dentate with few obtuse teeth, the upper leaves acute (10 to 18 lines long): corolla light yellow with brownish centre, 7 or 8 lines in diameter: pedicels mostly longer than the flower: fruit not seen. — Rock Spring in the Providence Mountains, S. E. California, *Palmer*. Apparently allied to the preceding.

+ + + Perennials, not viscid, mostly low: anthers almost always yellow.

++ Very minutely cinereous-puberulent or glabrous throughout, no stellular pubescence whatever: corolla (yellowish) wholly destitute of a darker eye: leaves all cordate or broad and abrupt at base, thickish: pedicels long and filiform.

P. GLÁBRA, Benth. (not Martins & Gal.), of Lower California, if found within the United States will be known by being completely smooth, and the leaves ovate- or hastate-lanceolate.

P. crassifolia, Benth. Minutely puberulent, or the leaves at length nearly glabrous: stems a span to a foot long, branching from the base, sometimes soon procumbent: leaves ovate or rounded-subcordate, repand or entire: pedicels commonly an inch long: corolla ochroleucous, half inch in diameter: fruiting calyx an inch long, 5-angled. — Bot. Sulph. 40; Gray, l. c. & Bot. Calif. i. 541, the small-leaved form. — S. E. California and Western Arizona. (Lower Calif.)

Var. cardiophýlla. A more upright form: leaves thinner and larger (6 to 15 lines long), sometimes with a few angulate and more prominent teeth. — *P. cardiophylla*, Torr. Bot. Mex. Bound. 153. — On or near the Rio Colorado, Fort Mohave, Fort Yuma, &c.

++ ++ Pubescence stellular or branching, at least on the calyx, &c.: leaves all or most of them cordate or ovate with abrupt base: corolla usually with darker eye: anthers occasionally with a tinge of blue: fruiting calyx globose-ovate.

P. Fendleri, Gray, l. c. Pruinose-puberulent; the pubescence microscopically minute and partly simple, partly branched or stellular, sometimes a little glandular: stems a span to a foot high from a deep tuberous stock, slender, much branched: leaves small (an inch or less long), from deltoid-ovate or slightly cordate to ovate-lanceolate, and from repand-undulate to coarsely sinuate-toothed, mostly acute: pedicels shorter than the flower: corolla half an inch in diameter. — *P. mollis*, Torr. Bot. Mex. Bound., in part. — Rocks and plains, New Mexico, *Fendler, Thurber, Wright, Bigelow, Parry*. Also S. Colorado. *See ad*

P. mollis, Nutt. Softly cinereous-tomentose or canescent throughout with stellate or many-branched woolly hairs: stems a span to a foot or more high: leaves varying from ovate (or some of the lower obovate) to rounded-cordate, mostly obtuse, angulate-toothed or repand (an inch or two long), on slender petioles: pedicels usually filiform and equalling the petiole: corolla half to three-fourths inch in diameter: fruiting calyx an inch or more long. — Nutt. in Trans. Am. Phil. Soc. ser. 2, v. 194; Torr. l. c., in part; Gray, Proc. Am. Acad. x. 66. *P. tomentosa*, Dunal in DC. l. c.? not Walt. — Thickets and banks of streams, Arkansas (*Nuttall, &c.*) and Texas. (Mex.) Sometimes very white-woolly (as in coll. *E. Hall*); but passing into

Var. cinerascens, Gray, l. c. Greenish; the pubescence much shorter and less dense, the hairs less compound: leaves roundish, rarely at all cordate, some of the lower with cuneate base: pedicels sometimes shorter. — *P. Pennsylvanica*, var. *cinerascens*, Dunal in DC. l. c. 435. — Indian Territory (*Palmer*) and through Texas (*Drummond, Schott, E. Hall, &c.*) to Mexico. *Berlandier* collected it at Matamoras.

++ ++ Pubescence stellular, or simple and somewhat rigid, or nearly none: leaves from oval to lanceolate-linear and tapering into the petiole, or in the first species occasionally subcordate: style commonly clavate.

P. viscosa, L. Cinereous or when young almost canescent with short and soft stellular or 2-3-forked pubescence: stems ascending or spreading from slender creeping subterranean shoots, a foot or two long: leaves ovate or oval, varying to oblong and obovate, entire or undulate ($1\frac{1}{2}$ to 3 inches long): pedicels about the length of the petioles: corolla two-thirds to three-fourths inch in diameter, greenish-yellow with a more or less dark throat: fruiting calyx globose-ovate, an inch or more long: berry yellow or orange. — Dill. Elth. t. 10; Jacq. Vind. t. 136; Michx. Fl. i. 149; Gray, l. c. *P. Pennsylvanica*, L. Spec. ed. 2, 1670, but not from Pennsylvania or near it. *P. tomentosa*, Walt. Car. 99. *P. maritima*, M. A. Curtis in Am. Jour. Sci. ser. 2, vii. 407. *P. Jacquinii*, Link, Enum. Berol.; Dunal, l. c. *P. Walteri*, Nutt. in Jour. Acad. Philad. vii. 112. — In sands on and near coast, Virginia (L.), N. Carolina to Florida. (Buenos Ayres, &c.) Specific name from the viscous berry.

Var. spathulæfolia, Gray, l. c. Leaves spatulate or oblong-lanceolate, gradually tapering into the petiole. — *P. pubescens*, Engelm. & Gray, Pl. Lindh. i. 19. *P. lanceolata*, var. *spathulæfolia*, Torr. Bot. Mex. Bound. l. c. — Sea beaches, Florida and Texas. Glabrate forms approach the next.

P. angustifolia, Nutt. Bright green, very minutely stellular-pubescent when young, or glabrous from the first, except a fine soft stellular pubescence on the margins of the leaves, or at least on the calyx-lobes: stems erect or ascending from filiform running shoots, a span to a foot or more high: leaves from oblong-lanceolate or oblanceolate to linear, tapering into a very short petiole ($1\frac{1}{2}$ – $3\frac{1}{2}$ inches long): corolla three-fourths inch in diameter when expanded: flowering calyx broadly campanulate and 3 or 4 lines long, the subglobose fruiting calyx seldom an inch long. — Jour. Acad. Philad. vii. 112; Gray, l. c. — Sandy coast and Keys of W. Florida.

P. lanceolata, Michx. More or less hirsute-pubescent with short and stiff (or on the stem often longer and somewhat villous-hispid) tapering hairs, most of which are simple, a few 2-3-forked, varying to nearly glabrous: stems a span to a foot high from rather stout subterranean shoots, angled, somewhat rigid: leaves pale green, varying from oblong-ovate to narrowly lanceolate, and from sparingly angulate-few-toothed to undulate or entire, mostly acute at base or tapering into a short petiole: corolla ochroleucous with more or less dark eye, two-thirds to three-fourths of an inch in diameter: calyx (4 or 5 lines long) commonly hirsute, in fruit conical-ovate with sunken pyramidal base, 1 to $1\frac{1}{2}$

inches long; berry reddish. — Fl. i. 149; Ell. l. c.; Dunal in DC. l. c.; Gray, l. c. *P. pumila*, Nutt. in Trans. Am. Phil. Soc. ser. 2, vii. 193. *P. Pennsylvanica*, Gray, Man. ed. 5, 382, in part, not Linn.? *P. Elliotti*, Kunze in Linn. xx. 33. — Dry open ground and bottoms, Lake Winnipeg to Florida and Texas, Colorado, Utah, and New Mexico. Calyx-lobes varying from triangular-lanceolate to ovate-triangular; fruiting calyx pyramidal-ovate, large.

Var. lævigáta, Gray, l. c. Glabrous or almost so throughout, or with some extremely short and pointed appressed rigid hairs on young parts, calyx, &c., or on the margins of the leaves: petioles commonly longer. — *P. longifolia*, Nutt. in Trans. Amer. Phil. Soc. l. c. *P. pumila*? var. *Sonoreæ*, Torr. Bot. Mex. Bound. l. c. — Nebraska to Texas, New Mexico and Arizona.

Var. hirta, Gray, l. c. A remarkable and ambiguous form, approaching *P. mollis*, var. *cinerascens*; much of the hirsute pubescence of the leaves being 2-3-forked, as also are some of the villous-hispid abundant hairs of the stem. — *P. Pennsylvanica*, var., Gray in E. Hall's list, Coll. Tex. no. 501. — Wet woods, Houston, Texas, *Drummond*, E. Hall. Lawrence, Kansas, *J. H. Carruth*.

8. MARGARÁNTHUS, Schlecht. (Composed of μάργαρον, a pearl, and ἄνθος, flower, from a fancied resemblance of the corolla.) — Resembles an annual *Physalis* on a small scale, except in the globular (livid or violet-tinged) corolla; the small berry wholly included in the globular and vesicular fruiting calyx, rather dry, 20-30-seeded. — Single species.

M. solanáceus, Schlecht. Nearly glabrous slender annual, a span to two feet high, erect, divergently branched: leaves membranaceous, ovate and ovate-lanceolate, entire or somewhat repand, occasionally 1-2-toothed, an inch or two long, slender-petioled: pedicels short, recurving: corolla barely 2 lines' and globular-conical fruiting calyx 4 to 6 lines long. — Ind. Sem. Hort. Hal. 1838, & Hort. Hal. Ic. i. t. 1; Torr. Bot. Mex. Bound. 154. *M. tenuis*, Miers, Ill. ii. 74, t. 57, with more acute or acuminate leaves. — Southern and western borders of Texas (*Berlandier*, referred to *Physalis divaricata* by Dunal in DC. Prodr. l. c. 444) and New Mexico, *Wright*, *Bigelow*. (Mex.)

9. NICÁNDRA, Adans. APPLE-OF-PERU. (*Nicander* of Colophon.) — Single species, sparingly naturalized, from gardens: fl. summer.

N. physalóides, Gærtn. Glabrous annual, 3 or 4 feet high, with the habit of an overgrown *Physalis*, and very smooth Stramonium-like leaves laciniate- or sinuate-lobed: pedicels solitary, recurved: flower rather showy: corolla blue or bluish (an inch long and with a broad nearly entire limb): fruiting calyx over an inch long: included fruit so dry and thin-walled as to appear capsular. — Fruct. ii. 237, t. 131; Miers, Ill. ii. t. 43. *Atropa physaloides*, L.; Jacq. Obs. t. 98. — Waste grounds near dwellings and old gardens. (Peru, and now dispersed through warm regions.)

10. LÝCIUM, L. (*Lycia*, the country of the earliest-known species.) — Shrubby plants (of warm-temperate and dry tropical regions), often spinose; the entire and usually narrow leaves commonly fascicled in the axils, often veinless. Flowers from greenish or white to purple, on solitary or fascicled terminal or axillary pedicels, in spring or summer. — Miers, Ill. S. Am. Pl. ii. 88; Gray, Proc. Am. Acad. vi. 45, vii. 388, & viii. 292.

* Introduced from Old World, sparingly escaped from cultivation.

L. vulgáre, Dunal. (MATRIMONY-VINE. BOX-THORN.) Tall, the long and slender branches recurving or somewhat climbing, glabrous: spines few or none: leaves oblong-lanceolate with a tapering base or somewhat spatulate: peduncles slender: corolla short-funnelform, dull greenish-purple; the style and slender filaments equalling its lobes: berry oval, orange-red. — *L. Barbarum*, L., in part. — Escaped into waste grounds and thickets in Penn., &c. (Mediterranean region.)

* * Indigenous, southern and western : berries red or reddish (one species excepted), globular.

— Large-flowered : funnellform corolla nearly an inch long.

L. pallidum, Miers. Glabrous : stems and branches widely spreading, 2 to 4 feet high, spiny : leaves pale, spatulate and oblanceolate, an inch or two long : pedicels about equalling the deeply 5-cleft calyx : corolla greenish, tinged with purple ; the lobes broad and rounded : filaments exserted : anthers tipped with a deciduous point. — Ill. l. c. 108, t. 67 ; Torr. Bot. Mex. Bound. 154 ; Gray, Proc. Am. Acad. vi. 45. — New Mexico and Arizona : also S. Utah, *Fremont, Fendler, &c.*

++ — Large calyx, with lobes commonly longer than or equalling the tube, foliaceous and obtuse : corolla half inch long or less : stamens included : herbage puberulent.

++ Flowers 4-merous.

L. Palmeri, Gray. Apparently unarmed, with slender branches : leaves narrowly spatulate : flowers short-pedicelled, 4 or 5 lines long : calyx-lobes lanceolate, equalling the oblong-campanulate tube of the corolla, which is little longer than its oval lobes. — Proc. Am. Acad. viii. 292. — Yaqui River, W. Sonora, Mexico, added because it may reach Arizona.

++ ++ Flowers 5-merous : corolla-lobes ovate, short, recurved-spreading.

L. Cooperi, Gray. Branches stout, and with some very short spines ; leaves spatulate, minutely viscid-pubescent or puberulent, half inch or more in length : pedicels at least equalling the cylindraceous at length campanulate calyx, both hirsute or pubescent ; the oblong-lobes of the latter more or less shorter than the tube : corolla narrowly funnellform, apparently white, half inch long, its lobes obtuse : filaments hairy at base : anthers oval, mucronulate. — Proc. Am. Acad. vii. 388, & Bot. Calif. 542. South-eastern border of California and adjacent part of Arizona, *Cooper, Palmer*.

Var. pubiflora. Corolla strongly pubescent outside : calyx shorter. — On the Mohave River, with the ordinary form, *Palmer*.

L. puberulum, Gray. Stem 2 to 4 feet high, with slender divergent and spinescent branches : leaves obovate and oblong-spatulate, a quarter to half inch long, minutely and densely puberulent : flowers solitary and sessile in the fascicles of leaves : calyx-lobes oblong, much shorter than the tube of the corolla, twice the length of their own tube : corolla 4 or 5 lines long, tubular-funnelform, white, with the triangular-ovate acute lobes not longer than the abruptly dilated throat and tinged with greenish-yellow : filaments glabrous, inserted in the throat : anthers roundish-cordate. — Proc. l. c. vi. 46. — Borders of Texas and New Mexico, on the Rio del Norte, near El Paso, *Wright*.

L. macrodon, Gray, l. c. Spiny : leaves spatulate-oblanceolate, glabrate, 2 to 4 lines long : pedicels at most a line and a half long : lobes of the minutely viscid calyx narrowly linear, twice the length of the short campanulate tube (3 lines long), half the length of the narrow corolla : filaments a little hairy at base : anthers oval-oblong. — California or Nevada ? *Fremont*, 1849 : not since seen.

++ ++ Short-flowered : the tube and throat of corolla only a line or two long, and the limb comparatively large : calyx with short lobes or teeth or irregularly cleft : herbage glabrous or nearly so.

++ Corolla comparatively large, nearly half inch in diameter : leaves fleshy.

L. Caroliniænum, Walt. Glabrous, 2 or 3 feet high, widely spreading, spiny : leaves linear-spatulate or so thickened as to be clavate, an inch or less long : pedicels slender : flower 4-5-merous : calyx short, irregularly cleft in age : corolla purple, its almost rotate limb deeply parted into oval lobes : slender filaments (woolly at base) and style elongated. — Car. 84 ; Michx. Fl. i. 95 ; Miers, l. c. t. 71. *L. salsum*, Bartr. Trav. 9. — Salt marshes, S. Carolina to Texas.

++ ++ Corolla small : the expanded limb under 3 lines wide, about equalled by the stamens : pedicels a line or two long or none : branches more or less spinescent : leaves linear-spatulate.

L. Californicum, Nutt. Slender stems very much branched, 2 feet high : leaves thickish and apparently fleshy-coriaceous, very small (1 to 3 lines long), from obovate or spatulate to nearly linear : pedicels sometimes hardly any : tube of the white corolla included in the campanulate 4-toothed calyx ; its rotate 4-parted limb barely 2 lines in diameter. — Gray, Bot. Calif. i. 542. — Clayey hill-sides, California, near San Diego, *Nuttall* (without flowers), *Cleveland, Palmer*. (Islands of Lower California.)

L. parviflorum, Gray. Stems 2 to 4 feet high: leaves 2 to 5 lines long, narrow, not fleshy: corolla (2 lines long) funnelform, rather more than twice the length of the short-campanulate often irregularly 2-3-cleft calyx; the 4 lobes very short: style at length much exserted. — Proc. Am. Acad. vi. 48. — Southern Arizona, *Thurber, Parry*.

L. barbinodum, Miers. Stout, 6-10 feet high; the old spurs or nodes densely short-woolly: leaves linear-spatulate, 6 to 12 lines long: corolla (2 lines long) with narrow tube about equalling the commonly 2-3-cleft short calyx, abruptly enlarged into a broadly campanulate throat; the lobes 5, short, roundish. — Ill. l. c. 115, t. 68, the corolla badly drawn and unlike the description. — N. W. Mexico (*Seemann*) and Magdalena, Sonora, *Thurber* (who says the berries are white and translucent); doubtless in adjacent Arizona.

L. BRÉVIPES, Benth., and L. RICHII, Gray, are little known species of Lower California.

+ + + Long-flowered; the corolla tubular or when funnelform with tube and throat over two lines long and much exceeding the lobes, white, cream-color, or tinged with violet: stamens little if at all exserted.

+ + Leaves, pedicels, and calyx puberulent: flowers 5-merous.

L. Fremonti, Gray. Stem 2 to 4 feet high: leaves spatulate, 4 to 9 lines long: pedicels shorter than or barely equalling the cylindraceous calyx: corolla narrowly tubular-funnelform, 4 to 6 lines long, with very short ovate lobes: filaments nearly naked: style soon exserted. — Proc. Am. Acad. vi. 46, & Bot. Calif. i. 543. — S. E. California or Nevada, *Fremont*. Arizona, *Palmer*.

Var. Bigelovii, Gray, l. c. Calyx shorter-campanulate: corolla broader and merely 4 lines long: filaments slightly hairy at base. — Williams Fork, N. Arizona, *Bigelow*.

L. gracilipes, Gray. Minute pubescence somewhat viscid or glandular: leaves small (2 to 6 lines long), spatulate or the smaller oblong-obovate, thickish: pedicels filiform, as long as the flower: calyx campanulate, short-toothed: corolla elongated-funnelform, half inch long, white with a violet tinge or sometimes deep violet; the lobes rounded-ovate, very obtuse, a line long: filaments inserted low in the throat, a little hairy at base: anthers and style not exceeding the corolla-lobes. — Proc. Am. Acad. xii. 81. — Williams Fork, N. Arizona, *Palmer*.

+ + Glabrous throughout, or merely some woolly pubescence on the spurs at the insertion of the leaves and pedicels: flowers in the same species either 5-merous or 4-merous.

= Pedicels filiform, as long as the commonly 4-merous rather short funnelform corolla.

L. Berlandieri, Dunal. Spiny, 3 to 8 feet high, with mostly slender branches: leaves spatulate-linear, 6 to 12 lines long: corolla 3 or 4 lines long, mostly thrice the length of the campanulate calyx which nearly includes its narrow proper tube; the lobes oval or oblong (a line long): filaments villous at base. — DC. Prodr. xiii. 520; Gray, Proc. Am. Acad. vi. 47. *L. stolidum* & *L. senticosum*, Miers, l. c. t. 68, 71. — S. Texas, *Berlandier*, *Wright*, to Arizona, *Palmer*.

= = Pedicels (1 to 3 lines long) shorter than the tubular-funnelform corolla: flowers copious.

L. Andersónii, Gray. Exceedingly branched, 2 or 3 feet high: leaves mostly very small (2 to 6 lines long), linear-spatulate or broader: calyx short-campanulate: corolla half inch long or nearly, tubular, very gradually widening upward; the expanded limb only 2 or 3 lines wide; its rounded lobes with nearly glabrous edges: filaments slightly hairy at base: berries bright red, "edible." — Proc. Am. Acad. vii. 388, & Bot. Calif. l. c. — Utah, S. Nevada, and N. Arizona, first collected by *Anderson*.

Var. Wrightii, Gray. More leafy and sparsely flowered, spiny, smaller-flowered: corolla 4 or 5 lines long. — Bot. Calif. l. c. *L. stolidum*, Torr. Bot. Mex. Bound., in part. *L. Berlandieri*, Gray, Proc. Am. Acad. vi. 47, in small part. — S. Arizona, *Wright, Palmer*.

L. Torrèyi, Gray, l. c. More or less spiny, 4 to 8 feet high: leaves mostly larger than in the preceding, sometimes over an inch long and over 2 lines wide: pedicels 2 or 3 lines long: corolla 5 or 6 lines long, more funnelform; the limb about 4 lines wide, and the lobes tomentulose on the edges: filaments woolly at base: berries red, "not edible." — *L. barbinode*, Torr. in Pacif. R. Rep. v. 363, & Bot. Mex. Bound. 154. — Western border of Texas, near El Paso, to S. E. California.

11. **DATÚRA, L. STRAMONIUM, THORN-APPLE.** (From the Arabic name, *Tatorah*.) — Herbaceous plants, or some tropical species woody and arbo-

rescent, of rank odor, and narcotic-poisonous qualities, natives of America and tropical Asia; with ovate leaves, and large flowers on short peduncles in the forks of the branching stems, produced through the season. Corolla commonly white or violet, usually more or less fragrant.

D. ARBÓREA, the Tree-Stramonium, representing the section *Brugmansia*, with very large pendulous flowers, and oblong indehiscent fruit reflexed, cultivated in conservatories, may perhaps have become spontaneous on the southern borders of the United States.

§ 1. Calyx prismatic, 5-toothed: border of the corolla with 5 acute teeth: capsule dry, 4-valved: seeds thickish, with a dark-colored and more or less rugose or pitted crustaceous coat: annuals, with flowers erect.

* Capsule strictly erect: seeds somewhat scrobiculate-rugose.

D. INÉRMIS, Jacq. Vind. iii. 44, t. 82, which may sometimes be met with in waste ground, is very similar to *D. Stramonium*, but with a perfectly smooth and unarmed capsule.

D. STRAMÓNIUM, L. (COMMON STRAMONIUM OR JAMESTOWN-WEED.) Green, glabrous, 1 to 4 feet high: leaves sinuately and laciniately angled and toothed: corolla white, about 3 inches long: capsule thickly armed with short stout prickles, the lower ones mostly shorter.—A weed of waste grounds, common, especially in the Atlantic States. (Nat. from Asia?).

D. TÁTULA, L. Stem purple, commonly taller: corolla pale violet: prickles of the capsule all nearly equal: otherwise similar to the preceding.—Waste grounds in the Atlantic States. (Nat. from trop. Amer.)

D. QUERCIFÓLIA, HBK. Green, and young parts commonly somewhat pubescent: leaves sparingly but mostly deeply sinuate-pinnatifid: corolla nearly as of *D. Tatula*: capsule armed with large and unequal flattened prickles, some of the upper not rarely an inch long (nearly as in *D. ferox*).—S. W. borders of Texas to Arizona. (Nat. from Mex.)

* * Capsule nodding: seeds rugose-tuberculate.

D. DÍSCOLOR, Bernh. More or less cinereous-pubescent, low: leaves sinuately or laciniately toothed: corolla white tinged with purple, 2 or 3 inches long: globose capsule and its stout large prickles pubescent.—Linn. (in Lit.) viii. 138; Gray, Proc. Am. Acad. v. 165. *D. Thomasii*, Torr. in Pacif. R. Rep. v. 362, & Bot. Mex. Bound. 155.—Colorado, Arizona, and S. E. California. (Introd. ? from Mex.)

§ 2. Calyx tubular, mostly 5-toothed: corolla large, 6 to 8 inches long; the border with 5 or 10 acute teeth: capsule nodding on the short recurved peduncle, globose, succulent, bursting irregularly at maturity: seeds flatter, with a softer and pale smoothish coat: flowers erect.

D. meteloides, DC. Pruinoso-glaucous with minute puberulence or pubescence, a foot to 3 feet high from a (at least commonly) *perennial* root: leaves unequally ovate, merely repand or nearly entire: calyx cylindrical, about 3 inches long: corolla white suffused with violet, sweet-scented, 7 or 8 inches long when well developed, the widely dilated and very open funnelliform limb 5 or 6 inches in diameter, and with 5 slender subulate teeth: persistent base of the calyx narrow: capsule 2 inches in diameter, thickly muricate with short and equal prickles: seeds with a narrow and sometimes cord-like margin.—Dunal in DC. Prodr. l. c. 544 (the descr. and drawing of Mocino and Sesse wrong as to 10-dentate corolla); Gray in Bot. Mex. Bound. 154; Fl. Serres, t. 1266. *D. Wrightii*, Hortul.; Regel, Gartenfl. viii. t. 260. *D. Metel*, var. *quinqueuspida*, Torr. in Pacif. R. Rep. vii. 18.—Along streams, S. W. Texas, on the Rio Grande, to Arizona and Santa Barbara, California. (Adjacent Mex.)

12. *HYOSCYÁMUS*, Tourn. HENBANE. (From *ῥῆς*, *ῥός*, a hog, and *κνίσιος*, a bean, said to poison swine.)—Natives of the Old World, one species, the medicinal *Henbane*, sparingly introduced.

H. nÍGER, L. (BLACK HENBANE.) Biennial with a fusiform root, or sometimes annual, viscid-pubescent or villous, heavy-scented (narcotic), a foot or two high: leaves oblong,

sinuate-toothed or somewhat pinnatifid, the upper all more or less clasping and partly decurrent; uppermost subtending the second at length spicate flowers: corolla lurid-yellowish with reticulated purple veins. — Waste grounds and roadsides. (Nat. from Eu.)

13. CÉSTRUM, L. (Ancient Greek name of some plant, applied by Linnaeus to this genus.) — Shrubs or low trees of tropical America. Leaves entire, short-petioled, pinnately veined. Flowers variously clustered on axillary peduncles, or forming a terminal panicle or corymb; the corolla narrowly tubular-funnelform or clavate: berries reddish or blackish. — Several are in cultivation, both day-blooming and night-blooming, the latter very sweet-scented. One species is sparingly spontaneous in Florida, viz. —

C. DIURNUM, L. Glabrous; leaves oblong, very bright green above: flowers sessile in a short close cluster on an axillary peduncle: corolla white, enlarging very gradually from base to summit, not narrowed at the throat, half an inch long, with lobes short and roundish, open through the day. (Dill. Elth. t. 154, fig. 186.) — Key West. (Adv. from W. Ind.)

14. NICOTIÁNA, Tourn. TOBACCO. (In memory of *John Nicot*, who was thought to have introduced Tobacco into Europe.) — Herbs, or one peculiar species arborescent, mostly American, narcotic-poisonous, heavy-scented, usually viscid-pubescent; with entire or sometimes repand or pandurate leaves, and paniculate or racemose flowers.

§ 1. **TABÁCUM, Don.** Capsule septicidal, dividing the two placentæ; the valves at length 2-cleft at the apex: leaves ample: flowers diurnal, naked-panicled: corolla funnelform with ventricose throat and acute or acuminate spreading lobes or teeth, purplish-red or rose-color, sometimes white in cultivation.

N. TABÁCUM, L. (COMMON TOBACCO.) Tall annual, more or less glutinous-pubescent: leaves from ovate to narrowly lanceolate, acuminate, the lower commonly 2 or 3 feet long: flowers pedicelled: corolla about 2 inches long. — Cult. from S. Amer., and spontaneous in waste grounds along the south-western borders of the United States.

Var. UNDULÁTA, Sendtner, a marked form, with long and narrow lanceolate gradually caudate-acuminate leaves, undulate below, and corolla-lobes caudate-acuminate. — Mart. Fl. Bras. x. 166. *N. lancifolia*, Willd., & *N. Ybarrensis*, HBK. To this probably belongs the *Yaqui Tobacco*, found by Dr. Palmer cultivated in Arizona, and also *N. caudata*, Nutt. Pl. Gamb., at Monterey, California.

§ 2. **NICÓTIA, Gray.** Capsule septifragal, 2–4-valved (in anomalous forms several-valved); the thin dissepiment remaining with the entire central placenta: corolla mostly white or greenish. Ours annuals. — Benth. & Hook. Gen. ii. 907.

* Corolla oblong-inflated, open throughout the day: leaves all broad and petioled.

N. RÚSTICA, L. A foot or two high, very viscid-pubescent: leaves ovate or the lower rounder and subcordate, very obtuse (often a foot long): flowers thyrsoid-paniculate: calyx with broad round-ovate teeth, not equalling the globular at first merely 2-valved capsule: corolla about three-fourths inch long, lurid yellowish or greenish, not thrice the length of the calyx, inflated from a short narrow base and with contracted orifice; the short and rounded lobes reticulate-veiny. — Bart. Fl. Am. Sept. i. 25; Reichenb. Ic. Fl. Germ. xx. t. 1626. — Spontaneous in waste grounds, rare, formerly cult. by Indians. Probably indigenous to the Old World, but of unknown nativity.

* Corolla salverform or tubular-funnelform: calyx-lobes narrow.

† Leaves undulate-cripsed or repand, or panduriform, all the upper more or less clasping: flowers vespertine: tube of the corolla almost filiform, $1\frac{1}{2}$ to $2\frac{1}{2}$ inches long: filaments very short, inserted in the throat: stem loosely branching, racemously loose-flowered.

N. plumbaginifolia, Viv. Somewhat scabrous-pubescent or glabrate: cauline leaves sessile and with partly clasping base, undulate and sometimes even crisped along the margins; the lowest oblong or obovate-spatulate; the others oblong-lanceolate and acuminate,

above passing into linear-subulate bracts: corolla greenish-white, less than 2 inches long, somewhat contracted between the limb and the subclavately dilated throat; the lobes 2 or 3 lines long, acute. — Dunal in DC. l. c. 569. — Damp grounds around Matamoras, *Berlandier*. Probably on the Texan side of the Rio Grande also. (Mex., W. Ind.)

N. repánda, Willd. Minutely pubescent or above glabrate, 2 or 3 feet high, with loose slender branches, extending into open racemose or somewhat paniculate naked inflorescence: leaves thin (3 to 6 inches long and 1 to 4 wide), ovate, or the lower obovate and sometimes panduriform, commonly repand; the lowest contracted into a winged petiole; upper deeply cordate-clasping: bracts minute or often wanting: calyx-lobes slender, fully as long as the short-campanulate acutely 10-ribbed tube: corolla with tube frequently 2 inches long, somewhat clavate or funnelliform at the open throat; the spreading limb white, or sometimes tinged with rose, 7 to 12 lines in diameter; its lobes short and obtuse or acutish. — Lehm. Nicot. 40, t. 3 (depauperate); Dunal in DC. l. c., but not Hook. Bot. Mag. and perhaps not *N. lyrata*, HBK. *N. pandurata*, Dunal, l. c. *N. Roemeriana*, Scheele in Linn. xxi. 767. — Low grounds, Texas. (Mex.)

+ + Leaves entire, or the margins sometimes obscurely undulate: filaments slender,

++ Equally inserted low down on the tube of the salverform corolla, which is not enlarged at the throat, and is very much longer than the small obtusely 5-lobed limb.

= Leaves, even the lower, with more or less clasping base: flowers open throughout the day.

N. trigonophýlla, Dunal. Viscid-pubescent: stem 1 to 3 feet high, simple or virgately branched: leaves all sessile or only the lower tapering into a winged petiole, and obovate-oblong; the upper oblong-lanceolate with a broader cordate half-clasping base, or some spatulate-lanceolate with a dilated auriculate-clasping base (1 to 4 inches long): inflorescence at length loosely paniculate-racemose, with the later bracts very small or wanting, and somewhat unilateral pedicels about the length of the calyx: calyx-lobes subulate-lanceolate but rather obtuse, equalling the campanulate tube, attaining the middle of the corolla-tube, about equalling the 4-valved capsule, somewhat callous-margined: corolla greenish-white or yellowish, about three-fourths inch long, somewhat pubescent, a little constricted at the orifice; the tube slightly enlarging upward; the sinuately-lobed limb about 4 lines in diameter. — DC. Prodr. xi. 562; Gray, Bot. Calif. i. 545. *N. multiflora*, Torr. in Pacif. R. Rep. v. 362, excl. "Nutt. Pl. Gamb." *N. ipomopsisiflora*, Gray, Proc. Am. Acad. v. 166, and perhaps of Dunal, l. c., but the figure in Mocino & Sesse, Ic. Fl. Mex. ined. t. 909, represents a more funnelliform corolla. *N. glandulosa*, Buckley in Proc. Acad. Philad. 1862, 166. — Texas to S. E. California. (Mex.)

N. Pálmeri. Viscid-tomentose throughout, except the corolla: stem apparently 3 feet high, loosely branched above: leaves as of the preceding, but acuminate and mostly with undulate margins, the larger 5 or 6 inches long: flowers sparsely racemose, short-pedicelled: calyx-lobes lanceolate-subulate, somewhat unequal, longer than the tube, half the length of the corolla, conspicuously surpassing the capsule: corolla white tinged with green, an inch long, neither constricted nor dilated at the orifice, externally somewhat pubescent: the conspicuously 5-lobed limb 6 or 7 lines in diameter. — Northern Arizona, on Williams Fork, *Palmer* (no. 433, coll. 1876).

= = Leaves not clasping: flowers vespertine, and closing before noon or under sunshine.

N. Clevelandi. Viscid-pubescent, or the stem (a foot or two high) villous: leaves ovate or the upper ovate-lanceolate (2 or 3 inches long); the lower obtuse and with margined petiole not dilated at base; the upper subsessile and gradually narrowing from a broad and rounded or truncate subsessile base into an acuminate apex: bracts lanceolate: flowers paniculate-racemose; calyx-lobes linear, unequal; the longer fully twice the length of the tube, more than half the length of the corolla: the latter greenish-white tinged with violet, almost glabrous, an inch long, quite salverform; the somewhat 5-lobed limb half inch in diameter. — California, in dry bed of streams, Chollas Valley near San Diego, *Cleveland, Palmer* (no. 267, coll. 1875). Near Santa Barbara, *Rothrock*, a smaller-flowered form.

N. attenuáta, Torr. More or less viscid-pubescent, a foot or two high: leaves all on naked and mostly slender petioles and acute or merely obtuse at base; the lower ovate or oblong ($1\frac{1}{2}$ to 4 inches long); the upper from oblong-lanceolate and attenuate-acuminate to linear-lanceolate or linear: inflorescence loosely paniculate and naked above: pedicels short: calyx-teeth triangular-lanceolate or subulate, with thin edges, almost equal, much

shorter than the tube, not over a line and a half long, and not surpassing the capsule: corolla dull white or greenish, glabrous, slender-salverform; the tube an inch to inch and a half long; the obscurely 5-lobed or angulate limb 4 to 6 lines in diameter. — Watson, Bot. King, 276, t. 27, fig. 1, 2; Gray, Bot. Calif. i. 545. — Dry ground, California and Nevada to Colorado. (Guadalupe Island off Lower California, *Palmer*, referred to *N. Bigelovii*.)

++ ++ Filaments more or less unequally inserted in the upper part of the tube of the tubular-funnelform or salverform but open-mouthed white corolla, which is vespertine and open by day only in dull weather: capsule thin-walled: herbage viscid-pubescent, often minutely so.

= Ovary and ovate 4-valved capsule 2-celled as in all the foregoing: diameter of the limb of the corolla less than the length of the slender tube.

N. Bigelovii, Watson. A foot or two high: leaves oblong-lanceolate, sessile or nearly so; the lower (5 to 7 inches long) with tapering base; the upper (3 to 1½ inches long) more acuminate, with either acute or some with broader and partly clasping base: inflorescence loosely racemiform, with all the upper flowers bractless: calyx-teeth unequal, linear-subulate, about equalling the tube, surpassing the capsule: tube of the corolla 1½ to 2 inches long, narrow, with a gradually expanded throat; the 5-angulate-lobed limb 12 to 18 lines in diameter. — Bot. King, 276, t. 27, fig. 3, 4; Gray, Bot. Calif. i. c. 546. *N. plumbaginifolia?* var. *Bigelovii*, Torr. Pacif. R. Rep. iv. 127. — California, from Shasta Co. to San Diego, and eastward to Nevada and the border of Arizona.

Var. Wallácei, a form with corolla smaller (the tube 12 to 16 lines long), and calyx-teeth shorter, but variable, sometimes hardly surpassing the capsule: upper leaves more disposed to have a broad and roundish or subcordate slightly clasping base: herbage, &c., more viscid. — Near Los Angeles and San Diego, *Wallace, Cleveland*.

= Ovary and capsule globular, 4-several-celled, at first somewhat succulent: the valves at maturity thin and rather membranous: corolla with ampler limb and proportionally shorter more funnelform tube. — *Polydichis*, Don. *Polydichis*, Miers.

N. quadrivalvis, Pursh. A foot high, rather stout, more or less viscid-pubescent, low-branching: leaves oblong or the uppermost lanceolate, and the lower ovate-lanceolate, acute at both ends, mostly sessile (3 to 5 inches long); the lowest larger and petioled: flowers few: calyx-teeth much shorter than the tube, about equalling the 4-celled (or sometimes 3-celled?) capsule: tube of the corolla barely an inch long, the 5-lobed limb an inch and a half or more in diameter; its lobes ovate and obtusish, veiny. — Sims, Bot. Mag. t. 1778; Lehm. Nicot. 45, t. 4; Nutt. Gen. i. 132; Gray, Bot. Calif. i. c. *Polydichis quadrivalvis*, Miers, Ill. i. 164, & ii. 55, 60, fig. 2-14. — Oregon, and cultivated by the Indians from Oregon to the Missouri: their most prized tobacco-plant. Perhaps a derivative of the preceding species.

Var. multivalvis, Gray, l. c. An abnormal form of cultivation (by aborigines), generally stouter, with calyx, corolla (often over 2 inches wide), and stamens 5-8-merous, and capsule several-celled, sometimes an inch in diameter. — *N. multivalvis*, Lindl. Bot. Reg. t. 1057. *Polydichis multivalvis*, Miers, l. c. t. 60, fig. 1 & 9. — Oregon, probably known only as an escape from aboriginal cultivation.

N. NANA, Lindl. Bot. Reg. t. 833, *Nierembergia nana*, Miers, must be *Hesperochiron Californicus*.

15. PETÚNIA, Juss. (*Petun* is an aboriginal name of Tobacco.) — Viscid South American herbs, with entire leaves, the upper disposed to become opposite, and scattered flowers becoming lateral: two large-flowered species and their hybrids familiar in gardens; an inconspicuous small-flowered one is a naturalized weed, and perhaps indigenous along the southern borders of the U. S. It forms a peculiar section, and has received several generic names.

P. parviflora, Juss. A small prostrate or diffusely spreading annual, much branched, more or less pubescent: leaves oblong-linear or spatulate, rather fleshy, seldom half an inch long, nearly sessile: peduncles very short: calyx-lobes resembling the smaller leaves: corolla purple with a pale or yellowish tube, 4 lines long, funnelform; its short retuse lobes slightly unequal: capsule small, ovoid. — Juss. in Ann. Mus. ii. 216, t. 47; Miers, Ill. i. t. 23; Dunal. l. c. 575. *Nicotiana parviflora*, Lehm. Nicot. 48. *Lindernia Montevidensis*, Spreng. *Calibrachoa procumbens*, Llav. & Lex. Nov. Mex. Veg. ii. 3. *Salpiglossis prostrata*, Hook. & Arn. Bot. Beech. 123. *Leptophragma prostrata*, Benth. mss. ex Dunal, l. c. 578. —

Waste grounds and coasts, S. Florida and Texas to California; also adventive at some seaports of the Atlantic States: an insignificant little weed (S. Amer., &c.)

16. **BOUCHÉTIA**, DC. (In memory of *D. Bouchet*, an obscure botanist of the south of France.) — Prodr. xiii. 589, in part; Benth. & Hook. Gen. ii. 908. — Single species.

B. erécta, DC. l. c. Much branched from a perennial root, ascending, a span high, minutely appressed-pubescent: leaves oblong-spatulate, or the lower oval and petioled, and the upper lanceolate and sessile, rather small: peduncles terminal or lateral and scattered: corolla white, 6 to 9 lines long, about twice the length of the calyx; the broadly funnel-form limb deeply 5-lobed; lobes roundish. — *Nierembergia anomala*, Miers in Lond. Jour. Bot. iii. 175, & Ill. i. 99, t. 20; Dunal in DC. l. c. 528; Torr. Bot. Mex. Bound. 156. *N. staticeæ-folia*, Sendtner in Mart. Fl. Bras. x. 179. *Leucanthea Ruemeriana*, Scheele in Linn. xxv. 250. — Moist prairies and rocky hills, Texas. (Mex., S. Brazil, &c.)

17. **LEPTOGLÓSSIS**, Benth. (*Λεπτός*, thin or small, and *γλῶσσις*, in place of *γλωττίς*, the mouth of the windpipe, the throat of corolla being narrow.) — Extra-tropical S. American herbs, resembling *Nierembergia* (which has 5 fertile stamens borne at and exserted from the orifice of the open saucer-shaped limb), but with tubular-funnelform throat, in the lower part or base of which the didynamous stamens are inserted. Besides the genuine species, a Texan and a Mexican species constitute a subgenus,

§ 1. **BRACHYGLÓSSIS**, with strictly salverform corolla of *Nierembergia*; the long and filiform tube abruptly saccate-dilated just under the ample rotate limb: stigma rather narrowly 2-lobed, and the lobes alate-decurrent on the apex of the style: habit and foliage of *Bouchetia*. — Gray, Proc. Am. Acad. xii. 164.

L. Texána, Gray, l. c. Low perennial, diffusely much branched from a suffrutescent base, a span high, viscid-pubescent: leaves spatulate-obovate or oblong, acute (half inch long), narrowed at base, the lower into a short margined petiole: peduncles mostly shorter than the campanulate-funnelform 5-toothed calyx (the teeth deltoid): corolla apparently white; the filiform tube 8 or 9 lines long; the almost regular broadly 5-lobed plane limb of about the same diameter; the very short campanulate throat hardly over a line in height and width: winged appendages under the stigma narrower than wide: capsule only half the length of the 10-nerved calyx: seeds somewhat reniform, coarsely transverse, rugose, otherwise smooth. — *Nierembergia* (*Leptoglossis*) *viscosa*, & *Browellia* (*Leptoglossis*) *Texana*, Torr. Bot. Mex. Bound. 155, 156. — Rocky hills, W. Texas, *Wright*, *Bigelow*. (Adjacent Mexico, at San Carlos, *Berlandier*, no. 3194.) *L. Coulteri*, Gray, l. c., a nearly related Mexican species of this section, is minutely pubescent, and has ovate leaves on slender petioles, longer peduncle, calyx cleft to the middle, and very broad wings to the apex of the style.

ORDER XCVI. SCROPHULARIACEÆ.

Herbs, shrubs, or rarely small trees, with leaves either alternate or opposite and destitute of stipules, primary inflorescence centripetal and the secondary when developed centrifugal, perfect flowers with the bilabially irregular corolla (3) imbricated and not plicate in the bud, didynamous or diandrous stamens, 2-celled ovary with axile several-many-ovuled placentæ, usually capsular fruit, and anatropous or amphitropous seeds (generally numerous), with a small and straight or only slightly curved embryo in fleshy albumen, the cotyledons little if at all broader than the radicle. The calyx and corolla are mostly 5-merous, and the former persistent; but sometimes they are 4-merous, at least apparently, and

either with or without all four stamens present; sometimes the corolla is nearly or quite regular, and even with all five stamens present and complete (uniformly so in *Verbascum*, abnormally in several species of *Pentstemon*); and the ovules are sometimes few and definite, rarely solitary. The posterior or superior stamen is the deficient or abortive one. Corolla wanting in one *Synthyris*. Style one and undivided: stigma either entire, or 2-lobed, or bilamellar (bilabiate); its lobes and the cells of the ovary anterior and posterior. Seeds comparatively small, rarely winged. — This large order has its tribes arranged by Bentham and Hooker (Gen. ii. 915) under three series, hardly to be regarded as suborders, the first of which closely connects with the preceding order, except as to inflorescence. The ambiguous *Salpiglossideæ* are referred to that order.

I. (PSEUDOSOLANÆÆ.) Leaves all alternate. Inflorescence simply centripetal. Corolla hardly if at all bilabiate; the 2 posterior lobes external in the bud. All five stamens sometimes present and perfect.

TRIBE I. LEUCOPHYLLÆÆ. Corolla campanulate or short-funnelform; the lobes plane or merely concave.

1. LEUCOPHYLLUM. Calyx short, 5-parted; the lobes nearly valvate. Corolla with 5 rounded and spreading nearly equal lobes. Stamens 4 and didynamous, or rarely 5 and the fifth imperfect, included: anthers with cells confluent at the apex, at length divaricate. Stigma emarginate or bilamellar. Capsule 2-valved, and the valves at length 2-cleft. Tomentose shrubs.

TRIBE II. VERBASCEÆ. Corolla rotate, with hardly any tube. Anthers by confluence 1-celled. (None indigenous to America.)

2. VERBASCUM. Stamens 5, all with anthers; all or the three superior filaments woolly-bearded. Style flattened and dilated at apex. Capsule globular or oblong, septically 2-valved; the valves 2-cleft at apex. Seeds very numerous, rugose.

II. (ANTIRRHINIDÆÆ.) Leaves prevailinglly opposite, at least the lower. Inflorescence when simple centripetal, when compound the partial centrifugal; *i. e.* the peduncle cymosely few-several-flowered. Upper lip or lobes of the corolla external in the bud, with a few occasional and irregular exceptions. Fertile stamens very seldom more than four.

TRIBE III. ANTIRRHINÆÆ. Corolla bilabiate and more or less tubular; the base of the tube gibbous or saccate or spurred on the lower side, and the lower lip often with an intrusion (palate) at the throat. Capsule opening by irregular perforations or lacerate chinks, not by normal valves, many-seeded. Inflorescence simple and racemose, or the flowers solitary and axillary.

* Stamens 4, with more or less 2-celled fertile anthers.

3. LINARIA. Corolla with a spur at base (this rarely abortive) and a prominent palate nearly closing the throat. In the occasional monstrosity called *Peloria*, the corolla becomes regular by the production of 5 spurs and 5 regular short lobes.
4. ANTIRRHINUM. Corolla merely saccate or gibbous at base, otherwise nearly as *Linaria*, or the palate in some species much less prominent. Seeds destitute of any proper wing.
5. MAURANDIA. Corolla barely gibbous at base, nearly funnelform, ringent, with two longitudinal and commonly bearded intruded lines or plaits instead of palate. Capsule equal or hardly oblique. Seeds winged or wingless.

* * Antheriferous stamens only 2 (the anterior pair); the posterior reduced to small abortive filaments.

6. MOHAVEA. Corolla with short tube merely gibbous at base, and very ample bilabiate but somewhat campanulate-erect limb; the lips obovate-dilated or fan-shaped, the upper 2-lobed, the lower 3-lobed and bearing a prominent but comparatively small palate, bearded down its middle; lobes all broad, erose-denticulate, and abruptly short-acuminate. Anthers of the two fertile stamens one-celled by confluence. Style slender and straight:

stigma depressed-capitate. Capsule and the cyathiferous seeds of *Antirrhinum* § *Pseudorontium*.

TRIBE IV. CHELONEÆ. Corolla more or less bilabiate and tubular, not saccate or otherwise produced at base anteriorly. Antheriferous stamens 4, and rudiment of the fifth commonly present. Capsule dehiscent by valves. Inflorescence normally compound (at least the peduncle 2-bracteate), and leaves opposite. (*Chionophila* is exceptional and of doubtful position, having flowers simply spicate, and the leaves sometimes alternate. In some species of *Collinsia*, the flowers are solitary in the axils on a bractless peduncle or pedicel.)

* Corolla gibbous or saccate on the upper or posterior side of the tube: ovules and seeds few or solitary in the cells: calyx deeply 5-cleft, campanulate: peduncles or pedicels simple and ebracteate.

7. *COLLINSIA*. Corolla declined, deeply bilabiate; its upper lip 2-cleft, with lobes more or less erect and replicate; lower larger and 3-lobed; its lateral lobes pendulous-spreading; middle one conduplicate into a keel-shaped sac which encloses the 4 declined stamens and style. Filaments long and filiform; the lower or anterior pair inserted higher on the corolla than the other: anthers round-reniform; their two cells confluent at the apex into one. Gland at base of corolla on the upper side represents the fifth stamen. Style filiform: stigma small, entire, or minutely 2-cleft. Capsule ovate or globose, at first septicidal; the valves soon 2-cleft. Seeds amphitropous and peltate, concave ventrally. Leaves undivided.

8. *TONELLA*. Corolla little declined, obscurely bilabiate, and the 5 more or less unequal lobes somewhat rotately spreading; the lower not enclosing the soon ascending stamens; tube slightly gibbous posteriorly. Ovules and seeds 1 to 4 in each cell, oval. Cauline leaves mainly ternately divided or parted.

* * (Genuine *Cheloneæ*.) Corolla-tube not gibbous posteriorly: ovules and seeds indefinitely numerous: calyx deeply 5-parted or of distinct sepals, imbricated: inflorescence mostly thyrsoidal, i.e. the axillary clusters centrifugal or cymose, or when reduced to a single flower the peduncle or pedicel 2-bracteate: capsule septicidal.

— Sterile stamen represented by a scale on the upper side of the throat of the corolla.

9. *SCROPHULARIA*. Corolla short; the tube ventricose and globular or oblong; lobes 5, unequal, four of them erect and the two posterior longer; the fifth or anterior reflexed or spreading. Stamens 4, declined, usually included or shorter than the corolla lobes; tube slightly gibbous posteriorly. Stigma entire or emarginate. Seeds marginless, rugose.

— — Filament of the sterile stamen conspicuous and elongated: corolla from ventricose-campanulate to elongated-tubular; the limb either obscurely or strongly bilabiate.

10. *CHELONE*. Seeds surrounded by a broad membranaceous wing. Otherwise nearly as *Pentstemon*. Anthers long-woolly as in the first division of that genus; the wool mainly confined to the inner face.

11. *PENTSTEMON*. Seeds angulate, marginless. Antheriferous stamens 4, declined at base, ascending above: filaments filiform: anther-cells either united or confluent at apex. Style filiform: stigma small, entire.

* * * Corolla-tube not gibbous: ovules and seeds rather numerous: calyx not deeply cleft: inflorescence simply spicate: capsule at first loculicidal.

12. *CHIONOPHILA*. Calyx funnellform, thin-membranaceous becoming scarious, merely and obtusely 5-lobed. Corolla tubular, with slightly dilated throat and bilabiate limb, somewhat personate; upper lip erect and slightly concave, barely 2-lobed, the sides somewhat recurved; lower with convex densely bearded base forming a palate, and 3-lobed, the short lobes recurving. Stamens of *Eupentstemon*: cells of the anthers divaricate and confluent. Sterile filament small and short, or even minute, naked. Style filiform: stigma minute, entire. Capsule oblong, enclosed in the marcescent calyx and corolla, loculicidally 2-valved, and the valves soon septifragal and 2-parted; placental dissepiment flat. Seeds rather large, oblong, with a very loose and arilliform cellular-reticulated outer coat.

TRIBE V. GRATIOLEÆ. Corolla from bilabiate to almost regular, not saccate or otherwise produced at base. Antheriferous stamens 2 or 4: no rudiments of the fifth. Capsule dehiscent, many-seeded. Inflorescence simple and centripetal; the pedicels solitary in the axil of bracts or leaves and ebracteolate. Leaves opposite (or verticillate), or only the uppermost alternate.

- * Calyx prismatic and barely 5-toothed, or rarely campanulate and hardly 5-cleft: corolla more or less bilabiate: stamens 4.
13. **MIMULUS**. Corolla with either elongated or short tube; upper lip 2- and the lower 3-lobed or parted; the former often erect and the sides turned back; a pair of palatine ridges (either bearded or naked and more or less intruded) running down the lower side of the throat. Stamens inserted low within the throat or on the tube. Anthers generally approximate in pairs, on filiform filaments; their cells divergent, either distinct or confluent at the apex. Style filiform: stigma bilamellar, or sometimes peltate by the union of the two dilated lips, or rarely even funnelform. Capsule enclosed in the calyx, loculicidal; the placenta either firmly united, or in one section barely contiguous in the axis.
- * * Calyx 5-parted: corolla more or less bilabiate: stamens 4, inserted below the throat, included: anther-cells distinct.
- + Sepals narrow and nearly alike: capsule septicidal or septifragal.
14. **STEMODIA**. Corolla with cylindraceous tube, somewhat erect and hardly 2-lobed upper lip, and more spreading lower one. Anther-cells separate and stipitate. Stigma 2-lobed. Capsule with valves soon 2-parted: placenta left in the axis.
15. **CONOBEA**. Corolla nearly of the preceding, or more equally 5-lobed. Anther-cells distinct but not stipitate, parallel. Stigma bilamellar. Capsule septifragal; valves entire or rarely 2-cleft. Seeds striate.
- + + Sepals unequal and imbricated; the posterior one considerably or much broader than the anterior; the two lateral interior and usually much narrower: capsule septicidal or loculicidal; the valves entire or 2-parted, separating from the undivided placentiferous column.
16. **HERPESTIS**. Corolla with short cylindraceous tube, and spreading lips; upper emarginate or 2-lobed; lower 3-lobed, plane. Anther-cells parallel or divergent. Capsule globose or ovate.
- * * * Calyx 5-parted or deeply 4-5-lobed: antheriferous stamens only 2,
- + The posterior pair; the anterior pair sterile rudiments or sometimes wanting: flowers not minute: corolla manifestly bilabiate; upper lip entire or 2-lobed; lower 3-cleft: sepals narrow, little unequal: stigma dilated and mostly bilamellar.
17. **GRATIOLA**. Corolla with cylindraceous tube and lips nearly of equal length. Stamens both fertile (with anther-cells distinct) and sterile inserted below the throat and included. Capsule both loculicidal and septicidal; valves separating from the placentiferous column. Seeds striate and transversely reticulated.
18. **ILYANTHES**. Corolla with cylindraceous tube, or more dilated throat; upper lip erect and concave, 2-lobed; lower larger, spreading, with 3 broad nearly equal lobes. Fertile stamens inserted rather low down and somewhat included: sterile filaments inserted at the orifice and forked; one fork glandular and obtuse; the other smooth and naked, acute, sometimes reduced to a mere tooth, sometimes more elongated and even bearing the rudiment of an anther. Capsule ovoid or oblong, septicidal or septifragal; the valves entire, at length separating from the placentiferous column. Seeds foveolate-rugose.
- + The anterior pair of stamens antheriferous, at least only a single pair antheriferous, and no rudiments of sterile ones: flowers minute: corolla only 4-lobed: anthers short, of roundish distinct cells.
19. **MICRANTHEMUM**. Calyx usually 4-cleft or 4-lobed. Corolla with very short tube, obscurely bilabiate; its upper lip short or almost none; the lower 3-lobed and the middle lobe longer. Stamens inserted in the throat: filaments short, dilated or appendaged at base. Style short: stigma dilated or 2-lobed. Capsule globular, thin, becoming 1-celled by the vanishing of the partition, leaving the several-many-seeded placenta in the axis. Seeds oblong, minute.
20. **AMPHIANTHUS**. Calyx 5-parted, unequal. Corolla funnelform, with spreading 4-cleft limb; lobes rounded, one of them larger. Stamens on the tube of the corolla, included: filaments filiform, not appendaged. Style subulate: stigma minutely 2-cleft. Capsule obcordate, compressed, loculicidal; valves bearing the partition. Seeds numerous, linear-oblong, striate, transversely rugulose.
- * * * * Calyx and corolla both 5-lobed and nearly regular: antheriferous stamens 4, nearly equal: no sterile filament.
21. **LIMOSELLA**. Calyx campanulate; the lobes short. Corolla between rotate and campanulate; its lobes oblong or ovate. Stamens borne on the tube of the corolla: filaments slender, unappendaged: anthers by confluence 1-celled. Style short: stigma depressed-capitate. Capsule globose-ovoid, 2-celled only at base; the large central placenta many-seeded. Seeds ovoid, rugulose.

III. (RHINANTHIDEÆ.) Leaves various. Inflorescence simply centripetal. Lower lip or lateral lobes of the corolla external in the bud. Stamens very rarely more than 4.

TRIBE VI. DIGITALEÆ. Corolla usually little if at all bilabiate; the lobes all plane, the lateral or one of them external. Anther-cells contiguous at apex and often confluent. Herbs, or some shrubs, none parasitic.

* Stamens 4 or sometimes 5, nearly equal: corolla short-campanulate or nearly rotate.

22. SCOPARIA. Sepals 4 or 5, rather broad, imbricated. Corolla 4-cleft, densely hairy in the throat. Stamens 4: anther-cells distinct. Style slightly clavate: stigma truncate. Capsule septicidal. Leaves opposite or verticillate.

23. CAPRARIA. Sepals 5, narrow, hardly imbricated. Corolla 5-cleft. Stamens often 5: anthers sagittate or horseshoe-shaped; the cells confluent at apex. Style with thickened apex: stigma 2-lobed. Capsule 2-sulcate, loculicidal. Leaves alternate.

* * Stamens 2 (only abnormally 3 or 4), distant, straight, exserted, inserted at or below the sinuses between the two lateral and the posterior lobe of the corolla: style usually filiform, with terminal usually small-capitate stigma: capsule mostly compressed and obtuse or emarginate, few-many-seeded, loculicidal; the valves tardily if at all separating from the placentiferous axis. (Hypogynous disk mostly conspicuous and crateriform or annular.)

24. SYNTHYRIS. Corolla from oblong- to short-campanulate, 4-cleft, more or less irregular (upper lobe longer), sometimes irregularly and variably parted, occasionally wanting. Sepals 4, oblong. Anther-cells parallel or somewhat divergent below, not confluent at apex. Placentæ short, chiefly at the centre of the valves. Seeds discoidal, orbicular or oval, with very close and strictly conformed smooth coat.

25. VERONICA. Corolla from rotate with very short or hardly any tube to salverform; its lobes 4 (or sometimes 5), one usually smaller. Anther-cells more or less confluent at the apex. Seeds various.

TRIBE VII. GERARDIÆ. Corolla little or not at all bilabiate; the lobes all plane and mostly spreading, the anterior one external in the bud. Stamens 4: anther-cells distinct to the very apex, or sometimes one of them wanting. Capsule loculicidal, many-seeded. Herbs, most of them partially root-parasitic, and their green foliage inclined to blacken in drying: some African and Indian genera are wholly parasitic and destitute of green herbage, in the manner of *Orobanchaceæ*.

* Anthers by abortion 1-celled: corolla salverform; tube slender: flowers 2-bracteolate.

26. BUCHNERA. Calyx tubular or oblong, 5-10-nerved, 5-toothed. Corolla with straight or slightly curved tube, and almost equally 5-cleft widely spreading limb. Stamens didynamous: anthers approximate in pairs; the cell vertical. Style with somewhat clavate and entire apex. Valves of the oblong capsule separating from the placentiferous axis. Seeds with reticulated close coat.

* * Anthers 2-celled; the cells equal and parallel: pedicels ebracteolate.

+ Stamens equal or nearly so, more or less exserted: posterior lobes of the corolla united to near their middle.

27. SEYMERIA. Corolla short, somewhat campanulate or rotate, pale yellow, calyx 5-cleft or parted. Filaments short, usually woolly at base: anthers obtuse at base, not exceeding the corolla-lobes. Capsule globular or ovate, with more or less pointed and compressed apex. Seeds with a loose reticulated coat.

28. MACRANTHERA. Corolla (orange-color) salverform, with tube very much longer than the small lobes; its narrow orifice somewhat oblique; posterior and partly united lobes somewhat erect, the others soon reflexed. Calyx 5-parted; the divisions long and narrow. Stamens inserted toward the bottom of the corolla: filaments filiform, becoming conspicuously exserted, sparsely glandular-hairy, as are the linear-oblong anthers when young: cells of the latter acuminate at base. Style long and filiform: stigma simple or 2-cleft. Capsule globose and bisulcate; the valves at length 2-cleft. Seeds obovate, lamellate-crested on the back.

+ + Stamens conspicuously didynamous, shorter than the corolla.

29. GERARDIA. Corolla from campanulate to funnelform; the throat amplify: limb 5-parted, and with the two posterior lobes often rather smaller or more united. Calyx campanulate, 5-toothed or 5-cleft. Stamens commonly more or less hairy: anthers more or less approximate in pairs. Style filiform: stigma clavate-thickened or flattened. Seeds usually angulate and with a rather loose coat.

TRIBE VIII. EUPHRASIEÆ. Corolla manifestly bilabiate; the upper lip erect and concave or galeate, entire or emarginate, rarely 2-cleft; the lower 3-cleft, mostly spreading, external in the bud. Stamens 4 and didynamous, or rarely 2, ascending under the upper lip: anther-cells distinct, sometimes one abortive or wanting. Style mostly filiform and stigma entire, rarely 2-lobed. Capsule loculicidal. Leafy herbs, not rarely drying blackish; these partially root-parasitic.

* Ovules and usually the seeds numerous.

† Anther-cells unequal or dissimilar; the outer one affixed by its middle; the other pendulous from its upper end, mostly smaller, sometimes sterile or deficient: seeds with a loose reticulated coat: leaves alternate or only the lowest opposite.

30. **CASTILLEIA**. Calyx tubular, laterally flattened, more or less cleft anteriorly or posteriorly or both; the lobes entire or 2-cleft. Corolla tubular, more or less laterally compressed, especially the elongated and conduplicate or carinate-concave and entire upper lip (galea); lower lip short and small, often very small, 3-toothed, 3-carinate or somewhat saccate below the short teeth; the tube usually enclosed in the calyx. Stamens 4, all with 2-celled anthers.

31. **ORTHOCARPUS**. Calyx tubular-campanulate, 4-cleft, or cleft anteriorly and posteriorly and the divisions 2-cleft or parted. Corolla mostly with slender tube; upper lip (galea) little longer and usually much narrower than the inflated 1-3-saccate lower one. Stamens 4; the smaller anther-cell sometimes wanting.

32. **CORDYLANTHUS**. Calyx spathaceous, diphyllous (anterior and posterior), or by the absence of the anterior division monophyllous. Corolla tubular, with lips commonly of equal length; the upper (galea) nearly as in *Orthocarpus*; the lower 3-crenulate or entire. Stamens of *Orthocarpus*, or sometimes the shorter pair wanting: anther-cells either ciliate or minutely bearded at base and apex. Style hooked at tip and somewhat thickened under the stigma. Seeds mostly few.

†† Anther-cells equal, parallel and alike in all 4 stamens.

††† Flower 2-bracteolate under the calyx.

33. **SCHWALBEA**. Calyx tubular, 10-12-ribbed, oblique, 5-toothed; the posterior tooth much smaller; the 2 anterior united higher. Corolla with cylindraceous tube and lips of almost equal length; the upper erect and galeate, oblong, entire; lower erect-spreading, 2-plicate at base, obtusely 3-lobed at summit. Stamens slightly didynamous: anthers oblong; the cells barely mucronulate at base. Seeds linear, with a loose hyaline coat, including a small nucleus.

†††† Flowers ebracteolate.

34. **EUPHRASIA**. Calyx tubular or campanulate, 4-cleft, and rarely with a fifth small posterior lobe. Corolla with dilated throat; upper lip erect, barely concave, 2-lobed, and the sides folded back; lower larger, 3-lobed, spreading; its lobes obtuse or emarginate. Anther-cells mucronate at base. Seeds numerous, pendulous, oblong, longitudinally sulcate. Leaves opposite.

35. **BARTSIA**. Calyx equally 4-cleft. Corolla with upper lip entire and sides not folded back. Seeds sulcate and with salient or alate ribs. Otherwise much as *Euphrasia*.

36. **PEDICULARIS**. Calyx various, cleft anteriorly and sometimes posteriorly. Corolla with cylindraceous tube and narrow throat, strongly bilabiate; upper lip (galea) compressed laterally, fornicate or conduplicate; lower erect at base, 2-eristate above, 3-lobed; the lobes spreading or reflexed, the middle one smaller. Anthers transverse, approximate in pairs. Capsule compressed and often oblique or falcate, rostrate. Seeds numerous, various. Leaves mainly alternate or verticillate.

37. **RHINANTHUS**. Calyx ventricose-compressed, 4-toothed, inflated in fruit. Corolla with cylindraceous tube; galeate upper lip ovate, obtuse, compressed, entire at the apex, but with a minute tooth on each side below it; lower lip shorter, with 3 spreading lobes. Anthers approximate in pairs, transverse, pilose, mucinous. Capsule orbicular, compressed. Seeds few in each cell, orbicular, wing-margined. Leaves opposite.

* * Ovules only two in each cell, one sessile and ascending, the other stipitate and laterally attached: flowers ebracteolate: leaves opposite: flowers in our species scattered.

38. **MELAMPYRUM**. Calyx campanulate or short-tubular, 4-toothed; the teeth usually setaceous-acuminate, the posterior larger. Corolla with cylindraceous tube, enlarging at throat: galeate upper lip erect, compressed, obtuse, and with narrow replicate margins or a tooth to each; lower rather longer, erect-spreading, biconvex below, 3-lobed at apex. Stamens 4: anthers approximate in pairs, nearly vertical; the cells equal and parallel, mucronulate at base. Capsule compressed, oblique or falcate: cells 1-2-seeded. Seeds smooth, strophulate.

1. **LEUCOPHYLLUM**, Humb. & Bonpl. (*Λευκός*, light or white, and *φύλλον*, foliage.) — Low and much-branched shrubs (of Mexico and its northern borders), densely scurfy-tomentose with usually silvery-white wool; the flowers showy, on short bractless peduncles in the axil of the small obovate or roundish and short-petioled entire leaves; the corolla violet-purple. Fl. in summer. — Pl. Æquin. ii. 95, t. 109; Miers, Ill. ii. 76, t. 58.

L. Texánum, Benth. Shrub 2 to 8 feet high: leaves tomentose, obovate, half inch or more long, almost sessile: calyx-lobes lanceolate-oblong: corolla almost campanulate; the limb an inch in diameter, delicately soft-villous within. — DC. Prodr. x. 344; Gray in Bot. Mex. Bound. 115. — Southern borders of Texas, *Berlandier*, *Wright*, &c. (Adjacent Mex.)

L. mínus, Gray, l. c. A foot or two high: leaves minutely silvery-canescant, obovate-spatulate with long tapering base, half inch or less long: calyx-lobes linear: corolla with narrower and more funnellform tube and throat which much exceed the limb; that half inch in diameter, sparsely pubescent within. — South-western Texas, *Wright*, *Bigelow*, *Parry*.

2. **VERBÁSCUM**, L. MULLEIN. (Altered from *Barbascum*, old Latin name.) — Coarse weeds, from Europe, mostly biennials; cauline leaves sessile and often decurrent on the stem: flowering in summer: flowers ephemeral. Hybrids abound.

* Woolly or scurfy, tall and stout: flowers yellow, occasionally white.

V. THÍAPSUS, L. (COMMON MULLEIN.) Densely woolly throughout: stem simple, 3 to 6 feet high, winged by the decurrent bases of the oblong nearly entire crowded leaves: flowers in a dense long spike, yellow: lower filaments mostly naked — Fields, a common weed in the Atlantic States, rare in the Pacific. A white-flowered form (*V. elongatum*, Willd.), probably of hybrid origin, occurs occasionally. (Nat. from Eu.)

V. LYCHNÍTIS, L. (WHITE MULLEIN.) Clothed with fine somewhat mealy woolliness, often paniculate-branched at summit: leaves ovate, acute, somewhat crenate, not decurrent, the upper surface becoming naked and green: racemes panicleled, close: filaments white-woolly. — Fields, N. Atlantic States, rather rare. (Nat. from Eu.)

* Slender, green, more loosely-flowered, filaments all bearded with violet woolly hairs.

V. BLATTÁRIA, L. (MOTH MULLEIN.) Below glabrous; the loose virgate raceme and calyx glandular: leaves oblong, obtuse, crenate or sometimes sinuate, not decurrent; the small upper ones ovate, acute, partly clasping: pedicels solitary and much longer than the linear-lanceolate calyx-lobes: corolla yellow or white and purple-tinged. — *V. Claytoni*, Michx. Fl. i. 148. Roadsides, Atlantic States. (Nat. from Eu.)

V. VIRGÁTUM, Withering. Somewhat pubescent or hairy as well as glandular, especially the raceme: pedicels often in twos and threes, not longer than the calyx-lobes: otherwise very like a taller form of the last. — California. (Nat. from Eu. by way of Mexico?)

3. **LINÁRIA**, Tourn. TOAD-FLAX. (Name formed from *Linum*, Flax.) — Herbs, chiefly natives of the Old World. Calyx 5-parted. Style filiform: stigma small, nearly entire. Leaves, &c., very various. Fl. summer.

* Indigenous species, slender glabrous annuals or biennials; with entire leaves, linear and alternate on the erect flowering stems, smaller and oblong and mainly opposite or whorled on procumbent shoots or suckers from the base: small blue flowers in a naked terminal raceme.

L. Canadénsis, Dumont. Flowering stems nearly simple, 6 to 30 inches high: leaves flat (a line or two wide): pedicels erect, not longer than the filiform and curved spur of the corolla. — Chav. Mon. Antirr. 149; Hook. Bot. Mag. t. 3473. *Antirrhimum Canadense*, L.; Vent. Cels. t. 49. *Linaria Texana*, Scheele in Linn. xxi. 761, large-flowered form. — Sandy or gravelly soil, Canada to Texas, California, and Oregon. (S. Amer., &c.)

L. Floridána, Chapm. Flowering stem at length paniculately branching, a span or two high; its leaves filiform: pedicels spreading, filiform, sparsely and minutely glandular-hispid, much longer than the flower: raceme at length flexuous: spur very short and inconspicuous, subulate, slightly projecting below the calyx. — Fl. 290. — Sands of the

coast, E. and W. Florida. Corolla much smaller than in the preceding, 2 or 3 lines long. Seeds shorter, paler, smoother, and less broadly truncate at apex.

* * Naturalized from the Old World.

+ Perennial, erect, 1 to 3 feet high, glabrous, with narrow entire and alternate pale leaves, and yellow flowers in a terminal raceme.

L. VULGARIS, Mill. (RAMSTED, BUTTER & EGGS.) Leaves linear or nearly so, extremely numerous: raceme dense, often paniculate below: corolla an inch or more long, including the slender subulate spur: seeds winged. — Fields and road-sides, Atlantic States: a showy but pernicious weed. (Nat. from Eu.)

L. GENISTIFOLIA, Mill. Glaucous, paniculately branched: leaves lanceolate, acute: flowers smaller and more scattered: seeds wingless. — Sparingly naturalized near New York. (Adv. from Eu.)

+ + Annual, procumbent, and much branched, with broad and abruptly petioled veiny alternate leaves, and purplish and yellow small flowers from their axils.

L. ELÁTINE, Mill. Spreading over the ground, slender, hairy: leaves hastate or the lower ovate, much surpassed by the filiform peduncles: calyx-lobes lanceolate, acute: corolla 3 or 4 lines long, including the subulate spur. — Sandy banks and shores, rather rare. Canada to Carolina. (Nat. from Eu.)

L. SPURIA, Mill., like the preceding, but with roundish or cordate leaves and ovate or cordate calyx-lobes, and one or two other Old World species occasionally spring up in ballast or waste grounds near cities. *L. Cymbalaria*, Mill., a smooth and delicate creeping species, is common in cultivation, but seldom becomes spontaneous.

4. ANTIRRHÍNUM, Tourn. SNAPDRAGON. (*Ἀντιρρόιον* of Theophrastus, from the snout-like aspect of the flowers.) — Herbs, rarely shrubby, of very various aspect, indigenous to the warmer parts of the Old World and of North America and Mexico, in our species all or all but the lower leaves alternate. Calyx deeply 5-parted. Cells of the anthers either distinct or more or less confluent.

§ 1. **ORÓNTIUM**, Benth., partly. Capsule oblique, firm-coriaceous; the cells opening by a definite hole at the top: seeds cup-shaped on ventral face, with thickened incurved border, smooth and carinately one-ribbed on the back.

A. ORÓNTIUM, L. Annual, a span or two high, erect, slender, glandular-pubescent: leaves oblong-linear or lanceolate, entire: flowers subsessile: corolla purple or white, half inch long. — Cult. and waste ground, sparingly spontaneous in Atlantic States. (Nat. from Eu.)

§ 2. **PSEUDORÓNTIUM**, Gray. Capsule not oblique, somewhat didymous, chartaceo-membranaceous; the equal cells irregularly bursting at the apex: seeds strongly cup-shaped; the body muriculate on the back and far smaller than the involute wing. — Proc. Am. Acad. xii. 81.

A. CYATHÍFERUM, Benth. Bôt. Sulph. 40, t. 19, of Lower California, appears to differ from the following in having linear-lanceolate sepals, of only half the length of the tube of the corolla, and a shallower cup to the seeds.

A. chytrospérmum, Gray, l. c. Annual, viscid-pubescent: stem a span to a foot high: leaves ovate, entire, 3 to 9 lines long and contracted into a margined petiole: flowers axillary, short-peduncled: sepals oblong-lanceolate, equalling the tube of the purple corolla (this barely 3 lines long): cup of the seed several times larger than the body. — Ehrenberg, Arizona, *Palmer*.

§ 3. **ANTIRRHINÁSTRUM**, Chavannes. Capsule more or less oblique; the persistent style or its base bent forward: cells opening by one or two holes: seeds rugose-alveolate or tuberculate, similar on the two sides: palate of corolla closing the orifice or nearly so: leaves entire, pinnately veined, and with short petioles or none.

* Perennial Old World species.

A. MÁJUS, L. (COMMON SNAPDRAGON.) A foot or two high: leaves thickish, from oblong to linear, smooth; flowers short-pedicelled in a glandular-pubescent terminal raceme: corolla $1\frac{1}{2}$ or 2 inches long, purple, rose, or white. — Sparingly escaped from gardens to road-sides in Atlantic States.

* * Indigenous Californian species, annual so far as the root is known, small-flowered: prominent palate closing the orifice of the corolla; its upper lip spreading and lobes of the lower usually deflexed: filaments dilated at their apex. — § *Serorhinum*, Gray, Proc. Am. Acad. vii. 372, but a misnomer, the palate not gaping.

— Erect, in no way climbing, destitute of prehensile branchlets.

++ Flowers racemose-spicate, mostly rose-colored: capsule surmounted by a slender style: seeds fimbriate-favose.

A. vírga, Gray. Glabrous throughout: root not seen: stem strict, simple, 2 or 3 feet high: leaves thickish, linear-lanceolate; the lower 2 or 3 inches long, often 3 lines wide; the upper passing into filiform-subulate bracts of the long virgate spiciform raceme: flowers sometimes secund, soon horizontal: corolla with cylindrical tube (half inch long) fully twice the length of the lips and of the ovate-lanceolate sepals; sac at base mammæform: filaments viscid-hirsute; the dilated tips of the longer pair broader than the anther: capsules erect, ovoid, longer than the unequal sepals. — Proc. Am. Acad. vii. 373, & Bot. Calif. i. 549. — W. California, *Bridges*, in flower. Mendocino Co. in fruit, *G. R. Vasey*.

A. glandulósum, Lindl. Very glandular-pubescent and viscid throughout: stem stout, branching, 3 to 5 feet high, very leafy: leaves lanceolate, mostly sessile, above gradually passing into bracts of the leafy dense spike or raceme; these equalling or shorter than the oblong tube of the corolla: sepals oblong-lanceolate, unequal; the longer equalling the capsule: filaments all moderately dilated upwards. — Bot. Reg. t. 1893; Benth. in DC. Prodr. x. 291. — Dry ground, California, from Santa Cruz southward.

++ ++ Flowers sessile or nearly so in the axils of all but the lowest almost uniform leaves: corolla only 3 or 4 lines long, yellowish or dull purplish; the lips nearly the length of the tube; the sac prominent: sepals equal, linear, not longer than the ovate-globular capsule; the whole style indurated and persistent, stout at base.

A. cornútum, Benth. Viscid-villous, simply branched, a foot or so high: leaves linear-oblong or lanceolate, obtuse (an inch long); the lower tapering into a short petiole: filaments all obliquely obovate-dilated at apex: style rather longer than the capsule: seeds echinate-favose. — Pl. Hartw. 328; Gray, Proc. Am. Acad. l. c. — Valley of the Sacramento, California, *Hartweg*.

A. leptáleum, Gray, l. c. Viscid-villous, mostly simple, a span or two high: leaves nearly linear, mainly sessile (the lowest less than an inch long, uppermost small and spatulate-oblong): shorter filaments hardly dilated at apex: style rather shorter than the capsule: seeds rugose-pitted. — *A. cornutum*, Durand in Pacif. R. Rep. v. 11, t. 10, not Benth. — California; Sierra Nevada from Mariposa Co. to Kern Co.

+ + Spreading or erect, branching, producing filiform and at length tortile axillary branchlets by which the plant is disposed to climb: calyx unequal: corolla (purple, violet, or yellowish-white) short; both lips spreading, the lower usually conspicuously larger and as long as the tube.

++ Flowers in a naked spike or dense raceme: bracts minute.

A. Coulterianum, Benth. Stem 2 to 4 feet high, gaining support by its numerous filiform tortile branchlets acting as tendrils, below glabrous, as also the (from linear to oval) distant leaves: inflorescence villous-pubescent with viscid and sometimes glandular hairs; the spike virgate, 2 to 10 inches long: pedicels shorter than the calyx: sepals linear or lanceolate, obtuse, the 3 upper a little longer, all shorter than the oval or ovate-oblong glandular-pubescent capsule, which is twice the length of the style. — DC. Prodr. x. 592; Gray, l. c. — Santa Barbara Co. to San Diego, California. Corolla either violet-purple or white with yellowish palate; the lower lip with its great palate forming the larger part of the flower; the tube only 3 lines long, its sac broad and mammæform. Tendril-shoots mostly below, sometimes also in the lower part of the inflorescence.

++ ++ Flowers (purple) scattered along the slender diffuse branches, or somewhat racemose but leafy-bracteate at the summit, often accompanied by tortile prehensile branchlets from the same axils: upper sepal conspicuously larger than the others: leaves short, from linear to ovate.

— Peduncles shorter than the flower, mostly shorter than the calyx or hardly any: tube of the corolla rather longer than the lips: seeds tuberculate.

A. vágans, Gray, l. c. Very diffuse, sparsely setose-hirsute and often glandular, varying to nearly glabrous: leaves from lanceolate to oblong-ovate, thickish: flowers comparatively large (half inch long): sepals or at least the large and mostly oblong upper one equalling the tube of the corolla; the others linear: style slender, as long as the capsule. — Watson, Bot. King, 216, t. 21, fig. 5. *A. Coulterianum*, var. *appendiculatum*, Durand, l. c. 11, t. 11. — California, common through the western part of the State.

Var. Bolánderi, Gray, l. c., a form with broader and thinner leaves, those of the tortile branchlets orbicular, and unusually large posterior sepal, grows mainly in the shade of Redwoods. *A. Breweri*, var. *ovalifolium*, Gray, Proc. Am. Acad. l. c. 375, from the upper part of the Sacramento River, may be a depauperate form of this, with shorter calyx, approaching the following.

A. Bréweri, Gray, l. c. Slender, at first erect, a foot or two high, minutely or softly viscid-pubescent: leaves from oblong-linear to oval (half to an inch long), obtuse: pedicels shorter than the calyx: flowers small; the tube of the corolla (only 3 lines long) considerably longer than the moderately unequal sepals, rather narrowly saccate at base: style subulate, glandular, at length strongly deflexed, rather shorter than the capsule. — California, common from Lake Co. to Plumas Co. and northward.

== Peduncles more conspicuous: tube of the corolla not longer than the widely spreading lips, merely gibbous at base: the weakly tortile branchlets bearing small leaves.

A. Nuttallianum, Benth. Softly viscid-pubescent, sometimes glabrous below, at length diffusely much branched, 1 to 3 feet high: leaves ovate or subcordate (the largest an inch long), nearly all distinctly petioled: peduncles or at least the lower ones longer than the flowers, sometimes longer than the leaf and disposed to be tortile: sepals shorter than (or the ovate or oval posterior one equalling) the tube of the violet-colored corolla (this 2 or 3 lines long): palate very prominent: seeds almost alately costate. — DC. Prodr. x. 592; Gray, l. c. — Common through S. California, near San Diego, &c.

Var. effusum, Gray. Slender stems climbing over bushes by tortile leafy branchlets, reaching 4 or 5 feet high: filiform peduncles mostly twice the length of the leaves: ribs of the seeds less wing-like. — Bot. Calif. i. 622. — S. E. California, in the Mohave region, Parry, Lemmon, Palmer.

A. Kingii, Watson. Slender, mostly erect, a span to a foot or more high, somewhat hairy at base, above nearly glabrous: leaves from narrowly lanceolate to linear; the uppermost minute: pedicels at length equalling or exceeding the sparsely glandular calyx: corolla small (2 or 3 lines long, dull white); its tube half the length of the linear-oblong posterior sepal and about equalling the other sepals; the lips small: persistent style short and subulate, glabrous, half the length of the slightly oblique globular capsule: seeds favose-tuberculate. — Bot. King, 215, t. 21, fig. 1-4. — N. W. Nevada to Utah, Watson, Lemmon, &c.

§ 4. **MAURANDÉLLA, Gray, l. c.** Capsule and calyx equal or nearly so: seeds as in preceding: corolla with prominent palate partly or quite closing the orifice: herbs with entire or lobed leaves (all but the lower alternate), destitute of prehensile branchlets, but mostly climbing by tortile filiform petioles or peduncles, or by both, mainly glabrous. — *Maurandia* § *Antirrhinifloræ*, Benth. in DC. l. c.

* Annuals, with mostly lanceolate or linear short-petioled leaves, but long and filiform prehensile peduncles: calyx rather shorter than the globose capsule.

A. strictum, Gray, l. c. Erect, nearly simple, a foot or two high: lowest leaves ovate-lanceolate; upper ones linear, or the upper floral filiform, much shorter than the tortile racemose peduncles: corolla violet-purple (nearly half inch long), with hairy palate and gibbous base: capsule crustaceous, tipped with a straight style of equal length. — *Maurandia stricta*, Hook. & Arn. Bot. Beech. 375; Benth. l. c. — California, near Santa Barbara, Douglas, Brewer.

A. Coóperi, Gray, l. c. Climbing 2 to 4 feet high by the long filiform peduncles (of 2 or 3 inches in length): very slender stems at length much branched: lowest leaves ovate or oblong; the others linear; upper floral minute: corolla bright yellow (half inch long), conspicuously saccate at base, with hairy palate: style deciduous from the nearly membranaceous capsule: seeds rough-rugose and with 3 or 4 corky ribs. — Ravines near Fort Mohave, S. E. California, Cooper, Almendinger. S. Utah, Parry.

A. filipes, Gray, l. c. More delicate than the preceding, and with broader more membranaceous leaves: capillary tortile peduncles equally long: flowers very small, "white." — Ives Colorad. Exped. Bot. 19. — Arizona, in desert arroyos of the Colorado, *Newberry*. Flowers perhaps imperfect, the corolla little exceeding the calyx. Perhaps a depauperate or attenuated state of the foregoing.

* * Perennial, climbing by the slender tortile petioles and axillary peduncles: calyx longer than the globular capsule.

A. maurandioides, Gray, l. c. Low or tall climbing: leaves triangular-hastate or the lower cordate-hastate; the lateral lobes often with a posterior tooth: corolla purple or sometimes white (half to an inch long), with a nearly closing palate: sepals lanceolate, very acute: style slender: seeds strongly costate, the ribs corky. — *Usteria antirrhiniflora*, Poir. *Maurandia antirrhiniflora*, Willd. Hort. Berol. t. 83; Bot. Mag. t. 1643; Benth. l. c. *M. personata*, Lagasca. — Texas to Arizona and the borders of California. Common in cultivation. (Mex.)

§ 5. **GAMBÉLIA**, Gray, l. c. Capsule and seeds of preceding section: stems erect and more or less shrubby, not climbing: palate of the tubular corolla somewhat prominent, but not closing the throat: most of the leaves opposite or in threes. — *Gambelia*, Nutt. Pl. Gamb. 149.

A. speciosum, Gray, l. c. Shrub, 3 or 4 feet high, somewhat pubescent, leafy throughout: leaves oval or oblong, short-petioled, coriaceous: corolla "scarlet" or pink-red, hardly an inch long, thrice the length the lanceolate sepals, and the tube thrice the length of the narrow lips. — *Gambelia speciosa*, Nutt. l. c. t. 22. — California, on the Island of Catalina, *Gambell*. (Guadalupe Island, Lower Calif., *Palmer*.)

A. junceum, Gray, l. c. Shrubby slender stems glabrous, 2 feet high: leaves small, oblong-linear, or above hardly any: tube of the corolla 8 to 12 lines long. — *M. juncea*, Benth. Sulph. 41. — From San Diego southward (to the bay of Magdalena in Lower California, *Hinds*; also Cerros Island, *Dr. Streets*).

5. MAURÁNDIA, Ortega. (*Dr. Maurandy*, a botanical teacher at Carthagena.) — Perennial herbs (Mexican and Arizonian), climbing by the slender tortile petioles and sometimes by the axillary peduncles; the leaves cordate-triangular or hastate, only the lower opposite; and showy purple or rose-colored or rarely white flowers. — Gray, Proc. Am. Acad. vii. 377. *Maurandia* (excl. § 1) and *Lophospermum* (Don), Benth. in DC. Prodr. l. c. This comprises the two true *Maurandias* with wingless tuberculate seeds, *Lophospermum*, of one or perhaps two species, with seeds bordered by an irregular and lacerate wing; and the section *EPIXIRHIUM*, Engelm., with a narrow entire wing to the seeds, and capsule pointed by the subulate indurated style, containing the following species.

M. Wislizeni, Engelm. Glabrous, mostly low-climbing: leaves hastate, or some of them sagittate; the lowest obtuse, the others acuminate and with pointed basal lobes: peduncles short: corolla (pale blue, an inch long) with lips about half the length of the rather ample tube: sepals in flower linear-lanceolate, becoming in fruit triangular-lanceolate and gradually acuminate, much enlarged, rather rigid, very veiny-reticulated, and strongly saccate-carinate at base, enclosing the coriaceous globose-ovate capsule, and about the length of the sword-shaped indurated style: seeds compressed, oval, surrounded by a narrow entire wing, the sides chaffy-rugose. — Gray in Bot. Mex. Bound. 111. — New Mexico, on the banks of the Rio Grande, &c., and adjacent borders of Mexico, *Wislizenus*, *Parry*, *Wright*, *Bigelow*.

6. MOHÁVEA, Gray. (Name of the river on the banks of which the plant was discovered by Fremont. It had been previously collected, in fruit only, by Dr. Coulter.) — Single species.

M. viscida, Gray. Erect annual, a span to 2 feet high, corymbosely branched, pubescent and very viscid: leaves lanceolate, entire, 2 inches long, tapering to both ends, somewhat petioled; the lower opposite; upper alternate: flowers short-pedicelled: sepals lanceolate, acuminate, nearly equal: corolla inch and a half long, sulphur-colored, with some purple dots: capsule globular: seeds very numerous, oblong, smooth and even on the back; the ventral face deeply cup-shaped, with thickened somewhat corky sides. — Gravelly banks, S. E. California and adjacent parts of Arizona: fl. early spring.

7. COLLÍNSIA, Nutt. (*Zaccheus Collins* of Philadelphia, who published nothing, but was the most accurate botanist of his place and time.) — N. American winter-annuals, flowering early in spring and summer, low or slender; with simple opposite sessile leaves, or the lowest petioled and the upper verticillate, the uppermost often reduced to subulate bracts. Flowers handsome, in series of cymosely umbellate fascicles or in whorls, or sometimes solitary in the axils; the pedicels ebracteolate, and no common peduncle. Corolla not rarely 2-colored. The stamens and style occasionally rise out of the sac of the corolla into a more erect position before all the pollen is shed. Ovules and seeds usually few (6 to 2) and sometimes solitary in each cell. — Nutt. in Jour. Acad. Philad. i. 190, t. 9; Gray, Proc. Am. Acad. xi. 91, & Bot. Calif. i. 553.

* Flowers short-pedicelled or almost sessile, verticillate-crowded, below in the axils of leaves, above in the axils of bracts: corolla half to three-fourths inch long: seeds several or few, meniscoidal.

+ Corolla strongly declined; the much-inflated and gibbous saccate body (which we denominate the throat) full as broad as long, and forming an obtuse or right angle with the very short proper tube: gland short and small, sessile: upper pair of filaments more or less bearded toward the base: ovules and seeds several.

C. bicolor, Benth. A foot or so high, from nearly glabrous to hirsute, or above viscid-pubescent: leaves more or less dentate and oblong or lanceolate; the upper usually ovate-lanceolate, sessile by a broad or subcordate and nervose base: pedicels shorter than the acute calyx-lobes, mostly several in the fascicle: corolla with lower lip violet or rose-purple and the upper paler or white (occasionally both white); saccate throat very oblique to the tube; recurved-spreading upper lip a little shorter than the lower: seeds rugose-reticulated. — Lindl. Bot. Reg. t. 1734; Don, Brit. Fl. Gard. ser. 2, t. 307; Hook. Bot. Mag. t. 3488. *C. heterophylla*, Graham, Bot. Mag. t. 3695, rare form with lower leaves 3-cleft. — Moist grounds, common through the western part of California. Commonly cultivated.

C. tinctoria, Hartweg. Like the preceding, but with more glandular and viscid brown or yellowish pubescence, which stains the fingers: flowers almost sessile: calyx-lobes linear or oblong-linear, mostly obtuse: corolla yellowish, cream-color, or white, usually with some purple dots or lines; axis of saccate throat forming a right angle with the tube; the upper lip and its lobes very short: seeds smaller, rounder, and smoother. — Benth. Pl. Hartw. 328; Gray, Bot. Calif. l. c. 553. *C. barbata*, Bosse in Verhand. Gartenb. Preuss. 1853, & Bot. Zeit. xii. 905. *C. septemnervia*, Kellogg, Proc. Calif. Acad. ii. 224, fig. 69. — Common in California, especially along the Sierra Nevada and its foot-hills.

+ Corolla less declined or oblique; the gibbous throat much longer than broad: stems only a span or two high: leaves crenate or obtusely dentate, obtuse, thickish, seldom over an inch long.

++ Filaments and interior of corolla somewhat bearded: upper lip of the latter crestless, but with transverse callosity: calyx-lobes rather broad and obtuse.

C. bartsiaefolia, Benth. Puberulent and somewhat glandular, rarely hirsute-pubescent above: stem strict: leaves from ovate-oblong to linear: flower-clusters 2 to 5 or fewer: corolla purplish or whitish; its upper lip about the length of the curved gibbous throat; the lower with narrow base and emarginate or obovate lateral lobes: gland sessile and elongated, porrect: seeds only a pair in each cell, smooth. — DC. Prodr. x. 318; Gray, l. c. *C. hirsuta*, Kellogg, l. c. 110, fig. 34, a hirsute form. — Sandy soil, common through California, less showy than preceding.

C. corymbosa, Herder. Almost glabrous, cespitose-branching from base and diffuse or decumbent: leaves oblong or oval, very obtuse, rather fleshy: flowers mainly in a soli-

tary leafy-bracteate capitate cluster: corolla straightish, white or ochroleucous; its upper lip blue or bluish and very short, the lobes being almost obsolete; lobes of elongated lower lip entire: gland small, oblong, compressed, short-stipitate: seeds 4 or 5 in each cell, rugose-reticulated. — Ind. Sem. Petrop. 1867, & Gartenfl. 1868, 35, t. 568; Gray, Proc. Am. Acad. vii. 378, & Bot. Calif. l. c. — Shore of the northern part of California, *Bolander*, &c. (Doubtless not "Mexico.")

++ ++ Filaments and interior of corolla glabrous: upper lip of latter prominently fornicate-crested: flowers fewer: seeds about 4, smooth.

- C. Greénei**, Gray. Slender and smaller, erect, glandular-puberulent: leaves oblong-linear, tapering to base, sparsely and coarsely dentate: flowers 2 to 6 in the clusters, on pedicels sometimes as long as the calyx: corolla violet-purple, 5 or 6 lines long; its upper lip much shorter than the oblong throat, about half the length of the lower; the crest under the origin of the limb developed into a pair of conspicuous callous teeth on each side; lateral lobes of lower lip small: gland small and sessile. — Proc. Am. Acad. x. 75, & Bot. Calif. l. c. — On rocks, Lake Co., California, *Greene*.

* * Flowers slender-pedicelled, umbelliform-verticillate, or sometimes solitary.

+ Calyx-lobes acute, from lanceolate or even ovate to subulate, usually surpassing the capsule: plants glabrous, or the stems and pedicels puberulent, not glandular or viscid: leaves in the same species either somewhat serrate or entire: seeds about 4, smooth or nearly so.

++ Eastern species: showy corolla half inch long, with very gibbous throat much shorter than the limb: upper filaments more or less bearded below.

- C. vérna**, Nutt. l. c. Stem 6 to 20 inches high: leaves ovate or oblong, or the lowest rounded and slender-petioled, and the upper ovate-lanceolate and partly clasping; the upper floral reduced to subulate-linear bracts: whorls about 6-flowered: pedicels filiform, longer than the flowers: throat of the corolla equalling the calyx-lobes; the ample lower lip bright blue; the upper white or purplish; lobes barely emarginate: gland subulate, porrect: seeds thick, not flattened, oblong, arcuate. — Sweet, Brit. Fl. Gard. t. 220; Hook. Bot. Mag. t. 4927. — Moist woods, W. New York and Penn. to Wisconsin and Kentucky.

- C. violácea**, Nutt. Lower: leaves thickish; the upper lanceolate: whorls 2-4-flowered: pedicels as long as the flower: corolla violet; the upper lip much smaller than the lower; all the lobes obovate. — Trans. Am. Phil. Soc. n. ser. v. 179; Gray, Proc. Am. Acad. xi. 93. *Antirrhinum tenellum*, Pursh, Fl. ii. 421? — Arkansas, *Nuttall*, *Pitcher*. Little known species.

++ ++ Western species, one extending north-eastward.

= Flowers showy: corolla strongly declined; its saccate-ventricose throat shorter than the limb.

- C. grandiflóra**, Dougl. A span to a foot high: leaves thickish; the lowest roundish and petioled; upper from oblong to linear and sessile; the floral in whorls of 3 to 7: pedicels in whorls of 3 to 9, about the length of the flower: calyx-lobes lanceolate gradually subulate-attenuate to a very acute point: corolla half to two-thirds inch long, white or purple with lower lip deep blue or violet; its very saccate throat as broad as long, almost or quite transverse with the tube, as long as the recurving (internally 2-callous) upper lip; lobes of the larger lower lip merely retuse or emarginate: filaments glabrous: gland sessile and capitate: seeds roundish, smooth. — Lindl. Bot. Reg. t. 1107; Gray, l. c. — Shady hills, &c., from Mendocino Co. California to Brit. Columbia along the coast.

Var. pusílla. Small form, a span or more high: corolla only 4 or 5 lines long, more blue or violet throughout. — Plumas Co. California to Brit. Columbia.

- C. sparsiflóra**, Fisch. & Meyer. More slender: upper leaves all lanceolate and linear, all opposite, or the uppermost small bracts in threes: pedicels solitary or some of the upper 2 or 3 in a whorl, sometimes longer than the flower: calyx-lobes from ovate to deltoid-lanceolate, acute: corolla 4 to 8 lines long, violet; the saccate throat very oblique but not transverse; upper lip hardly shorter than the lower: filaments hirsute below: gland sessile, elongated-subulate: seeds meniscoidal, acute-margined, obscurely reticulated. — Ind. Sem. Petrop. 1835, ii. 33; Gray, l. c. *C. solitaria*, Kellogg, l. c. 10. — Rocky places, California, from San Francisco northward.

= = Flowers small, 2 or 3 lines long: corolla less declined or oblique; the oblong gibbous throat longer than the limb: stigma 2-cleft.

- C. parviflóra**, Dougl. About a span high, at length diffuse or spreading: leaves oblong or lanceolate; the upper narrowed at base and entire; the floral often in whorls of 3 to 5:

pedicels solitary or above 2 to 5 in the whorl, usually longer than the flowers: calyx-lobes lanceolate or triangular-subulate, usually almost equalling the blue (or partly white) corolla, hardly longer than the mature capsule: filaments glabrous: gland small, capitate, short-stipitate: seeds thickish, marginless. — Lindl. Bot. Reg. t. 1802; Hook. Fl. ii. 94 (misprinted *C. pauciflora*); Gray, l. c. — Shady moist grounds, Upper Michigan (shore of L. Superior) to the Pacific in Washington Territory, and south to Arizona and Utah. *C. minima*, Nutt. in Jour. Acad. Philad. vii. 47, of N. W. Rocky Mountains, is ambiguous, but apparently a dwarf and large-flowered form of *C. parviflora*, with corolla proportionally longer, 3 or 4 lines long.

++ Calyx-lobes obtuse: corolla (blue) 3 or 4 lines long, fully twice the length of the calyx: filaments glabrous: gland subulate or conical: stem slender, only a span or so high.

++ Not glandular nor viscid: ovules and usually seeds 6 or 7 in each cell; the latter round-oval, when young discoidal, reticulated.

C. Párryi. Puberulent: stem strict, simple: leaves (less than an inch long) lanceolate-linear, obtuse; the upper mostly entire and closely sessile; the lowest smaller, narrowly oblong, crenate, petioled: pedicels solitary, in pairs, or the upper in threes, as long as the flowers: calyx-lobes oblong, equalling the moderately oblique throat of the deep blue corolla, not exceeding the capsule: lips of the corolla almost equal in length, not longer than the throat; the lobes emarginate. — San Bernardino Co., South-eastern California, *Parry, Lemmon* (no. 296).

++ ++ Filiform pedicels and upper part of the stems more or less glandular-pubescent and viscid: ovules solitary in the cells: seed oblong, thick, almost terete, somewhat arcuate, smooth: calyx shorter than the throat of the corolla.

C. Chıldii, Parry, Herb. Stem mostly simple, puberulent: leaves thinnish; the lower obovate-rotund or oblong, obtusely more or less serrate, petioled; the upper oblong-lanceolate with narrowed base, subsessile: flowers rather few: pedicels and calyx pubescent and partly glandular: lobes of the latter lanceolate or oblong, surpassing the capsule: corolla light blue; the oblong moderately oblique throat longer than the lips, the lobes of which are of about equal length and entire. — South-eastern California, in deep woods (of *Libocedrus decurrens*) in the San Bernardino Mountains, *Parry & Lemmon, H. S. Child.* Also Kern Co., *Kennedy.*

C. Torréyi, Gray. Stem divergently much branched, very floriferous: slender branches and pedicels viscid-glandular: leaves thickish, linear with attenuate base and entire, or the lowest spatulate or oblong and petioled; floral mainly reduced to subulate 3-4-nate bracts subtending whorls of 3 to 6 deep blue or violet flowers: corolla rather strongly declined, thrice the length of the calyx, the lobes of which are shorter than the capsule; upper lip equalling and the lower longer than the ventricose throat. — Proc. Am. Acad. vii. 378, & Bot. Calif. l. c. — California, in open woods, through the Sierra Nevada from Mariposa Co. northward to Siskiyou Co.

8. TONÉLLA, Nutt. (An unexplained and probably quite meaningless name.) — Two known species, slender annuals, small-flowered, with the habit of *Collinsia*. — Gray, Proc. Am. Acad. vii. 378, xi. 92, & Bot. Calif. i. 555.

T. collinsioides, Nutt. Diffuse, nearly glabrous: filiform branches a span to a foot long: radical and lowest cauline leaves ovate or roundish (3 to 6 lines long), slender-petioled, mostly entire; the others shorter-petioled or sessile, many of them 3-parted or else quite divided into oblong or lanceolate divisions or leaflets; the floral in whorls of three; uppermost simple and shorter than the slender filiform (solitary, geminate, or sometimes ternate) pedicels: flowers minute: corolla blue, a line long; its 5 lobes of equal length; the lower one transversely oval or roundish, very much larger than the oblong lateral and upper ones, and separated from them by deeper sinuses: ovules solitary in each cell: capsule exceeding the calyx. — *Collinsia tenella*, Benth. in DC. Prodr. x. 593, where the mss. name of *Tonella collinsioides* of Nuttall is cited. — N. California and Oregon, in shady places.

T. floribúnda, Gray, l. c. Larger, a foot or two high: most of the cauline leaves 3-5-foliate: whorls numerous in a loose elongated raceme, each of 3 to 7 flowers: corolla larger, more rotate, 3 or 4 lines broad, much exceeding the calyx, purple; the three lobes of

the lower lip obovate and nearly alike, smaller than those of the 2-cleft upper lip: ovules and seeds 3 or 4 in each cell. — W. Idaho, *Spalding, Geyer*, &c.

9. **SCROPHULÁRIA**, Tourn. FIGWORT. (A reputed remedy for *scrofula*.) — Rank herbs, chiefly perennials, of homely aspect; with mostly opposite leaves, and loose cymes of small flowers forming a narrow terminal thyrsus, in summer, protogynous. Stamens in our species always shorter than the corolla.

* Corolla bright red, comparatively large, oblong-urceolate.

- **S. coccínea**, Gray. Glabrous, a foot or two high: leaves deltoid-ovate, slender-petioled, coarsely dentate, sometimes doubly so: pedicels and calyx minutely glandular: corolla two-thirds to three-fourths inch long; the 2-cleft upper lip much longer than the lower: rudiment of sterile stamen obovate. — Bot. Mex. Bound. 111. — New Mexico, in mountains near Santa Rita del Cobre, *Wright, Bigelow*.

* * Corolla lurid-purplish or greenish, 3 or 4 lines long, ventricose-ovoid.

- S. nodósa**, L. Nearly glabrous, 2 or 3 feet high: thyrsus naked or nearly so, elongated and open: leaves ovate or oblong-ovate, acute, and with rounded or subcordate base, sharply and often rather doubly serrate: cymes pedunculate: calyx-lobes broadly ovate, nearly marginless: rudiment of fifth stamen orbicular. (Eu., N. Asia.)

Var. Marilándica. Taller, sometimes 5 feet high: leaves larger and thinner, acuminate, often ovate-lanceolate, seldom at all cordate, mostly simply serrate: pedicels more slender. — *S. Marilándica*, L. *S. lanceolata*, Pursh, Fl. ii. 419, form with narrower leaves. — Damp grounds, Canada to Florida, and west to Utah and perhaps Oregon.

- S. Califórnicæ**, Cham. Leaves smaller, oblong-ovate, with truncate or cordate base, or the upper narrowly deltoid, acute, coarsely doubly toothed or sometimes laciniate-incised; the lower occasionally with a pair of detached lobelets near the summit of the petiole: thyrsus very loose, mainly naked: peduncles and pedicels minutely glandular: rudiment of fifth stamen spatulate or cuneiform, either roundish or acutish at base. — Linn. ii. 585; Gray, Bot. Calif. i. 552. *S. nodosa*, var., Benth. Pl. Hartw. 327. — Moist grounds, nearly throughout California, and in W. Nevada.

10. **CHELÓNE**, L. TURTLE-HEAD, BALMONY. (*Χελώνη*, a tortoise, the corolla in shape resembling the head of a reptile) — North American perennial herbs, glabrous or nearly so, large-flowered; the leaves opposite and acutely serrate. Seeds upwardly imbricated, compressed as well as broadly winged. Sterile filament shorter and smaller than the others. Capsule ovate: valves entire. Fl. late summer.

§ 1. **EUCHELÓNE.** Flowers in axillary and terminal short and close spikes: bracts and bractlets imbricated, ovate or orbicular, concave, membranaceous, and the broad sepals similar: corolla (white or rose-color) strongly ventricose and with lips of about equal length; the upper broad and carinate-fornicate, almost entire, and from under its apex protrudes the recurved tip of the long filiform style; the lower moderately spreading, broad, 3-lobed, the middle lobe smaller, woolly in the throat: filaments woolly.

- C. glábra**, L. A foot or two (or in Illinois 6 or 7 feet) high: leaves from narrowly to rather broadly lanceolate (4 or 5 inches long, 4 to 12 lines wide), gradually acuminate, serrate with sharp appressed teeth, narrowed at base usually into a very short petiole: bracts not ciliate: corolla white, or barely tinged with rose, an inch long. — Spec. ii. 611; Bart. Fl. Am. Sept. iii. t. 76. *C. glabra, alba*, Pursh, &c. — Wet places, Newfoundland to Saskatchewan and south to Florida.

- C. oblíqua**, L. A foot or two high, less strict or with spreading branches: leaves from broadly lanceolate to oblong (2 to 5 inches long), sometimes laciniately serrate, more veiny and duller, acute or obtuse at base, mostly short-petioled: bracts ciliate: corolla deep and

bright rose-color. — Syst. Nat. & Syst. Veg.; Schk. Handb. t. 172; Bot. Reg. t. 175. *C. foliis ovato-lanceolatis*, &c., Mill. Ic. t. 93. *C. purpurea*, Mill. Dict. *C. glabra*, var. *purpurea*, Michx., Pursh, &c. *C. glabra*, var. *lanceolata*, Nutt. Gen. ii. 51. *C. latifolia*, Muhl. Cat., ex Ell. Sk. ii. 127. — Damp or wet shady grounds, Illinois and Virginia to Florida. Varies between the preceding and following.

C. Lyóni, Pursh. About 2 feet high: leaves ovate or subcordate, acuminate (4 to 7 inches long), thin, evenly serrate, on rather slender naked petioles: bracts minutely ciliate: corolla bright rose-purple. — Fl. ii. 737; Don, Brit. Fl. Gard. t. 293. *C. major*, Sims, Bot. Mag. t. 1684. — Wet ground, mountains of N. Carolina and Tennessee to Georgia.

§ 2. **NOTHOCHÉLONE**. Flowers pedicellate, in a loose open terminal thyrsus: bracts and sepals lanceolate, acuminate: no bractlets under the calyx: corolla (violet-purple) with widely open orifice, a very short 2-cleft and not at all fornicate upper lip, and a 3-cleft spreading lower one; the throat and filaments glabrous: upper part of the filiform sterile filament hirsute. Accords with *Pentstemon*, except in the winged seeds.

C. nemorosa, Dougl. A foot or two high: herbage of rank somewhat unpleasant odor: leaves ovate and ovate-lanceolate, acute, acutely dentate, 2 or 3 inches long; the cauline sessile or almost so by a truncate or subcordate base: peduncles 3-5-flowered, as long as the pedicels: corolla fully an inch long. — Lindl. Bot. Reg. t. 1211; Benth. in DC. l. c. *Pentstemon nemorosus*, Trautvv. in Mem. Acad. Petrop. 1841, 250. — Woods along mountain streamlets, Washington Terr. to the northern borders of California, *Newberry*, *Greene*.

11. PENTSTÉMON, Mitchell. **BEARD-TONGUE**. (*Πέντε*, five, *στίμων*, stamen, all five stamens being conspicuously present, the fifth as a sterile filament, which in rare instances, in several species, has been found to be antheriferous.) — North American (a few Mexican and one N. E. Asian) perennials, mostly herbaceous, some suffruticose; usually with simple stems or branched from the base; the leaves opposite, rarely verticillate or very rarely the upper alternate; inflorescence from thyrsiform to almost simply racemose; and the flowers mostly handsome, in summer. — Nov. Gen. in Act. Phys. — Med. Nat. Cur. xiii. (1748) 36; Soland. in Ait. Kew. ii. 360; Benth. in DC. Prodr. x. 320, 593; Gray, Proc. Am. Acad. vi. 56, & Bot. Calif. i. 556. *Pentastemon*, Trautvv. in Mem. Acad. Petrop. 1841.

§ 1. **EUPENTSTÉMON**, Gray. Anther-cells soon divaricate or divergent, united and often confluent at the apex, dehiscent for their whole length or nearly.

* (*ERIANTHÉRA*.) Anthers densely comose with very long wool, in the manner of *Chelone*, pelately explanate in age: low and suffruticose, with coriaceous leaves.

P. Menziésii, Hook. A span or less to a foot high, woody at base: leaves commonly ovate, obovate, or oblong, a quarter to an inch long, rigidly serrulate or some entire, glabrous or when young pubescent; the lower short-petioled: inflorescence mostly glandular or viscid-pubescent, racemose; the pedicels almost all 1-flowered, usually 1-2-bracteolate: sepals ovate-lanceolate or narrower and attenuate-acuminate: corolla (violet-blue to pink-purple) an inch or more long, tubular-funnelform and moderately bilabiate, the upper lip deeply 2- and lower 3-cleft: sterile filament short and slender, hairy at apex or nearly naked. — Fl. ii. 98; Gray, Proc. Am. Acad. vi. 56 (var. *Lewisii*) & Bot. Calif. i. 556. *Gerardia fruticosa*, Pursh, Fl. ii. 423, t. 18. *Pentstemon Lewisii*, Benth. in DC. Prodr. x. 321. — On rocks and mountain tops, Brit. Columbia through the higher Sierra Nevada of California, and Rocky Mountains of Idaho and Wyoming. Corolla at the north and on Mt. Shasta, &c., bright violet or bluish. Passes into

Var. Newberryi, Gray, a form with rose-purple or pink corolla. — *P. Newberryi*, Gray in Pacif. R. Rep. vi. 82, t. 14. *P. Menziésii*, var. *Robinsoni*, Masters in Gard. Chron. 1872, 969, fig. 227. — Sierra Nevada, California, the only form southward.

Var. Douglásii, Gray, l. c., with entire and obovate-lanceolate or narrowly oblong leaves, and (as far as known) lilac-purple corolla, pink-red at base. — *P. Douglasii*, Hook. l. c., in fruit only. *P. crassifolius*, Lindl. Bot. Reg. xxiv. t. 16. — Interior of Oregon and Washington Terr. Passes into

Var. Scouleri, Gray, l. c. Leaves lanceolate, or even linear-lanceolate, acute; the larger $1\frac{1}{2}$ to even 3 inches long, sparsely and acutely serrulate: corolla commonly inch and a half long, violet-purple. — *P. Scouleri*, Dougl. in Lindl. Bot. Reg. t. 1277. — Interior of Oregon to Brit. Columbia. A form (var. *Lyalli*, Gray, l. c. 76) is 2 feet or more high, with remarkably long willow-like leaves.

* * (Fruticost.) Anthers glabrous, dehiscent through the apex and expanate after dehiscence: stems branching and shrubby, at least below: leaves coriaceous or chartaceous, small or short, mostly very short-petioled: filaments all bearded or pubescent at base.

— Corolla unknown: probably of this section.

P. microphýllus, Gray. Cinereous-puberulent and glabrate, much branched: primary leaves not seen; those of axillary fascicles only 2 lines long, obovate, obtuse, entire, thick-coriaceous: inflorescence racemose: sepals lanceolate-ovate, acute: persistent style (and therefore probably the corolla) short. — Torr. Pacif. R. Rep. iv. 119. — N. W. Arizona, on Williams Fork, *Bigelow*.

+ + Corolla red, long and narrow-tubular, an inch or more in length; its upper lip erect and the lower more or less spreading: inflorescence somewhat glandular, mostly compound: sterile filament bearded down one side.

P. cordifólius, Benth. Somewhat scandent over shrubs by long sarmentose branches, very leafy, scabrous-puberulent: leaves subcordate or ovate with truncate base, acutely serrate or denticulate, veined, an inch or less long: thyrsus short and leafy: peduncles several-flowered: sepals ovate-lanceolate: corolla scarlet; its tube near an inch and lips half inch long. — Scroph. Ind. adnot., & DC. Prodr. x. 329. — California, common from Santa Barbara to San Diego.

P. corymbósus, Benth. Erect, a foot or two high, cinereous-pubescent or glabrate: branches leafy up to the naked and few-many-flowered corymbiform cyme: leaves oblong or oval, barely obtuse at base, obscurely or sparingly denticulate, somewhat parallel-veined (half to 2 inches long): sepals lanceolate: corolla scarlet, an inch long. — DC. Prodr. x. 593; Gray, Bot. Calif. i. 557. — California, from Shasta Co. to Santa Cruz, &c.

P. ternátus, Torr. Glabrous and the long virgate flowering shoots (2 to 4 feet long) glaucous: leaves linear-lanceolate, rigid, acutely serrate or denticulate, with salient teeth (8 to 18 lines long); the upper ternately verticillate: flowers in a long racemiform thyrsus: sepals ovate-acuminate: corolla pale scarlet, an inch long and the lips about 3 lines long. — Bot. Mex. Bound. 115; Gray, l. c. — Mountains of S. California, from Kern Co. southward.

+ + + Corolla yellow or yellowish, merely tinged with purple, less than an inch long, with tube shorter than the ringent limb; upper lip fornicate and merely emarginate; the lower pendulous-recurved.

P. breviflórus, Lindl. Glabrous, 3 to 6 feet high, with slender or virgate branches leafy to the narrow many-flowered racemiform thyrsus: leaves lanceolate or oblong-lanceolate, denticulate, seldom if ever verticillate, an inch or more long: sepals ovate-lanceolate, acuminate: corolla yellowish with flesh-color, striped within with pink, about half inch long: upper lip beset with long and viscid hairs: sterile filament naked. — Bot. Reg. t. 1946; Gray, l. c. *P. carinatus*, Kellogg in Proc. Calif. Acad. i. 62. — Dry hills and banks, California to the borders of Nevada, common on the flanks of the Sierra Nevada.

P. antirrhinóides, Benth. Minutely cinereous-puberulent or glabrous, 1 to 5 feet high, much branched, very leafy: leaves small (barely half inch long), spatulate or oval, entire: inflorescence leafy-paniculate: peduncles 1-flowered, short: sepals broadly ovate: corolla ventricose, 8 to 12 lines long, unusually broad, lemon-yellow: sterile filament densely bearded on one side. — DC. Prodr. x. 594; Hook. Bot. Mag. t. 6157; Gray, l. c. *P. Lobbi*, Illustr. Hort. 1862, t. 315. — S. California, San Diego Co., &c.

+ + + Corolla apparently purplish or flesh-color, not over half inch long, with tube and throat longer than the open lips: shrubby at base; the slender branches more herbaceous.

P. Rothrockii. A span or two high, minutely puberulent, oval- or ovate-oblong, obtuse, mostly subcordate or truncate at subsessile base, usually undulate-dentate, 4 or 5 lines

long: inflorescence loosely spiciform, leafy below: subsessile and mostly solitary 2-bracteolate flowers and their bracts or floral leaves commonly alternate: sepals ovate-lanceolate, puberulent, slightly if at all glandular: corolla 4 lines long, rather narrow, glabrous: sterile filament glabrous. — S. E. California, on Little Olanche Mountain, toward the sources of Kern River, at 10,400 feet, *Rothrock*.

P. Lemmóni, Gray. Glabrous up to the pedicels, 2 to 4 feet high, slender, rather remotely leaved: leaves ovate- or oblong-lanceolate, thinnish, acutely and sparsely serrulate, an inch or less long: thyrsus loose, leafy below: peduncles all opposite, slender, few-several-flowered: short pedicels and ovate-lanceolate sepals viscid-pubescent: corolla half inch long, somewhat campanulate-dilated above, viscid or glandular: filament strongly yellow-bearded on one side of the curved apex. — Bot. Calif. i. 557. — California, from Mendocino to Plumas Co., *Kellogg, Lemmon*.

+ + + + Corolla (white or purplish) nearly an inch long, oblong-campanulate from the base, hardly at all bilabiate.

P. frutescens, Lamb. A span or less high from a woody (subterranean? or prostrate) stock: stems pubescent, leafy: leaves oblong, with somewhat narrowed base, denticulate, glabrous ($1\frac{1}{2}$ to 3 inches long, 7 to 12 lines wide): thyrsus terminal, 3-9-flowered: pedicels and lanceolate acuminate sepals villous and viscid: lobes of the corolla short and broad, nearly equal and equally somewhat spreading: lower part of the fertile filaments and most of the sterile one hirsute-bearded. — Linn. Trans. x. 250. t. 6, fig. 1; Pursh, Fl. ii. 428 (excl. hab.); Benth. in DC. Prodr. x. 321. — "Unalaschka, *Pallas*." Not since detected there, and perhaps a mistake. Certainly not found "on the north-west coast" by *Lewis*. (Kamtschatka and Japan!)

* * * (AMBIGUI.) Anthers glabrous, reniform, not explanate in age, the line of dehiscence stopping a little short of the base of the cells: stem sufruticose and leaves thick-coriaceous.

P. baccharifolius, Hook. Glabrous, or the rigid branches obscurely puberulent, 2 feet high, leafy below: leaves oblong, nearly sessile, rigidly and acutely dentate, almost veinless, an inch long; the uppermost abruptly reduced to small ovate bracts of the loose and racemose glandular inflorescence: peduncles 1-3-flowered: sepals ovate: corolla deep carmine-red, an inch long, broadly tubular and with a short moderately bilabiate limb; upper lip somewhat erect, 2-lobed; lower recurved and 3-parted: sterile filament naked. — Bot. Mag. t. 4627; Gray in Bot. Mex. Bound. 115, & Proc. Am. Acad. vi. 58. — S. W. Texas, on the San Pedro River, *Wright*.

* * * * (ELMIGERA.) Anthers glabrous (rarely villous); the cells dehiscant from the base towards but not to the apex, consequently not explanate after dehiscence: corolla tubular, little ampliate upward, red: sterile filament mostly glabrous: herbs glabrous and usually glaucescent, glabrous even to the calyx and outside of the corolla, or merely pruinose-puberulent: stems virgate and simple: leaves all entire; the cauline sessile or partly clasping: thyrsus elongated and virgate, loosely-flowered, racemiform or paniculate. — *Elmigeria*, Reichenb. § *Elmigeria* (Benth. in DC. l. c., excl. spec.), Gray in Proc. Am. Acad. l. c.

+ Corolla strongly bilabiate; upper lip erect and concave, 2-lobed at apex; lower reflexed and 3-parted: peduncles and pedicels mostly slender.

P. barbatus, Nutt. Usually tall, 2 to 6 feet high: leaves lanceolate or the upper linear-lanceolate; the lowest and radical oblong or ovate: sepals ovate: corolla inch long, from light pink-red to carmine; base of the lower lip or throat usually bearded with long and loose or sparse yellowish hairs: anthers even in the bud divergent, soon divaricate. — Gen. ii. 53; Benth. l. c.; Lindl. Bot. Reg. xxv. t. 21, flesh-colored variety; Gray, Proc. Am. Acad. vi. 59. *Chelone barbata*, Cav. Ic. iii. 22, t. 242; Bot. Reg. t. 116. *C. ruellioides*, Andr. Bot. Rep. t. 34. *Elmigeria barbata*, Reichenb. in Steud. Nom. — Mountains of Colorado and New Mexico; and commonly cult. (Mex.)

Var. Torreya, Gray, l. c. (*P. Torreya*, Benth. in DC. Prodr. l. c.), a tall and usually deep scarlet-red-flowered form, with few or no hairs in the throat; but in cultivated and even in wild specimens the distinction vanishes. — W. borders of Texas to Colorado and New Mexico.

Var. puberulus, Gray in Bot. Mex. Bound. 114, is pruinose-puberulent, otherwise like the preceding. — Guadalupe Cañon, Arizona, *Thurber*.

Var. trichander, Gray, is also like a low form of var. *Torreya*, except that anthers are beset with long woolly hairs! — Proc. Am. Acad. xi. 94. — S. W. Colorado, *Brandege*.

Var. labrosus, Gray. A low and narrow-leaved form, with almost simply racemose flowers: corolla apparently red with a yellowish tube; the lips remarkably long (6

to 8 lines), the lobes of the lower very narrow. — Bot. Calif. i. 622. — S. E. California; on Mt. Pinos, Kern Co. at 7,000 feet, *Rothrock*. San Bernardino Co., *Parry & Lemmon*.

Var. WISLIZENI, Gray, Proc. Am. Acad. vi. 59 (*P. coccineus*, Engelm. in Mem. Wisliz. 107), known only from Chihuahua, Mexico, is between *P. barbatus* and *P. imberbis*, having nearly the corolla of the latter, with the early divaricate anthers of the former.

+ + Corolla obscurely bilabiate and the lobes hardly spreading: peduncles and pedicels short.

P. Eatóni, Gray. A foot or two high, hardly glaucescent: leaves from lanceolate to ovate; the upper partly clasping: thyrsus virgate and strict, simple; the peduncles very short, 1-3-flowered, and pedicels seldom much longer than the ovate-lanceolate sepals: corolla an inch long, bright carmine-red, tubular, hardly enlarged at the naked throat; its broadly oval lobes (2 lines long) all nearly alike except that the two of the upper lip are united higher: anther-cells usually (but not always) early divergent or divaricate, dehiscent for only three-fourths their length: sterile filament sometimes minutely bearded at the apex. — Proc. Am. Acad. viii. 395, & Bot. Calif. i. 560, but flowers in Wallace's collection, mistakenly referred to it, are of *P. Clevelandi*. *P. centranthifolius*, Watson, Bot. King, 219, not Benth. — Dry banks and cañons, Walsatch Mountains, Utah, to S. Nevada and Arizona. Intermediate in aspect between *P. barbatus* and *P. centranthifolius*.

* * * * * (SPECIOSI.) Anthers with the diverging or divaricate and distinct cells dehiscent from base nearly or quite to, but not confluent through, the apex, not peltately expanate after dehiscence, either glabrous, hirsute, or rarely long-pilose: herbs with simple stems and closely sessile mostly very glabrous (rarely puberulent) entire cauline leaves: inflorescence never glandular-pubescent or viscid: flowers showy: corolla blue or violet, ventricose-ampliate above; the lobes of the moderately or slightly bilabiate limb roundish and equally spreading.

+ Corolla two-thirds to three-fourths inch long, funnelform, little ventricose.

P. Fremónti, Torr. & Gray. A span or more high, minutely and densely pruinose-pubescent: cauline leaves lanceolate or the lowest (like the radical) spatulate: thyrsus spiciform, virgate, rather densely flowered: peduncles and pedicels very short: sepals oblong-ovate, acute, with irregular scarious margins: corolla very obscurely bilabiate; the lobes 2 lines long: anthers hirsute: sterile filament with dilated bearded apex. — Proc. Am. Acad. vi. 60. — Utah, "on the Uinta plains," *Fremont*.

Var. subgláber. A span to a foot high, merely puberulent below, glabrous above: upper leaves oblong-lanceolate: sepals conspicuously acuminate. — Idaho (in mountains near Fort Hall, *Burke*), &c.

+ + Corolla an inch to an inch and a half in length, ventricose-ampliate above.

P. strictus, Benth. Glabrous, or minutely pruinose, more or less glaucous: stem slender, virgate, 6 to 20 inches high: radical leaves from oval to spatulate; cauline narrowly lanceolate or linear; floral reduced to small subulate bracts of the elongated narrow and loose thyrsus: peduncles and pedicels commonly slender: sepals ovate or oval, obtuse, not over 2 lines long, barely half the length of the narrow proper tube of the violet-purple or blue (about inch long) corolla; the throat of which is strongly ampliate: anthers either thickly or sparsely comose with very long flexuous hairs: sterile filament naked or with some similar slender hairs. — DC. Prodr. x. 324. *P. comarrhenus*, Gray, Proc. Am. Acad. xii. 81. — Rocky Mountains of W. Wyoming to those of S. W. Utah. The original specimen (*Fremont*) is strict, with the inflorescence imperfectly developed, and no good corolla extant, the cauline leaves 2 or 3 inches long and 2 lines broad. The long and soft, but rather coarse hairs of the anther are not rarely a line and a half in length.

P. gláber, Pursh. Glaucous or glaucescent and very glabrous: stems ascending or erect, a foot or two high: leaves mostly oblong-lanceolate or the upper ovate-lanceolate: thyrsus elongated and many-flowered: peduncles and pedicels short, commonly very short: sepals from orbicular-ovate and merely acute to ovate-lanceolate or strongly acuminate from a broadish base: corolla (1 to 1½ inches long) bright blue to violet-purple: anthers (and also the apex of sterile filament) from glabrous to sparsely hirsute; the cells dehiscent to or very near their apex. — Fl. ii. 728, & Bot. Mag. t. 1672, &c., under the form *P. glabra*. *P. erianthera*, Nutt. in Fras. Cat. & Gen. ii. 53, not Pursh. *P. Gordonii*, Hook. Bot. Mag. t. 4319. *P. speciosus*, Dougl. in Lindl. Bot. Reg. t. 1720; Brit. Fl. Gard. ser. 2, t. 259; a narrower-leaved form, with anthers and sterile filament commonly naked. *P. Kingii*, var. *glauca*, Kellogg in Proc. Calif. Acad. v. 39. — Plains of the Upper Missouri, in Nebraska and Dakota, to Colorado and Arizona, and west to the Sierra Nevada in California, and Oregon. — The following are extreme forms.

Var. alpinus, Gray. A span high: cauline leaves from narrowly to broadly lanceolate: thyrsus abbreviated and few-flowered. — *P. alpinus*, Torr. in Ann. Lye. N. Y. i. 35. — Alpine region of the Rocky Mountains, from the Yellowstone to Pike's Peak.

Var. Utahensis, Watson. Stems a foot or two high, strict and slender (sometimes pruinose-puberulent): cauline leaves lanceolate, or even linear lanceolate, the lower tapering to the base: thyrsus virgate: sepals either narrower or much acuminate: sterile filament and usually the anthers hirsute. — Bot. King, 217. — Utah to Arizona and the borders of California, passing into the *P. speciosus*, Dougl., and the lower forms into the preceding variety.

Var. cyananthus, Gray. Usually tall and less glaucescent: leaves all broad; the cauline ovate or subcordate and ovate-lanceolate: thyrsus dense: sepals much acuminate or narrow: corolla bright blue: anthers and sterile filament from hirsute to nearly glabrous. — Proc. Am. Acad. vi. 60. *P. cyananthus*, Hook. Bot. Mag. t. 4464; Watson, Bot. King, l. c. — Rocky Mountains, Wyoming and Colorado to the Wahsatch in Utah. Seems very distinct, but passes into *P. glaber*.

P. Wárdi, Gray. Low, a span or more high, minutely and densely cinereous-pubescent: leaves thick, oblong or the upper oblong-lanceolate: corolla externally pale and sparsely puberulent: anthers cartilaginous; the cells dehiscent from the acutish base upward for little more than three-fourths of their length, glabrous: sterile filament also glabrous: otherwise like the preceding, of which it may be only a variety. — Proc. Am. Acad. xii. 82. — Glenwood, Utah, *L. F. Ward*.

* * * * * (GENUINI.) Anthers dehiscent from base to apex and through the junction of the two cells, glabrous (or merely hirtello-ciliate at lines of dehiscence), open after dehiscence, usually explanate in age, in the greater number confluent 1-celled: herbs, or rarely suffrutescent at base; the species of the first following subdivision approaching the preceding.

+ Glabrous throughout (or rarely minutely pruinose-puberulent or glandular) even to pedicels and calyx: leaves all entire, from linear to ovate, glaucous or pale: stems simple and erect: thyrsus virgate or contracted, with short or hardly any peduncles: five lobes of the corolla plane: anthers of cartilaginous or coriaceous texture.

++ Corolla less than an inch long, lilac or mauve-purple, or verging to violet, abruptly campanulate-inflated, and the broad rather strongly bilabiate limb widely spreading or open.

P. secundiflorus, Benth. A foot or two high, including the elongated and racemiform strict many-flowered thyrsus: cauline leaves narrowly lanceolate (2 or 3 inches long and lines wide); radical spatulate: peduncles 1-3-flowered: sepals ovate or oblong, acute or obtuse, with somewhat scarious but entire margins: corolla with narrow proper tube of nearly twice the length of the calyx, abruptly dilated into the broadly campanulate throat of about one-third inch in height and width; this nearly equalled by the widely spreading lips; the lobes round-oval: sterile filament glabrous or minutely bearded at the dilated tip. — Prodr. x. 324. — Mountains of Colorado, common at 8 or 9,000 feet. A well-marked and beautiful species.

P. Hallii, Gray. Allied to the foregoing, only a span or so high: leaves thickish, linear and linear-spatulate, or the lowest rather broader, obtuse: thyrsus short and more spiciform, 5-15-flowered, obscurely viscid: sepals broadly ovate and with widely scarious erose margins: corolla 7 to 10 lines long, broadly campanulate-inflated from a thickish and inconspicuous proper tube which is shorter than the calyx; bilabiate limb rather short: sterile filament short-bearded from the apex downward. — Proc. Am. Acad. vi. 71. — Colorado Rocky Mountains, at 10-12,000 feet (common on Gray's Peak), *Hall & Harbour, Parry, Greene, &c.*

Var. Arizonicus. An ambiguous form, almost a foot high, with flowers apparently intermediate between those of *P. Hallii* and *P. secundiflorus*, and sterile filament of the latter; but corolla lips shorter than the less abruptly expanded portion. — Mount Graham, Arizona, at 9,250 feet, *Rothrock*.

++ ++ Corolla two-thirds or three-fourths inch long, from blue to lilac: the tube gradually and moderately dilated into the funnelliform throat; lobes of the obscurely bilabiate 5-parted limb short and widely spreading. (See also *P. confertus, Watsoni, &c.*, which, being glabrous and entire-leaved, might be referred here.)

P. acuminatus, Dougl. Glaucous, 6 to 20 inches high, generally stout and rigid, leafy: leaves coriaceous, somewhat cartilaginous-margined; radical and lowest cauline obovate or oblong; upper cauline from lanceolate to broadly ovate, or the upper cordate-clasping, these mostly acute or acuminate: thyrsus strict, interrupted, leafy below, naked above;

the clusters several-flowered, and peduncles and pedicels mostly very short: sepals ovate and acute or lanceolate: corolla lilac or changing to violet; the limb half or two-thirds inch in diameter: sterile filament mostly bearded at the dilated tip: capsule firm-coriaceous and acuminate. — Lindl. Bot. Reg. t. 1285; Hook. Fl. ii. 97; Benth. in DC. l. c.; Gray, Proc. Am. Acad. vi. 61 (excl. syn. *P. secundiflorus*), & Bot. Calif. i. 559. *P. nitidus*, Dougl. ex Benth. in DC. l. c. *P. Fendleri*, Gray in Pacif. R. Rep. ii. 168, t. 5, & Bot. Mex. Bound. 114, excl. syn. — Plains of the Saskatchewan and Upper Missouri to the interior of Oregon, and south to Nevada, New Mexico, and the western borders of Texas. (Adjacent Mex.) Seems to pass into

P. cærúleus, Nutt. Low: leaves (even the radical) all from lanceolate to narrowly linear (often 3 inches long and only a line or two wide): thyrsus spiciform and usually dense: sepals lanceolate-acuminate: corolla blue, varying occasionally to rose-lilac or white: sterile filament much bearded above. — Gen. ii. 52; Benth. in DC. l. c.; Gray, l. c. *P. angustifolius*, Nutt. in Fras. Cat.; Pursh, Fl. ii. 738. — Plains of Dakota and Montana to Colorado at the base of the mountains.

++ ++ ++ Corolla an inch or less long, red, tubular or funnellform, hardly bilabiate; the roundish or short-oblong lobes all alike, except that the two upper are rather more united: sepals ovate or roundish, obtuse or acute: peduncles usually manifest and pedicels slender.

= Sterile filament filiform, naked: corolla narrow-tubular, deep scarlet; lobes short, little spreading.

P. centranthifolius, Benth. Very glaucous: stem strict, leafy, 1 to 3 feet high: leaves thick, from ovate-lanceolate or the lowest oblong to lanceolate-linear, the upper with subcordate-clasping base: thyrsus virgate, elongated: corolla fully an inch long; the lobes (2 lines long) hardly longer than the width of the orifice. — Scroph. Ind. & Prodr. l. c.; Hook. Bot. Mag. t. 5142; Gray, l. c. *Chelone centranthifolia*, Benth. in Hort. Trans.; Lindl. Bot. Reg. t. 1737. — Open grounds, California, from Monterey southward, and W. Arizona.

= = Sterile filament dilated at tip and retrorsely bearded round one side: corolla funnellform, and with rather large and rounded widely spreading lobes.

P. puniceus, Gray. Very glaucous: stem stout, "1 to 6 feet high," sparsely leafy: leaves thick, oblong or the lowest obovate and the uppermost ovate, sometimes connate-perfoliate: thyrsus virgate, interrupted, many-flowered: corolla almost an inch long, narrowly funnellform, "brilliant scarlet;" the limb two-thirds inch in diameter. — Bot. Mex. Bound. 113, & Proc. l. c. — Guadalupe Cañon, Arizona, *Thurber, E. K. Smith*.

P. Parryi. Less glaucous: stem virgate, a foot or two high: leaves from oblong to narrowly lanceolate; the upper with auriculate or roundish partly clasping base; radical oblanceolate or spatulate: racemiform thyrsus more simple and fewer-flowered: corolla narrowly funnellform, half to three-fourths inch long, "bright pink" or cherry-red; the limb half inch in diameter. — *P. puniceus*, var.? *Parryi*, Gray, Bot. Mex. Bound. l. c. — Western Arizona, *Parry, Palmer, Greene*. Southern Nevada, *Miss Searls, Palmer*. Southern Utah, *Parry*. Some specimens of this have been referred to the preceding, some to the following species.

P. Wrightii, Hook. Pale and somewhat glaucous or glaucescent: stems rather stout, a foot or two high: leaves oblong or the lowest obovate (2 to 4 inches long, an inch or so wide); upper cauline partly clasping by a roundish base: thyrsus virgate and elongated, loosely flowered: sepals when in bloom with spreading tips: corolla bright rose-color, about three-fourths inch long and with ampliate throat, the expanded limb three-fourths inch in diameter. — Bot. Mag. t. 4601 (corolla too deep red), Gray, l. c.; Fl. Serres, vii. t. 685. — W. Texas and New Mexico, *Wright, &c.*

++ ++ ++ ++ Corolla showy, inch and a half or more in length, ventricose-funnelform, somewhat bilabiate, the upper lip rather smaller: sterile filament hooked at apex: sepals ovate or oblong-lanceolate, barely acute: thyrsus virgate, with hardly any common peduncles to the few-flowered clusters: leaves glaucous, thickish, broad; the upper and the floral rounded, all but the obovate radical ones clasping or perfoliate: stem 2 to 4 feet high.

P. grandiflorus, Nutt. Leaves all distinct at base: pedicels short: corolla lilac or lavender-blue, abruptly ventricose above the proper tube, which exceeds the calyx: sterile filament minutely pubescent at the dilated apex. — Fras. Cat. & Gen. l. c.; Benth. l. c.; Gray, l. c. *P. Bradburii*, Pursh, Fl. ii. 738. — Prairies, from Wisconsin, Minnesota, and Illinois to Nebraska and Kansas. Capsule almost an inch long.

P. Murrayanus, Hook. Cauline leaves connate-clasping, and all the upper pairs united into an oval or orbicular concave disk: pedicels slender: corolla deep scarlet, gradually widening upward; the lobes rather small: sterile filament wholly glabrous. — Bot. Mag. t. 3472; Gray, l. c. — Prairies of E. Texas, collected first by *Berlandier*, then by *Drummond*, &c.

+ + Glabrous and glandless throughout, even to the calyx: leaves oblong or ovate, rigid, glaucescent, very acutely and as it were spinulose-dentate or denticulate with salient teeth: cymes of the open elongated thyrsus pedunculate: flowers ample and showy; the corolla an inch long: sepals ovate, short.

P. spectabilis, Thurber. Pale or glaucescent, 2 to 4 feet high: leaves thinnish-coriaceous, ovate or ovate-lanceolate or the lower oblong, acute; the upper pairs acuminate and their broad bases connate-perfoliate: thyrsus many-flowered, elongated-pyramidal or sometimes virgate, a foot or two long: peduncles and pedicels slender (half inch or more long): corolla rose-purple or lilac with the ample limb usually violet or blue, a full inch long, with narrow proper tube twice the length of the calyx, then abruptly dilated into the campanulate-ventricose or broadly funnelform throat, moderately bilabiate; the oval or roundish plane lobes 3 or 4 lines long: sterile filament glabrous. — Gray in *Pacif. R. Rep.* iv. 19, & *Bot. Mex. Bound.* 113; Hook. *Bot. Mag.* t. 5260. — Dry hills and plains, S. California (from San Gabriel) to Arizona and New Mexico.

P. Cleavelandi, Gray. Resembling the preceding in foliage and growth: but leaves less broad at base and commonly distinct, sometimes connate-perfoliate; the lower on naked petioles: thyrsus smaller and virgate: corolla crimson, three-fourths to a full inch long, much narrower, tubular-funnelform; its lobes $1\frac{1}{2}$ or 2 lines long: sterile filament moderately bearded above on one side. — *Proc. Am. Acad.* xi. 94 & *Bot. Calif.* i. 559. — S. E. California, San Diego Co., *Cleveland, Palmer*, and San Bernardino Co., at Cucamonga, long ago collected (panicles only) by *Wallace*, and now near San Bernardino, by *Parry & Lemmon*. (Adjacent Mex.)

+ + + Very glabrous up to the loose elongated inflorescence and ovate appressed sepals: leaves coriaceous, glaucous, ovate or oblong-lanceolate, mostly spinulose-dentate: corolla abruptly much enlarged and remarkably wide.

P. Palmeri, Gray. Stems 2 or 3 feet high: leaves $1\frac{1}{2}$ to 4 inches long; the lower petioled; upper from closely sessile to completely connate-perfoliate, and from very sharply dentate or denticulate to nearly entire: thyrsus pyramidal-racemiform, glandular or pruinose-puberulent: lower peduncles 2-3-flowered, as long as the pedicels: corolla cream-white and usually suffused or parti-colored with pink; the short narrow proper tube hardly surpassing the calyx, very abruptly dilated into the ventricose-campanulate throat of about three-fourths inch in length and width at orifice; the lips broad; the upper erectish and 2-lobed; lower 3-parted, widely spreading, sparingly bearded at base: sterile filament long- and densely (yellow-) bearded above. — *Proc. Am. Acad.* vii. 378, & viii. 291; *Watson, Bot. King*, 220; Hook. f. *Bot. Mag.* t. 6064 (very highly colored). — Arizona and S. Utah to W. Nevada and S. E. California.

+ + + Puberulent or pubescent and above viscid or glandular: leaves from ovate to lanceolate-linear: thyrsus racemiform: corolla ample, purplish; its proper tube little if any longer than the lanceolate sepals, abruptly dilated into the ventricose-campanulate or broadly funnelform throat; the spreading limb obscurely bilabiate: sterile filament more or less long-bearded.

++ Corolla commonly 2 inches long: thyrsus lax and short: stem about a foot high: leaves large and broad, most of them acutely denticulate or serrate.

P. Cobæa, Nutt. Soft-puberulent: leaves ovate or oblong, or the lower broadly lanceolate and the upper subcordate-clasping (2 to 4 inches long): corolla abruptly campanulate-ventricose above the narrow tube, from dull reddish purple to whitish, glabrous within: slender sterile filament sparsely bearded. — *Trans. Am. Phil. Soc.* n. ser. v. 182; Hook. *Bot. Mag.* t. 3465. — Prairies, Kansas to Texas.

++ ++ Corolla about an inch long: thyrsus strict, leafy below: stems a span or two high: leaves narrower, mostly entire, or the margins undulate.

P. Jamésii, Benth. Pruinoso-puberulent: leaves all narrowly or linear-lanceolate ($1\frac{1}{2}$ to $3\frac{1}{2}$ inches long): corolla abruptly dilated into a broadly cyathiform-campanulate throat, a little hairy within: sterile filament moderately bearded. — *DC. Prodr.* x. 325; Gray, *Proc. Am. Acad.* vi. 67. *P. albidus*, in part, *Torr. in Ann. Lye. N. Y.* ii. 229, not Nutt. — Prairies, &c., S. Colorado, New Mexico, and W. Texas.

P. cristátus, Nutt. Pubescent, or above viscid-villous: leaves from linear-lanceolate to narrowly oblong (1 to 3 inches long): corolla more funnelform, being less abruptly dilated upward; its lower lip long-villous within: sterile filament more exerted, inordinately yellow-bearded. — *Fras. Cat. & Gen.* ii. 52; *Benth. l. c.* *P. erianthera*, Pursh, *Fl.* ii. 737, excl. syn., not Nutt. — Plains, &c., Dakota to Nevada and S. Colorado.

+ + + + + Pruinose-puberulent and glandular or nearly glabrous: leaves all linear and entire, narrow at base: corolla large, nearly inch and a half long, funnelform, purple or violet, very obscurely bilabiate; the rounded lobes 2 or 3 lines long: sterile filament wholly glabrous: inflorescence very loose, sometimes simply racemose: sepals ovate or oblong.

P. dasypkýllus, Gray. A foot high, simple, densely puberulent, and the few-flowered simply racemose inflorescence glandular: pedicels alternate, bracteolate only at base: leaves 3 or 4 inches long, 2 or 3 lines wide (rarely shorter and wider); uppermost reduced to subulate bracts: sepals hardly acute. — *Bot. Mex. Bound.* 112, & *Proc.* l. c. — Eastern Arizona and New Mexico.

P. stenophýllus, Gray, l. c. Glabrous or obscurely puberulent, 2 or 3 feet high: leaves 3 or 4 inches long and the larger only 2 lines wide, attenuate-acute; the uppermost and floral nearly filiform: thyrsus loosely paniculate: peduncles and pedicels slender: sepals acuminate. — Southern Arizona, *Wright.* (Adjacent Mex., *Wislizenus.*)

P. LANCEOLÁTUS, Benth., of Mexico, may reach our borders. It is minutely puberulent, has leaves mostly broader at base, racemose but not quite simple inflorescence, and a "red" corolla barely an inch long.

+ + + + + Puberulent, or viscid-pubescent, at least the inflorescence, or sometimes glabrous: leaves various: corolla from an inch down to 4 lines long, not abruptly campanulate-ventricose above, except in *P. lewigatus*: sepals usually narrow or acuminate.

++ Leaves from ovate to lanceolate, or the upper cauline when narrower widest at base, undivided: stems erect or ascending: thyrsus mostly many-flowered.

== Sterile filament bearded along one side, at least toward the apex.

a. Corolla hardly at all bilabiate, funnelform, with proportionally rather ample and nearly equal spreading lobes, white or whitish, often with a tinge of purple, two-thirds or three-fourths inch long and the limb about as broad: sterile filament thinly short-bearded: leaves entire or barely and sparingly denticulate: thyrsus strict and verticillastriform-interrupted.

P. tubifórus, Nutt. Wholly glabrous: stem 2 or 3 feet high, strict, naked above: leaves oblong or ovate-lanceolate; the floral shorter than the remote and densely-flowered clusters of the much interrupted virgate thyrsus: sepals ovate, merely viscid, only 2 lines long, very short in proportion to the rather slender tube of the corolla. — *Trans. Am. Phil. Soc.* ser. 2, v. 181; *Benth. l. c.* — Low prairies, Kansas and Arkansas. Still rare and insufficiently known. Thyrsus a span to a foot long, of several whorl-like clusters.

P. álbíus, Nutt. Viscid-pubescent, 6 to 10 inches high: leaves oblong-lanceolate or narrow: thyrsus strict, leafy below, of approximate few-several-flowered clusters: sepals lanceolate, densely viscid-pubescent, 3 or 4 lines long: corolla with shorter tube and more cyathiform throat. — *Gen.* ii. 53; *Benth. l. c.* *P. teretiflorus*, Nutt. in *Fras. Cat.* *P. viscidulum*, Nees in *Neuwied Trav.* app. 18. — Plains, Dakota to Colorado and Texas.

b. Corolla more manifestly bilabiate; lower lip usually somewhat bearded or pubescent within.

1. Leaves ovate, all or most of them serrate: corolla bright blue or changing to purple, rather narrow, half or two-thirds inch long.

P. pruinósus, Dougl. Stem a foot high, pubescent: leaves from ovate to oblong, glaucescent, an inch or two long; the radical and lowest and also uppermost cauline commonly entire; the others acutely and rigidly dentate or denticulate: thyrsus virgate, interrupted: peduncles (several-flowered) and pedicels short; these and the lanceolate attenuate-acuminate sepals viscidly villous: lower lip of the deep blue corolla slightly hairy within. — *Lindl. Bot. Reg.* t. 1280; *Benth. l. c.* — Interior of Oregon and Washington Territory, *Douglas, Lyall.* Little known.

P. ovátus, Dougl. Stem 2 to 4 feet high, puberulent or pubescent: leaves ovate and the upper subcordate-clasping, all acutely serrate (or the radical rarely entire), bright green: thyrsus looser; the lower peduncles often longer than the clusters: sepals ovate or oblong, barely acute, glandular: lower lip of the purple-blue corolla bearded in the throat. — *Hook. Bot. Mag.* t. 2903; *Brit. Fl. Gard.* ser. 2, t. 211; *Benth. l. c.* — Woods and banks, Oregon to Brit. Columbia and the western part of Idaho.

2. Leaves from oblong or ovate-lanceolate to lanceolate, entire, or some denticulate, glabrous: corolla from a third to two-thirds of an inch in length.

P. attenuátus, Dougl. Stem strict, a foot or two high; the summit and inflorescence more or less pubescent and viscid: leaves narrowly oblong to lanceolate, or the upper sometimes ovate-lanceolate: thyrsus of the next species or less compact: sepals ovate to oblong-lanceolate, acute or acuminate, narrowly scarious-margined, as long as the capsule: corolla narrowly funnelform, over half inch long, ochroleucous, sulphur-yellow, or sometimes violet or blue. — Lindl. Bot. Reg. t. 1295; Hook. Fl. ii. 97; Benth. l. c. — Interior of Oregon, Idaho, &c. No indigenous specimens yet seen accord with the figure, in robustness, upper cauline leaves ovate-lanceolate and inch wide, and corolla 9 lines (or according to Bentham 9 to 11 lines) long. The plants referred here verge to the next, but have longer corolla, 6 or 8 lines long. The species is still uncertain.

P. confértus, Dougl. Glabrous throughout, or the inflorescence and calyx sometimes viscid-pubescent or puberulent, a foot or two high: leaves from oblong or oblong-lanceolate to somewhat linear, usually quite entire: thyrsus spiciform, interrupted, naked, of 2 to 5 verticillastriform dense many-flowered clusters (either subsessile or the lower peduncled): pedicels very short: sepals from oblong-lanceolate to broadly ovate, with broad scarious margins commonly erose or lacerate, rather shorter than the capsule: corolla narrow, 4 to 5 or rarely 6 lines long, in the typical forms from ochroleucous to sulphur-color; lower lip conspicuously bearded within. — Lindl. Bot. Reg. t. 1260; Hook. l. c.; Benth. l. c.; Gray, Proc. Am. Acad. vi. 72. — Moist or dry grounds, Northern Rocky Mountains to Oregon. The commoner state is

Var. cæruleo-purpúreus, Gray, l. c. A foot or two high, rarely more, or in the higher mountains from 10 down to 2 inches high; the latter with capituliform inflorescence: sepals very variable, commonly very scarious and erose, sometimes with a long herbaceous acumination: corolla blue-purple and violet. — *P. procerus*, Dougl. ex Graham in Edinb. Phil. Jour. 1829; Hook. Bot. Mag. t. 2954; Lodd. Bot. Cab. t. 1616; Benth. l. c. *P. Tolmiei*, Hook. Fl. ii. 97. *P. micranthus*, Nutt. in Jour. Acad. Philad. vii. 45. — Saskatchewan and along the Rocky Mountains to Colorado, west to Oregon and through the whole length of the Sierra Nevada, California.

P. Watsóni. Glaucous and glabrous throughout, or inflorescence and calyx minutely puberulent, but neither glandular nor viscid: stems a foot or more high, ascending or weak: cauline leaves oblong-lanceolate to ovate-lanceolate, acute or acuminate (1 to 2 inches long, 4 to 9 lines wide): contracted thyrsus rather loose: peduncles several-flowered; the lower slender: pedicels longer than the calyx: sepals broadly ovate or orbicular with a small acumination, somewhat scarious-margined, little over a line long, barely half the length of the mature capsule: corolla narrowly funnelform, 6 to 8 lines long, violet-purple or partly white; lower lip almost glabrous within. — *P. Fremonti*, var. *Parryi*, Gray ex Watson, Bot. King, 218. — Mountains of W. Colorado, Utah, and Nevada (*Fremont, Parry, Watson, Wheeler, Vasey, Ward, &c.*), to borders of Arizona, *Palmer*.

P. húmilis, Nutt. Stems a span or two high, glabrous or above with the inflorescence and flowers viscid-pubescent: leaves glaucous, from oblong to lanceolate (an inch or more long); the cauline commonly denticulate: thyrsus strict and virgate, 2 to 4 inches long: peduncles (2-5-flowered) and pedicels short: sepals ovate or lanceolate and acuminate, lax: corolla rather narrowly funnelform, half inch long, deep-blue or partly white; lower lip somewhat hairy within. — Gray, Proc. l. c.; Watson, Bot. King, 220. — Rocky Mountains from the British boundary to S. Colorado, and west to the Humboldt Mountains in Nevada. The larger forms may pass into *P. gracilis*.

Var. brevifólius. A low and rather diffuse tufted form, with weak stems: leaves at most half inch in length; cauline elliptical-oblong; the radical oval or rotund: corolla light blue. — *P. humilis*, var. ? Watson, l. c. — Utah, in the Wahsatch Mountains, at 9,000 or 10,000 feet, *Watson, Eaton*.

3. Leaves from ovate-lanceolate to linear, often denticulate: corolla an inch or three-fourths inch long: cymes of the more or less open thyrsus pedunculate: sepals lanceolate, acute, marginless.

P. grácilis, Nutt. A foot or less high, glabrous or merely puberulent up to the more or less viscid-pubescent strict thyrsus: stems slender: cauline leaves mostly linear-lanceolate (1 to 3 inches long, the serrations when present very acute or subulate); the radical spatulate or oblong: peduncles 2-several-flowered: corolla tubular-funnelform or almost cylin-

draceous, lilac-purple or sometimes whitish, three-fourths to nearly an inch long; the throat open. — Gen. ii. 52; Graham in Bot. Mag. t. 2945; Lodd. Bot. Cab. t. 1541; Benth. l. c. *P. pubescens*, var. *gracilis*, Gray, Proc. l. c. partly. — Saskatchewan to Wyoming, and south in the mountains to Colorado. Intermediate between the preceding and following: distinguished from slender forms of the latter by the open mouth and nearly terete throat of the narrow corolla.

P. pubescens, Solander. Stem a foot or two high, viscid-pubescent, or sometimes glabrous up to the inflorescence: cauline leaves from oblong to lanceolate (2 to 4 inches long), usually denticulate; the lowest and radical ovate or oblong: thyrsus loosely-flowered, mostly naked, narrow: flowers drooping: corolla dull violet or purple, or partly whitish, an inch long, very moderately dilated above the short proper tube, carinate-angled for the whole length of the upper and deeply plicate-bisulcate on the lower side, the upper part of the intrusive portion villous-bearded and forming a sort of palate; orifice crescentic or almost closed; the lips and their lobes short: sterile filament densely bearded far down. — Ait. Kew. ii. 360; Sims, Bot. Mag. t. 1424; Gray, l. c. excl. syn. *P. lævigatus*. *Chelone hirsuta*, L. *C. Pentstemon*, L. Mant. 415. *Asarina caule erecto*, &c., Mill. Ic. t. 152. *Pentstemon hirsutus*, Willd. Spec. iii. 227. *P. Mackayanus*, Knowles in Fl. Cab. ii. 117, t. 74. *P. longifolius*, Scheele in Linn. xxi. 764? — Dry or rocky grounds, from Canada to Iowa and south to Florida and Texas.

P. lævigatus, Solander, l. c. Mostly glabrous up to the glandular inflorescence: stem 2 to 4 feet high: leaves of firmer texture and somewhat glossy; cauline ovate- or oblong-lanceolate with subcordate-clasping base, 2 to 5 inches long: thyrsus broader: corolla about an inch long, white and commonly tinged with purple, abruptly campanulate-inflated above the proper tube, more or less obliquely ventricose, obscurely angled down the upper side, not at all intruded on the lower; orifice widely ringent, sparingly slender-bearded at base of the lower lip: sterile filament thinly bearded above. — Sims, Bot. Mag. t. 1425; Michx. Fl. ii. 21; Pursh, Fl. ii. 427. *Chelone Pentstemon*, L. Spec. ed. 2, 850, excl. syn. Arduin, Moris. &c.; Lam. Ill. t. 528. *P. pubescens*, var. *multiflorus*, Benth. in DC. l. c. (*P. Digitalis*, var. *multiflorus*, Chapm.); a small-flowered and small-fruited form, answering to the figure by Lam. *P. glaucophyllus*, Scheele in Linn. xxi. 763? — Moist or rich soil, Penn. to Florida and westward, where the commoner form is.

Var. Digitalis. Stem sometimes 5 feet high: corolla larger and more abruptly inflated, white. — *P. Digitalis*, Nutt. in Trans. Am. Phil. Soc. n. ser. v. 181; Reichenb. Exot. v. t. 292; Hook. Bot. Mag. t. 2587; Benth. in DC. l. c. 327; Gray, Man. ed. 5, 328. *Chelone Digitalis*, Sweet, Brit. Fl. Gard. t. 120. Penn. to Illinois, Arkansas, &c.

P. glaucus, Graham. Glabrous up to the inflorescence, more or less glaucous: stems dwarf or ascending, a span to a foot high: leaves thickish, oblong-lanceolate or the radical oblong-ovate (one or two inches long), entire or denticulate: thyrsus short and compact, either simple or compound, villous-pubescent and viscid or glandular: corolla dull lilac or violet-purple, less than an inch long, campanulate-ventricose above the very short proper tube, gibbous, not at all plicate-sulcate; the orifice widely ringent; the broad lower lip sparsely villous-bearded within: sterile filament bearded mostly at and near the apex only. — Edinb. Phil. Jour. 1829, 348; Lindl. Bot. Reg. t. 1286; Gray, Proc. l. c. *P. glaber*, var. *stenosépalus*, Regel in Act. Petrop. iii. 121? — Rocky Mountains north of 49° (*Drummond*) to Wyoming and Utah; southward, chiefly in the form of

Var. stenosépalus, Gray, l. c. Sometimes over a foot high: thyrsus comparatively small and glomerate: sepals attenuate-lanceolate: corolla dull whitish or purplish. — Mountains of Colorado and Utah near the upper borders of the wooded region.

== Sterile filament beardless (rarely with a few minute short hairs), sometimes completely antheriferous in certain flowers.

P. Whippleanus, Gray. Glabrous up to the inflorescence or nearly so: stems slender, a foot long, ascending from a decumbent base, leafy: leaves membranaceous, ovate or ovate-oblong, entire or repand-denticulate, acute or acuminate, commonly 2 inches long; lower petioled; upper cauline closely sessile or partly clasping by a broad base: thyrsus loosely few-flowered: peduncles 2 to 5, slender, 2-3-flowered: pedicels and the narrowly linear-lanceolate lax and attenuate sepals villous, somewhat viscid: corolla an inch long, campanulate-ventricose above the short proper tube, decidedly bilabiate; the lower lip longer than the nearly erect 2-lobed upper one, sparsely long-bearded within: sterile fila-

ment dilated, uncinatè at tip. — Proc. Am. Acad. vi. 73. — New Mexico, Sandia Mountains, *Bigelow*. Corolla in size and shape, and probably color, resembling that of *P. glaucus*.

P. deustus, Dougl. Completely glabrous; the calyx at most obscurely granular-pruinose or glandular: stems a span to a foot high in tufts from a woody base, rigid: leaves coriaceous, from ovate to oblong-linear or lanceolate (an inch or two long), irregularly and rigidly dentate or acutely serrate, or some of them entire; upper cauline closely sessile: thyrsus virgate or more paniculate, mostly many-flowered: peduncles and pedicels short: sepals from ovate to lanceolate, nearly marginless: corolla ochroleucous or dull white, rarely with a tinge of purple, half inch or less long, either narrowly or rather broadly funnelform; the short lobes widely spreading. — Lindl. Bot. Reg. t. 1318; Benth. l. c.; Gray, l. c., & Bot. Calif. i. 559; Watson, Bot. King, 222, who has seen the "filament bearded with yellow hairs." *P. heterander*, Torr. & Gray, Pacif. R. Rep. ii. 123, t. 8, a narrow-leaved form having the fifth filament in some flowers antheriferous. — Dry interior region, California, on the eastern side of the Sierra Nevada, and north to the borders of Brit. Columbia and Montana.

P. heterodóxus. A span or more high, leafy, glabrous nearly up to the inflorescence: leaves oval or oblong, obtuse, entire; the cauline closely sessile: thyrsus short, compact, viscid-pubescent: sepals lanceolate: corolla 7 lines long, narrow-tubular, hardly dilated up to the small limb, probably purplish: fifth filament filiform, resembling the others, in some flowers completely antheriferous. — *P. Fremonti*, Gray, Bot. Calif. i. 622, not of Torr. & Gray. — High mountain near Donner Pass, in the Sierra Nevada, California, *Torrey*. Species imperfectly known, from insufficient specimens.

++ ++ Leaves from linear-spatulate to obovate, or the uppermost sometimes ovate, entire: stems low-cespitose or spreading, leafy to summit, often suffrutescent at base, few-flowered: corolla over half inch long, mostly purple or blue, narrowly funnelform: sterile filament bearded down one side.

== Leaves green and mostly glabrous, broad, half to quarter inch wide.

P. Harbóurii, Gray. Tufted nearly simple stems 2 to 4 inches high, puberulent: leaves about 3 pairs, thickish, obovate, oval, or the uppermost sometimes ovate, these sessile by a broad base: thyrsus reduced to 2 or 3 crowded short-pedicelled flowers: sepals ovate-oblong, villous and somewhat viscid: corolla little bilabiate, with rather broad cylindrical throat and tube, barely twice the length of the round-oval lobes; lower lip bearded within. — Proc. Am. Acad. vi. 71. — High alpine region of the Colorado Rocky Mountains, *Hall & Harbour*, *Parry*.

== Leaves cinereous or canescent, a line or two wide: sepals lanceolate: corolla narrowly funnelform, mostly three-fourths inch long: flowering along the short stems in the axils of the leaves: short peduncles leafy-bracteolate, 1-3-flowered.

P. púmilus, Nutt. Canescent (even to the marginless sepals) with a dense and fine short pubescence: stems an inch or two high, erect or ascending, very leafy: leaves lanceolate or the lower spatulate (the latter, including the attenuate base or margined petiole, an inch or more long): corolla with regularly funnelform throat, glabrous within: sterile filament sparsely short-bearded, or more abundantly at the tip. — Jour. Acad. Philad. vii. 46; Gray, l. c. 67. — Rocky Mountains in Montana? "on Little Goddin River," *Wyeth*. A small and few-flowered plant.

Var. Thompsoniæ. Cespitose, from half inch to 4 inches high, suffrutescent at base: stems copiously flowering for their whole length: lowest leaves obovate; upper lanceolate: corolla two-thirds to three-fourths inch long. — S. Utah, *Mrs. Thompson*, *Capt. Bishop* (a dwarf and depressed form), also *Siler*, *Palmer*, a more developed and elongated form, with corolla apparently bright blue.

Var. incánus. A small and very white-hoary form, few-flowered: leaves only 2 or 3 lines long, spatulate and obovate, more mucronate: corolla half inch long, slightly hairy within down the lower side, somewhat as in the next. — Palranagat Mountains, S. E. Nevada, *Miss Searls*. S. W. Utah, *Siler*.

P. cæspitósus, Nutt. Minutely cinereous-puberulent, spreading, forming depressed broad tufts 2 to 4 inches high: leaves from narrowly spatulate to almost linear (3 to 8 lines long, including the tapering base or margined petiole): peduncles mostly secund and horizontal, but with the flower upturned: sepals more acuminate, and the margins below obscurely scarious: corolla tubular-funnelform, and the lower side biplicate, the narrow folds sparsely villous within: sterile filament strongly and densely bearded. — Gray, Proc.

Am. Acad. vi. 66; Watson, Bot. King, 219. — Rocky Mountains, Wyoming, W. Colorado, and Utah, *Nuttall, Hall & Harbour, Parry, Watson.*

Var. suffruticósus. A span or more high from a stouter woody base: leaves from spatulate to obovate and more petioled, thicker, glabrate: sepals less acuminate: corolla and stamens not seen: probably a distinct species. — Utah near Beaver, *Palmer*, in fruit.

++ ++ Leaves from narrowly linear-lanceolate with tapering base or linear-spatulate to filiform, entire: stems or branches racemously several-many-flowered.

= Stem herbaceous to the base, very simple, a foot or two high: corolla broad: sterile filament glabrous: peduncles mostly opposite.

P. virgátus, Gray. Minutely glandular-pruinose or glabrous: stem strict and elongated: thyrsus virgate: leaves all linear-lanceolate ($1\frac{1}{2}$ to 4 inches long): peduncles short, 1-3-flowered: sepals ovate: corolla lilac with purple veins, three-fourths inch long, abruptly dilated into a broadly campanulate funnelform throat (as wide as long), distinctly bilabiate; the broad lips widely spreading: stamens nearly equalling the lips. — Bot. Mex. Bound. 112, & Proc. Am. Acad. vi. 66. — New Mexico and Arizona, *Fendler, Wright, &c.* Inflorescence and corolla in the manner of *P. secundiflorus*.

= = Stems or tufted branches mostly simple from a woody base (or herbaceous in the last species), low: sterile filament longitudinally bearded: short peduncles commonly alternate.

P. linarioides, Gray, l. c. Cinereous, minutely pruinose-puberulent: stems much crowded on the woody base, filiform, rigid, very leafy, 6 to 18 inches high: leaves 6 to 12 lines long, from oblanceolate-linear (at most a line wide) to nearly filiform, mucronulate; the floral short and subulate: thyrsus racemiform or sometimes paniculate; only the lower peduncles 2-4-flowered: pedicel shorter than the ovate or oblong acuminate sepals: corolla lilac or purple, half inch or more long, with dilated-funnelform throat, less bilabiate than in the preceding; lower lip conspicuously bearded at base. — Arid grounds, New Mexico and Arizona, *Wright, Thurber, Parry, &c.*

Var. Sileri. A dwarf and suffruticlose form, with smaller and fewer flowers, mostly 1-flowered peduncles subtended by proportionally longer floral leaves, and the lower lip less bearded. — *P. caespitosus*, var., Parry in Am. Naturalist, ix. 346, a much reduced form. — S. Utah, *Siler, Parry.*

P. Gairdneri, Hook. Cinereous-puberulent: stems a span high, rigid: leaves linear or the lower more or less spatulate, obtuse, half to full inch long: thyrsus short and simple: peduncles usually one-flowered: sepals oblong-ovate, glandular-viscid: corolla half inch long, narrowly funnelform, obscurely bilabiate, purple. — Fl. ii. 99; Gray, l. c. — Dry interior of Washington Terr., Oregon, and W. Nevada.

P. laricifólius, Hook. & Arn. Glabrous: lignescent caudex not rising above the soil: leaves very slender, when dry filiform (the larger a fourth of a line wide, and with margins revolute, an inch or less long), much crowded in subradical tufts and scattered on the (2 or 5 inch long) filiform flowering stems: flowers few, loosely racemose, slender-pedicelled: sepals ovate-lanceolate: corolla tubular-funnelform, half inch long; the small limb obscurely bilabiate. — Bot. Beech. 376; Gray, l. c. — Interior of Oregon and Wyoming.

= = = Stems paniculately branching and slender, woody toward the base: corolla between funnelform and salverform: sterile filament glabrous: peduncles slender, opposite, all the upper one-flowered.

P. ambíguus, Torr. Glabrous, a foot or two high, diffuse and often much branched: leaves filiform, or the lowest linear and the floral slender-subulate: inflorescence loosely paniculate: sepals ovate, acuminate: corolla rose-color and flesh-color turning to white; the rotately expanded limb oblique but obscurely bilabiate; lobes orbicular-oval; throat or its lower side somewhat hairy: sterile filament sometimes imperfectly antheriferous. — Ann. Lyc. N. Y. ii. 228, & Marcy Rep. t. 16; Gray, Proc. Am. Acad. vi. 64. — Plains of E. Colorado and New Mexico to S. Utah and Arizona. (Adjacent Mex.) **Var. foliosus, Benth.** l. c., is an undeveloped state. Corolla in the typical form with a narrow and somewhat curved tube and throat, of half inch in length: but it passes into

Var. Thúrberi, Gray, l. c. (*P. Thurberi*, Torr. in Pacif. R. Rep. vii. 15), with shorter tube and more dilated throat. The two extremes of this have, in the larger forms, limb of corolla half inch in diameter with tube and throat together only 3 lines long (Arizona, *Palmer, &c.*); in the smallest, corolla-limb only half the size, with tube and throat 2 or 3 lines long (Arizona and adjacent Mex., *Wislizenus, Rothrock*). New Mexico, Arizona, and S. Utah.

++ ++ ++ ++ Leaves pinnately parted into narrowly linear divisions!

P. disséctus, Ell. Merely puberulent: stem slender, 2 feet high: leaves in rather distant pairs; radical and lowest not seen; upper with 7 to 11 obtuse entire divisions, of barely half line in width, on a rhachis of equal breadth: thyrsus long-peduncled, umbelliform or triradiate, few-flowered: pedicels slender: sepals ovate-oblong: corolla "purple," 9 lines long; oblong-funnelform; the limb obscurely bilabiate: sterile filament bearded at the apex. — Sk. i. 129; Gray, l. c. — Middle Georgia, "*Jackson*," Darby.

§ 2. **SACCANTHÉRA**, Benth. Anthers sagittate or horseshoe-shaped; the cells confluent at the apex, and there dehiscent by a continuous cleft, which extends down both cells only to the middle; the base remaining closed and saccate, sometimes hirsute, never lanate. Pacific-States species, herbaceous or some rather woody at base, mostly with ample and showy flowers.

* Soft-pubescent and viscid, with broad and thinnish leaves mostly serrate or denticulate.

P. glandulósus, Lindl. Stem rather stout, 2 or 3 feet high: radical leaves ovate or oblong, 6 or 8 inches long, dentate: cauline from cordate-clasping to ovate-lanceolate, acuminate, usually denticulate or few-toothed: thyrsus contracted and interrupted, leafy below: cymes short-pedunculate, few-several-flowered: sepals attenuate-lanceolate, lax: corolla lilac, over an inch long, with funnelform-inflated throat, and rather short broad and spreading lips: sterile filament glabrous. — Bot. Reg. t. 1262; Hook. Bot. Mag. t. 3868; Benth. in DC. Prodr. x. 330; Gray in Proc. Am. Acad. vi. 74. *P. staticifolius*, Lindl. Bot. Reg. t. 1770. — Mountain woods and along streams, Oregon and Washington Terr. to Idaho.

* * Glabrous or merely puberulent: leaves serrate, incisely dentate, or sometimes lacinate: sterile filament more or less hairy above: corolla funnelform and moderately bilabiate, lilac, purple, or light violet,

+ Over an inch long: calyx remarkably small.

P. venústus, Dougl. Very glabrous: stems rather strict and simple, a foot or two high, leafy: leaves thickish in texture, oblong-lanceolate or the upper ovate-lanceolate, closely and subulately serrate (about 2 inches long): thyrsus naked, mostly narrow: peduncles 1-3-flowered: sepals ovate, acute or acuminate, only a line or two long, much shorter than the proper and narrow tube of the corolla: upper part of fertile filaments and of the sterile one (as also usually anthers and lobes of the corolla within) sparsely pilose. — Lindl. Bot. Reg. t. 1309; Benth. l. c.; Gray, l. c. *P. amœnus*, Kunze in Linn. xvi. littbl. 107? — Oregon and Idaho.

+ + Corolla barely or less than an inch long: calyx and pedicels mostly puberulent or viscid-glandular: stems (a foot or two high) ascending or diffuse: thyrsus paniculate.

P. diffusus, Dougl. Leaves from ovate to oblong-lanceolate, or the upper subcordate, sharply and unequally and sometimes laciniately serrate ($1\frac{1}{2}$ to 4 inches long): thyrsus commonly interrupted and leafy: pedicels mostly shorter than the ovate or lanceolate and acuminate (sometimes lacinate-toothed) sepals: corolla three-fourths inch long: anthers glabrous: sterile filament villous-bearded above. — Lindl. Bot. Reg. t. 1132; Hook. Bot. Mag. t. 3645; Gray, l. c. *P. serrulatus*, Menzies in Hook. Fl. ii. 95. *P. argutus*, Paxt. Mag. Bot. vi. 271, appears to be a form of this, connecting with the next species. — Wooded or rocky banks, Oregon to Brit. Columbia.

P. richardsonii, Dougl. Stems often loosely branching: leaves ovate- to narrowly lanceolate in outline, from incisely to lacinate-pinnatifid; the upper commonly alternate or scattered: thyrsus loosely panicled: sepals (ovate or oblong) and pedicels often glandular and viscid: corolla three-fourths to an inch long: sterile filament sparingly villous-bearded at apex. — Lindl. Bot. Reg. t. 1121; Hook. Bot. Mag. t. 3391; Lodd. Bot. Cab. t. 1641. — Bare rocks, &c., Oregon and Washington Terr.

P. triphyllus, Dougl. Stems slender, about a foot high, usually simple: cauline leaves lanceolate or linear (an inch or so long), rigid, from denticulate to irregularly pinnatifid-lacinate; the upper sometimes ternately verticillate, sometimes alternate: thyrsus narrow, loosely paniculate: sepals lanceolate, acuminate: corolla comparatively small and narrow, half to two-thirds inch long: sterile filament densely bearded at apex. — Lindl. Bot. Reg. t. 1245; Benth. in DC. Prodr. l. c. — Rocks, &c., Oregon to British Columbia.

* * * Glabrous or merely puberulent: leaves all entire.

+ Corolla blue or violet, half inch long, slender-funnelform, moderately bilabiate: sterile filament lightly bearded.

P. graciléntus, Gray. Stems slender from a lignescent base, a foot or more high, rather few-leaved, naked above, terminating in a loose and rather simple paniculate thyrsus: leaves glabrous and green, lanceolate, or the upper linear and the lowest sometimes oblong, all narrowed at base: peduncles (and calyx) viscid-puberulent, 2-5-flowered; the lower elongated: pedicels short: corolla-lobes only 2 lines long, moderately spreading. — *Pacif. R. Rep.* vi. 83, *Proc. Am. Acad.* vi. 75, & *Bot. Calif.* i. 561. — Mountains, N. California and adjacent parts of Oregon and Nevada, at 5-8,000 feet.

+ + Corolla blue to purple, more ventricose-funnelform, short-bilabiate, two-thirds to an inch and a half long: sterile filament glabrous. (Species too nearly allied, mostly lignescent or rather shrubby at base.)

+ + Inflorescence and calyx glandular or viscid-pubescent: thyrsus open-paniculate.

P. lætus, Gray. A foot or so high, cinereous-pubescent or puberulent, above glandular-pubescent: leaves lanceolate or linear-lanceolate and the lowest spatulate: sepals ovate or oblong, herbaceous: corolla an inch long, blue. — *Jour. Bost. Nat. Hist. Soc.* vii. 147, *Proc. Am. Acad.* i. c., & *Bot. Calif.* i. c. — Open and dry grounds, California to the mountains above the Yosemite and apparently even to Siskiyou Co.

P. Rœzii, Regel. Smaller, a span to a foot high, below glabrous or minutely puberulent: leaves all lanceolate or linear, or the lower oblanceolate: thyrsus either narrow or more diffuse and compound, with the branches divergent: corolla smaller (from half to two-thirds inch long) and narrower, pale blue or violet. — *Act. Hort. Petrop.* ii. 326, & *Gartenfl.* 1872, t. 239; Gray, *Bot. Calif.* ii. 567. *P. heterophyllus*, var.? Torr. & Gray in *Pacif. R. Rep.* ii. 122. — Drier parts of the Sierra Nevada, California, from Kern Co. to frontiers of Oregon and adjacent Nevada. Approaches smaller forms of the preceding.

+ + Inflorescence and calyx, as well as foliage, perfectly glabrous or else minutely puberulent without glandulosity: thyrsus usually narrow.

P. Kingii, Watson. Hardly glaucous: stems a span or so high from the depressed ligneous base, leafy to the top, erect or ascending: leaves oblanceolate or lanceolate-linear, acutish or obtuse, mostly narrowed to the base, an inch or so long: thyrsus strict, 1 to 5 inches long: sepals ovate-lanceolate and slender-acuminate, equalling the capsule: corolla comparatively small (two-thirds inch long), "purple." — Nevada and Utah, from the W. Humboldt to the Wahsatch and Uinta Mountains, *Watson*, &c.

P. azúreus, Benth. Glaucous, rarely pruinose-puberulent: stems erect or ascending, 1 to 3 feet high: leaves from narrowly to ovate-lanceolate or even broader, the uppermost wider at base: thyrsus virgate, loose, usually elongated: sepals ovate, with or without a conspicuous acumination: corolla from 1 to 1½ inches long, azure-blue verging or changing to violet, the base sometimes reddish; the expanded limb sometimes an inch in diameter. — *Pl. Hartw.* 327; Gray, l. c.; "*Paxt. Fl. Gard.* t. 64; *Lem. Jard. Fl.* t. 211; *Moore, Mag.* 1850, t. 209." — Dry ground, California, apparently through the length of the State, common on the Sacramento, &c. Founded on a rather narrow-leaved form, but varies greatly in the foliage.

Var. Jaffrayánus, Gray, l. c. A low form: leaves oblong or oval, or the upper ovate-lanceolate or ovate, very glaucous: peduncles 1-5-flowered: flowers large. — *P. Jaffrayanus*, Hook. *Bot. Mag.* t. 5045. *P. glaucifolius*, Gray in *Pacif. R. Rep.* vi. 82. *P. heterophyllus*, var. *lutifolius*, Watson, *Bot. King*, 222? — Northern part of California and through the Sierra Nevada, also eastward to the Wahsatch Mountains in Utah, if the syn. *Bot. King* is rightly referred.

Var. párvulus. Less than a foot high: leaves oblong and oval, barely an inch long: many-flowered thyrsus rather open: sepals broadly ovate: corolla hardly three-fourths inch long: would be referred to the preceding variety, except for the smaller flowers. — Northern part of California, in mountains above Jackson Lake, at 8,000 feet, *Greene*.

Var. angustíssimus, the extreme narrow-leaved form: leaves narrowly linear or sometimes the uppermost narrowly lanceolate from a broad base. — Yosemite Valley, &c.

Var. ambíguus, a rather tall form, paniculately branched and slender, with lanceolate and linear leaves all narrowed at base in the manner of the following species, but pale and glaucescent, and the corolla violet-blue (only an inch or less long): sepals remarkably

small, ovate, merely mucronate. — *P. heterophyllus*, Watson, Bot. King, 222. — Cañons of the Wahsatch Mountains, Utah, viz. of the Provo and American Fork, Watson, &c.

P. heterophyllus, Lindl. Green, seldom glaucescent: stems or branches 2 to 5 feet high from a woody base, slender: leaves lanceolate or linear, or only the lowest oblong-lanceolate, mostly narrowed at base: corolla an inch or sometimes more in length, with narrow tube rose-purple or pink, sometimes changing toward violet; the bud often yellowish: otherwise hardly distinguishable from narrow-leaved forms of the preceding. — Bot. Reg. t. 1899; Hook. & Arn. Bot. Beech. 376; Bot. Mag. t. 3853; Gray, l. c. — Dry banks, through the western and especially the southern part of California.

✚ ✚ ✚ Corolla scarlet-red, tubular-funnelform, conspicuously bilabiate, an inch long: sterile filament glabrous.

P. Bridgésii, Gray. A foot or two high from a lignescent base, glabrous up to the virgate secund thyrsum, or pruinose-puberulent: leaves from spatulate-lanceolate to linear; the floral reduced to small subulate bracts: peduncles (1-5-flowered) and pedicels short: these and the ovate or oblong sepals glandular-viscid: lips of the narrow corolla fully one-third the length of the tubular portion; the upper erect and 2-lobed; the lower 3-parted and its lobes recurved: anthers deeply sagittate. — Proc. Am. Acad. vii. 379, & Bot. Calif. i. 560. — Rocky banks, Sierra Nevada, California, from the Yosemite southward, on Williams Mountain, N. Arizona, and S. W. Colorado (*Brandegee*).

P. Nuttállii, Beck in Am. Jour. Sci. xiv. 120, is wholly doubtful, perhaps *P. levigatus*.

P. Cerrosénsis, Kellogg in Proc. Calif. Acad. ii. 19, from Cerros Island, off the coast of Lower California, is said to have a tubular yellow corolla, 3-nerved sepals, &c. Probably not of this genus.

P. canoso-barbatum and *P. rostriflorum*, Kellogg in Proc. Calif. Acad. ii. 15, Californian species, remain wholly obscure.

12. CHIONÓPHILA, Benth. (*Χιών*, snow, and *φίλος*, beloved, growing on snow-capped mountains.) — DC. Prodr. x. 351; Benth. & Hook. Gen. Pl. ii. 942. — Single species: fl. summer.

C. Jamésii, Benth. l. c. Dwarf perennial, glabrous or nearly so: leaves thickish, entire, mostly radical in a tuft, spatulate or lanceolate, tapering into a scarious sheathing base; those on the scape-like (1 to 3 inches high) flowering stems one or two pairs, or occasionally alternate, linear: spike few-many-flowered, dense, mostly secund, imbricate-bracteate: bracts shorter than the flowers: corolla over half inch long, dull cream-color, in anthesis twice the length of the calyx, at length more nearly enclosed by it. — Gray in Am. Jour. Sci. ser. 2, xxxiii. 252. — Colorado Rocky Mountains, in the high alpine region, first collected by *Dr. James*, in Long's Expedition, on James', now Pike's Peak.

13. MÍMULUS, L. MONKEY-FLOWER. (Latin diminutive of *mimus*, a mime, from the grinning corolla.) — Large genus, of wide dispersion, but far most largely N. American; with opposite simple leaves, and usually showy flowers from the axils, or becoming racemose by the diminution of the upper leaves to bracts. Chiefly herbs, one polymorphous species shrubby; fl. in summer; several cultivated for ornament. — Gray, Bot. Calif. i. 563, & Proc. Am. Acad. xi. 95; Benth. & Hook. l. c. *Mimulus*, *Diplacus* (Nutt.), *Eumanus*, & *Herpestis* § *Mimuloides*, Benth. in DC. Prodr.

§ 1. **EUNÁTUS**, Gray. Annuals, mostly very low, glandular-pubescent or viscid: flowers sessile or short-pedicelled: calyx 5-angled and 5-toothed; the angles and teeth more or less plicate-carinate: corolla in the typical species with long and slender tube: anthers approximate in pairs, forming crosses: upper part of style pubescent or glandular: stigma variable, not rarely funnelform or peltate-petaloid: placentæ separated in dehiscence and borne by the half-dissepiment on the middle of each valve. — *Eumanus*, Benth. in DC.

* Capsule cartilaginous, 2-4-sulcate, tardily dehiscent, oblique or gibbous at base: calyx gibbous at base and very oblique at the orifice: corolla purple or violet, with spotted or variegated throat: leaves entire or obscurely few-toothed.

— Corolla-tube filiform and long-exserted, in the earlier state much longer than the stems, an inch or more in length. — *Enoë*, Gray in Pl. Hartw. 329. *Mimulus* § *Enoë*, Gray, Bot. Calif. i. 503.

M. tricolor, Lindl. Leaves from oblong to linear, obscurely nerved, with narrowed base nearly sessile: calyx hardly gibbous at base, ampler toward the very oblique orifice: corolla about inch and a half long, with short-funnelform throat, lips of about equal length, and lobes similar: capsule short-oval or ovate, slightly compound, rather acutely angled before and behind: seeds obovate, oblique, much larger than in related species. — Jour. Hort. Soc. Lond. iv. 222 (June, 1849); Gray, l. c. *Eunanus Coulteri*, Gray in Benth. Pl. Hartw. 329, Aug. 1849. — California, from the valley of the Sacramento to Mendocino Co. and eastward, Plumas Co. Stem when beginning to flower only a quarter inch high, at length may reach 3 inches.

Var. *angustatus*, Gray, l. c. Leaves small and linear or nearly so: more slender tube of corolla sometimes nearly 2 inches long. — Plumas to Placer Co., Bolander, &c.

M. Douglásii, Gray, l. c. Leaves ovate or oblong, the 3-5-nerved base contracted into a petiole: calyx soon very gibbous at base on upper side: lower lip of corolla very much shorter than the ample erect lower one, or even obsolete; the throat more amply funnelform: capsule linear or linear-oblong, terete, 4-sulcate, gibbous or somewhat inflexed at the very base: seeds oval, small, apiculate at both ends, as in all the following species of the section: stigma very variable. — *M. nanus*, var. *subuniflorus*, Hook. & Arn. Bot. Beech. 378. *Eunanus Douglasii*, Benth. in DC. l. c. 374. — California, on gravelly banks, throughout the length of the State. Stem from a quarter of an inch to 6 inches high: corolla an inch to one and a half inches long.

— Corolla-tube hardly exserted from the calyx: flowers not surpassing the subtending leaf.

M. latifolius, Gray, l. c. Viscid-pubescent: stem a span high, loosely branching: leaves all broadly ovate or oval, slightly petioled, membranaceous, 5-nerved at base, 9 to 12 lines long: calyx in flower hardly oblique, in fruit very gibbous: corolla pink-purple, half to three-fourths inch long; the funnelform throat as long as the tube: capsule narrowly oblong, laterally sulcate. — Guadalupe Island, off Lower California, Palmer.

* Capsule coriaceous or membranaceous, symmetrical: calyx equal at base, campanulate or short-oblong: stigma peltate-funnelform, and entire or obscurely 2-lobed. — § *Eunanus*, Gray, Bot. Calif. i. 564.

— Corolla small, 3 to 6 lines long; the tube slender and exserted: calyx-teeth nearly equal.

M. leptaleus, Gray, l. c. Viscid-puberulent, 1 to 3 inches high, at length much branched: leaves from spatulate-oblong to linear-lanceolate, 2 to 6 lines long: calyx-teeth ovate or triangular, not equalling the oblong-ovate obtuse capsule: corolla crimson, with filiform tube, small throat, and oblique limb $1\frac{1}{2}$ to 3 lines wide. — California, in gravelly soil of the Sierra Nevada, at 5-8,000 feet.

— Corolla ampler, half to fully three-fourths inch long, funnelform, with widely spreading limb and throat gradually narrowed downward into the included or partly exserted tube: stems from an inch to a span or more high. (Species nearly related.)

— Calyx hardly at all oblique; the teeth almost equal in length.

M. Bigelóvii, Gray, l. c. Leaves oblong; the upper ovate, acute or acuminate: calyx-teeth very acutely subulate from a broad base (2 or less lines long), half the length of the broadly campanulate tube, the anterior ones narrower; throat of the corolla cylindraceous, and the ample limb rotate (crimson with yellow centre): capsule oblong-lanceolate, acute or acutish, a little exceeding the calyx; the valves membranaceous. — *Eunanus Bigelovii*, Gray in Pacif. R. Rep. iv. 121. — S. California, W. Nevada, and S. Utah.

M. nanus, Hook. & Arn. Leaves from obovate or oblong to lanceolate: calyx-teeth broadly lanceolate or triangular, acute (a line long), a quarter of the length of the tube: corolla sometimes rose-purple, sometimes yellow: capsule with tapering apex rather exceeding the calyx; the valves chartaceous. — Bot. Beech. l. c. 378, (var. *pluriflorus*); Gray, l. c. *Eunanus Tolmiei*, Benth. l. c. *E. Fremonti*, Watson, Bot. King, 226, not Benth. — Hills, &c., Sierra Nevada, California and adjacent parts of Nevada and Oregon to Wyoming.

Var. bicolor, Gray, l. c. A doubtful and insufficiently known form; with throat of corolla short and abruptly dilated, dark purple; the limb yellow. — *Eumans bicolor*, Gray, Proc. Am. Acad. vii. 381. — High Sierra Nevada in Fresno Co., *Brewer*.

M. Fremonti, Gray, l. c. Leaves narrowly oblong or the lowest spatulate, obtuse: calyx-teeth ovate, obtuse or acutish (less than a line long), less than a quarter the length of the tube, surpassing the proper tube of the crimson corolla. — *Eumans Fremonti*, Benth. l. c. — California, from Santa Barbara Co. southward and eastward, first coll. by *Fremont*.

++ ++ Calyx decidedly oblique at the orifice; the teeth unequal, reaching to the base of the funnelform throat of the corolla: stem rather slender: leaves quite entire.

M. Párryi, Gray, l. c. Not pubescent, minutely glandular, 2 to 4 inches high: leaves oblong or oblanceolate, half inch long: teeth of the campanulate calyx acute; the upper and larger one ovate; the others subulate from a broad base, a third or fourth the length of the tube: corolla yellow or pink, two-thirds inch long: capsule oblong-lanceolate, not surpassing the calyx. — St. George, S. Utah, on gravelly hills, *Parry*.

M. Torrreyi, Gray, l. c. Viscid-pubescent, a span to a foot high, simple or loosely branching: leaves oblong or almost lanceolate, sometimes an inch long: calyx-teeth all broad and obtuse; the posterior one larger and barely a line long: corolla half to three-fourths inch long, pink-purple: capsule chartaceous, lanceolate-oblong. — *Eumans Fremonti*, Gray in Pacif. R. Rep. vi. 83, not Benth. — California, through the Sierra Nevada, at 4,000 feet and upwards, from Mariposa Co. northward, first coll. by *Newberry*.

+ + + Corolla large and wide, an inch or more long, with proper tube very short and included in the calyx: teeth of the latter very unequal: stem simpler and taller: leaves often acutely dentate or denticulate with salient teeth. (Transition to *Eumimulus*.)

M. Bolánderi, Gray, l. c. A foot or less high, viscid-pubescent: leaves oblong, an inch or two in length; the lower surpassing the flowers: teeth of the very oblique calyx lanceolate; the posterior and longer one 3 lines long and half the length of the oblong tube: corolla purple, an inch long, cylindraceous: capsule fusiform-subulate, somewhat coriaceous. — *M. brevipes*, Gray in Pacif. R. Rep. iv. 120, not Benth. — California, in foothills and lower part of the Sierra Nevada.

M. brevipes, Benth. A foot or two high, very viscid-pubescent: leaves from lanceolate to linear, 1 to 4 inches long: calyx-teeth very unequal, acuminate; the posterior fully half the length of the broadly campanulate tube: corolla yellow, sometimes $1\frac{1}{2}$ inches long, and the expanded limb nearly as broad, campanulate, with ample rounded lobes: capsule ovate, acuminate, firm-coriaceous. — DC. Prodr. x. 369; Gray, Bot. Mex. Bound. 116. — California, from Monterey to San Diego and San Bernardino.

§ 2. **Díplacus, Gray.** Shrubby, glutinous; with flowers as of the following and capsule of the preceding section: tube of the funnelform corolla about the length of the narrow prismatic carinate-angled calyx: style glandular: stigma bilamellar: placentæ meeting but even in the ovary not united in the axis, in dehiscence borne on the linear firm-coriaceous valves. — *Díplacus*, Nutt. in Ann. & Mag. Nat. Hist. i. 137; Benth. in DC. Prodr. x. 368.

M. glutinosus, Wendl. Shrub 2 to 6 feet high, nearly glabrous but glutinous: leaves from narrowly oblong to linear, from denticulate to entire (1 to 4 inches long), at length with revolute margins: flowers $1\frac{1}{2}$ to 2 inches long, short-pedicelled: corolla usually buff or salmon-color, obscurely bilabiate; the spreading lobes lacinately toothed or notched. — Obs. 51; Jacq. Schœnbr. iii. t. 264; Gray, l. c. *M. aurantiacus*, Curt. Bot. Mag. t. 354. *Díplacus glutinosus* & *D. latifolius*, Nutt. l. c. *D. stellatus*, Kellogg, Proc. Calif. Acad. ii. 18. — Rocky banks, &c., California, common from San Francisco southward. Runs into many varieties, such as

Var. puniceus, Gray, l. c. Flowers from orange-red to scarlet, often slender-pedicelled: corolla-lobes commonly obcordate. — *Díplacus puniceus*, Nutt. l. c.; Hook. Bot. Mag. t. 3655. *D. glutinosus*, var. *puniceus*, Benth. in DC. l. c. W. California.

Var. lineáris, Gray, l. c. Flowers very short-pedicelled, red-brown to salmon-color: calyx commonly pubescent: leaves linear, more rigid, and revolute-margined. — *M. linearis*, Benth. Scroph. Ind. 27. *Díplacus leptanthus*, Nutt. l. c.; Benth. l. c. — From Monterey southward.

Var. brachypus, Gray, l. c. Flowers very short-pedicelled, salmon-color, large: calyx viscid-pubescent or villous: herbage often pubescent: leaves linear-lanceolate, mainly entire. — *Diplacus longiflorus*, Nutt. l. c. — From Santa Barbara southward.

§ 3. **EUMIMULUS, Gray.** Herbaceous: proper tube of the corolla mostly included in the plicately carinate-angled 5-toothed calyx (the teeth traversed by the strong nerve): style glabrous: stigma bilamellar, the lobes or lips ovate or rotund and equal: placenta remaining united in the axis of the capsule (or partly dividing, in *M. rubellus* completely), from which the thin and usually membranaceous valves tardily separate.

* Large-flowered and perennial western species: corolla $1\frac{1}{2}$ to 2 inches long, red or rose-color, with cylindrical body longer than the limb: calyx oblong-prismatic; the short teeth nearly equal: anthers either villous or almost glabrous in the same species: pedicels elongated: capsule oblong: leaves several-nerved from the base: seeds with a dull and loose epidermis, longitudinally wrinkled.

M. cardinalis, Dougl. Villous and viscid, 2 to 4 feet high: leaves ovate, or the lower obovate-lanceolate; the upper connate; all crose-dentate: corolla scarlet, with remarkably oblique limb; upper lip erect and the lobes turned back; lower reflexed: stamens exerted. — Lindl. Hort. Trans. ii. 70, t. 3; Brit. Fl. Gard. ser. 2, t. 358; Hook. Bot. Mag. t. 3560. — Along watercourses, through Oregon and California to Arizona.

M. Lewisii, Pursh. More slender, greener, and with minute or finer pubescence: leaves from oblong-ovate to lanceolate, denticulate: corolla rose-red or paler, with tube and throat proportionally longer; roundish lobes all spreading: stamens included. — Fl. ii. 427, t. 20; Gray, l. c. *M. roseus*, Dougl. in Bot. Reg. t. 1591; Hook. Bot. Mag. t. 3353; Brit. Fl. Gard. ser. 2, t. 210. — Shady and moist or wet ground, Brit. Columbia to California along the whole length of the Sierra Nevada, east to Montana and Utah.

* * Moderately large flowered eastern species, perennial, glabrous: corolla violet, at most an inch long, with narrow tube and throat more or less exceeding the nearly equal calyx, and personate limb: fructiferous calyx oblong: leaves throughout pinnately veined: seeds not wrinkled. (Corolla rarely varying to white, not very rarely with the lateral lobes of the lower lip exterior in the bud!)

M. ringens, L. Stem square, 2 feet high: leaves oblong or lanceolate, closely sessile by an auriculate partly clasping base, serrate: pedicels longer than the flower: calyx-teeth subulate, slender: seed-coat rather loose, cellular. — Hort. Ups. 176, t. i.; Lam. Ill. t. 523; Bot. Mag. t. 283. — Wet places, Canada to Iowa and south to Texas.

M. alatus, Solander. Stem somewhat wing-angled: leaves ovate to ovate-lanceolate, less acutely serrate, tapering at base into a margined petiole: pedicels shorter than the calyx: teeth of the latter short and broad with abrupt mucronate tips: seed-coat close and smooth. — Ait. Kew. ii. 361; Lodd. Bot. Cab. t. 410; Bart. Fl. Am. Sept. iii. t. 94. — Wet places, W. New England to Illinois, and south to Texas.

* * * Small- or moderately large-flowered mainly western species: corolla from yellow or sometimes partly white to brown-red or crimson: the throat broad and open: seeds with a thin and smooth or shining (or in *M. luteus* duller and reticulate-striate) coat.

+ Leafy-stemmed, not villous, nor leaves pinnately veined, but with 3 to 7 primary veins from or near the base, and hardly any, or only weak ones, from above the middle of the midrib.

++ Calyx oblique at the orifice: the posterior tooth largest: leaves mostly broad, dentate, at least the lower petioled: root fibrous.

= Perennial by stolons or creeping branches: upper leaves sessile by a broad or somewhat clasping base: lower lip of the corolla bearded at the throat.

M. Jamésii, Torr. & Gray. Diffuse and creeping, freely rooting, glabrate: leaves roundish and often reniform, from denticulate to nearly entire (4 to 12 lines long), all but the uppermost with margined petioles: flowers all axillary and slender-pedicelled: corolla light yellow, 4 to 6 lines long: fructiferous calyx campanulate, about 3 lines long: seeds oval, shining, almost smooth. — Benth. in DC. l. c. 371 (with var. *Fremontii*); Gray, Man. ed. 2, 287. *M. glabratus*, Gray in Bot. Mex. Bound. 116, partly, hardly of HBK. — In water or wet places, usually in springs, Illinois to Upper Michigan and Minnesota, west to the Rocky Mountains in Montana, thence south to New Mexico and Arizona. (Adjacent Mex.)

Var. Texensis. Larger: leaves more ovate, seldom subcordate, usually more strongly or even laciniately dentate; the uppermost sometimes reduced, so that the later flowers become somewhat racemose. — *M. glabratus*, Bot. Mex. Bound. l. c., mainly. — Texas, Wright, Lindheimer, &c. Probably in drier soil: near *M. glabratus*, of S. Am. and Mex.

M. luteus, L. Glabrous or puberulent: stems erect, ascending or with later branches spreading; the larger forms 2 to 4 feet high: leaves ovate, oval-oblong, roundish, or subcordate; the upper cauline and floral smaller, closely sessile, not rarely connate-clasping; all usually acutely dentate or denticulate; lower sometimes lyrate-lacinate; inflorescence chiefly racemose or terminal: pedicels equalling or shorter than the flower: corolla deep yellow, commonly dark-dotted within, and the protuberant base of lower lip blotched with brown-purple or copper-color, in the largest forms from 1 to 2 inches long: calyx ventricose-campanulate, half inch or less long: seeds oblong, rather dull, striate-reticulated longitudinally. — Spec. ed. 2, 884; Bot. Mag. t. 1501, 3363; Bot. Reg. t. 1030, 1796; Andr. Bot. Rep. t. 661; Gray, l. c. *M. guttatus*, DC. Cat. Monsp. 127; Hook. Fl. ii. 99. *M. variegatus*, Lodd. Bot. Cab. t. 1872. *M. rivularis*, Lodd. l. c. t. 1575; Nutt. in Jour. Acad. Philad. vii. 47. *M. lyratus*, Benth. Scroph. Ind. 28, form with lower leaves laciniate at base. *M. Scouleri*, Hook. Fl. ii. 100; a narrow-leaved form. *M. Smithii*, Lindl. Bot. Reg. t. 1674. — Moist or wet ground, Aleutian Islands and Alaska to California, and east to and through the Rocky Mountains. (Along the Andes, &c., to S. Chili.) Most variable and polymorphous: extreme forms are the following

Var. alpinus, Gray. A span or so high, lax, leafy to top: stem 1-4-flowered: corolla $\frac{3}{4}$ to $1\frac{1}{2}$ inches long: seeds oval: some leaves rather distinctly pinnate-veined above the middle! — Proc. Acad. Philad. 1863, 71; Watson, Bot. King, 224; Gray, Bot. Calif. i. 567. *M. dentatus*, Nutt. in DC. Prodr. l. c. 372, appears from an original specimen to be between this and *M. moschatus*, var. *longiflorus*. *M. Tilingii*, Regel, Gartenfl. 1869, 321, t. 631; plant which developed next year into a large many-flowered form, as figured in Gartenfl. 1870, 290, t. 665 (corolla distinctly personate by a palatine protuberance of base of lower lip, as is often seen in other forms). *M. cupreus*, Regel, l. c. 1864, t. 422 (throat of the corolla wide open). *M. luteus*, var. *cuprea*, Hook. Bot. Mag. t. 5478. — Alaska to high Sierra Nevada, California, and Colorado Rocky Mountains. (Chilian Andes.)

Var. depauperatus, Gray. Includes reduced or depauperate forms, flowering as slender annuals, 2 to 10 inches high, with leaves 3 to 6 lines long, fructiferous calyx 2 or 3 lines long, and corolla 3 to 7 lines long. — Bot. Calif. l. c. *M. microphyllus*, Benth. in DC. l. c. 371. — Washington Terr. to California and the Rocky Mountains.

= = Apparently only annual: leaves all petioled: pedicels long and filiform.

M. alsinoides, Benth. Very glabrous: stems slender, at length diffusely branched, 3 to 12 lines long: leaves from rotund- to rhombic-ovate (from $\frac{1}{4}$ to 16 lines long, besides the abruptly long-attenuate base or margined petiole), thin, the upper part salient denticulate: pedicels at length divaricate: corolla light yellow (or lower lip with a brown spot), 3 to 6 lines long; the limb small: calyx in flower narrow-cylindrical, in fruit narrow-oblong; its teeth all very short. — Benth. l. c.; Gray, l. c. — Wet shady places, Oregon to British Columbia, &c.

Var. minimus, Benth. l. c., consists of very small and depauperate forms, half inch to 2 inches high, with corolla 2 to 4 lines long. — Same range.

M. laciniatus, Gray, l. c. Glabrous or slightly pubescent: filiform stem diffusely branched, a span or less high: leaves on filiform petioles, which mostly exceed the (quarter to half inch long) hastately 3-lobed or laciniately 3-5-cleft and obscurely 1-nerved blade, about equalling the pedicels: corolla yellow, 2 lines long: calyx in fruit ovate, 2 lines long: the teeth rather conspicuous. — Sierra Nevada, California, on a branch of the Merced at Clark's.

++ ++ Calyx equal or nearly so at the orifice, and the teeth almost alike: root annual.

= = Cauline leaves contracted at base into margined petioles.

M. Pulsiferæ, Gray, l. c. Viscid throughout, but hardly pubescent, a span high, loosely branching: leaves from broadly ovate to lanceolate-oblong, sparsely denticulate or entire, 3-nerved at base (half inch or more long), equalled or surpassed by the pedicels: corolla yellow, 5 lines long: calyx cylindrical-campanulate, in fruit 3 or 4 lines long, with short ovate-triangular teeth. — California, in the northern part of the Sierra Nevada, on rocks, from Sierra Co. to Siskiyou Co., Bolander, Mrs. Pulsifer-Ames, Greene.

= = Cauline leaves mainly closely sessile by a broad base.

M. inconspicuus, Gray. Glabrous, 2 to 7 inches high, simple or branched from the base: leaves ovate or ovate-lanceolate, entire, somewhat 3-5-nerved (quarter to half inch long): pedicels as long as flower: corolla 5 lines long, with rather small limb, yellow or rose-color: fructiferous calyx oval, 4 or 5 lines long, appearing as if truncate; the teeth very short. — Pacif. R. Rep. iv. 120, & Bot. Calif. l. c. — Damp hillsides or rocks, Los Angeles to the Sacramento, California, *Bigelow*, &c.

= = Cauline leaves sessile or nearly so by a narrowed obscurely 3-nerved base: plants minutely viscid-pubescent or glandular, erect, branched from the base, from 2 to 10 inches high.

M. bicolor, Benth. Viscid-pubescent: leaves lanceolate or linear-oblong, sometimes spatulate, mostly denticulate, an inch long or less; the upper shorter than the pedicels: corolla half to three-fourths inch long, with ample limb, yellow, or lower lip commonly white: calyx narrowly oblong, purple-dotted, in fruit 4 lines long; the teeth comparatively large (a line long), triangular, acute. — Pl. Hartw. 328; Gray, Bot. Calif. i. 568. *M. Prattenii*, Durand in Jour. Acad. Philad. n. ser. ii. 98. — California, through the foot-hills of the Sierra Nevada.

M. Palmeri, Gray. Viscid, but hardly at all pubescent: leaves lanceolate or the lower spatulate, mostly entire, half inch or so long, all shorter than the filiform pedicels: corolla nearly three-fourths inch long, ample-funnelform, crimson, thrice the length of the calyx; the lobes all about equal and equally spreading: fructiferous calyx 3 or 4 lines long, narrowly oblong; the teeth broad and obtuse. — Proc. Am. Acad. xii. 82. — S. E. California, on the Mohave River, *Palmer, Parry & Lemmon*. Corolla in shape and color as of the *Emanus* section, foliage, aspect, and capsule of the present group.

M. rubellus, Gray. Viscid and sometimes pubescent: leaves from spatulate-oblong to linear, entire, rarely with a few salient teeth, a quarter to two-thirds inch long, commonly equalling the pedicels; the lower sometimes obovate or ovate: corolla 3 or 4 lines long, from one-third to twice the length of the calyx, yellow or rose-color, sometimes yellow varying or changing to crimson-purple: fructiferous calyx oblong, 3 lines long; its teeth mostly short and obtuse. — Bot. Mex. Bound. 116, & Bot. Calif. l. c.; Watson, Bot. King, 225. *M. montioides*, Gray, Proc. Am. Acad. vii. 380, in part. — Gravelly moist banks, Washington Terr. to Arizona, Colorado, and E. New Mexico, chiefly in the mountains.

Var. latiflorus, Watson, l. c. Stems an inch or two high: leaves from linear to oblanceolate: corolla yellow, half to two-thirds inch long, with slender exerted tube, funnel-form throat spotted with brown-purple, and comparatively large limb, resembling that of *M. bicolor*. — *M. montioides*, Gray, l. c., mainly. — W. Nevada, on the eastern side of the Sierra Nevada, &c., *Anderson*, &c. Adopted in this form in Bot. Calif. l. c.; but probably a distinct species.

+ Leafy-stemmed, villous and viscid, diffuse: leaves membranaceous, more or less pinnately-veined and petioled, denticulate or serrate: corolla narrow, light yellow: calyx slightly if at all oblique: the teeth nearly equal.

M. floribundus, Dougl. About a span high from an annual root, flowering from almost the lowest axils, at first erect, the lateral branches diffusely spreading: leaves ovate and the lower subcordate, an inch long or less; the upper shorter than the somewhat racemose pedicels: calyx short-campanulate, becoming ovate or oblong and truncate in fruit, 3 or 4 lines long; the teeth short and triangular: corolla 3 to hardly 6 lines long, about twice the length of the calyx: capsule globose-ovate, obtuse. — Lindl. Bot. Reg. t. 1125; Benth. in DC. l. c. 372; Gray, l. c. *M. peduncularis*, Dougl. in Benth. Scroph. Ind. 29. *Cupraria pusilla*, Torr. in Ann. Lyc. N. Y. i. 36. — Moist soil, Rocky Mountains of Colorado and Wyoming to California and Oregon.

M. moschatus, Dougl. (Musk Plant.) More villous and viscous, musk-scented: stems spreading and creeping, thus perennial, a foot or so long: leaves oblong-ovate, an inch or two long, mostly exceeding the pedicels: calyx short-prismatic, oblong-campanulate in fruit, 4 or 5 lines long; the teeth half the length of the tube, broadly lanceolate and acuminate, somewhat unequal: corolla usually two-thirds inch long and barely twice the length of the calyx: capsule ovate, acute. — Lindl. Bot. Reg. t. 1118; Benth. l. c.; Gray, l. c. — Wet places, along brooks, British Columbia to California and Utah.

Var. longiflorus. Corolla elongated, reaching an inch in length, thrice the length of the calyx: later peduncles surpassing the leaves. — The usual form in California, also in Oregon.

+ + + Scapose, i. e. peduncles scape-like: leaves 3-5-nerved, sessile.

M. primuloides, Benth. Perennial by filiform stolons: leaves all radical in a rosulate tuft, or crowded on an upright stem of 1 to 3 inches in height, soft-villous when young, glabrate with age, from obovate to oblanceolate, sparsely and sharply serrate or nearly entire, from 5 to 16 lines long: filiform and often solitary pedicels (1 to 4 inches long) and cylindraceous calyx glabrous: corolla golden-yellow, funnelform, a quarter to three-fourths inch long. — *Scroph. Ind. l. c.*, & *DC. l. c.*; *Regel, Gartenfl.* 1872, t. 739; *Gray, l. c.* — Wet soil, through the Sierra Nevada, California, at 6-10,000 feet, extending to the Blue Mountains of Oregon. Like the other species varies greatly in size of flower as well as in stature.

§ 4. **MIMULOÏDES, Gray.** Annual, with corolla of *Eumimulus*, capsule with the divided placenta of *Eumimus*, but the calyx campanulate and 5-cleft; its tube not prismatic nor even carinate-angled, but almost nerveless; its lobes plane: stigma bilamellar. — *Herpestis* § *Mimuloides*, Benth.

M. pilosus, Watson. A span to a foot high, at length much branched, leafy, soft-villous and slightly viscid, rarely glabrate, flowering from near the base: leaves lanceolate or narrowly oblong, sessile, entire, obscurely 3-nerved at base; the lower surpassing and the upper hardly equalling the pedicels: calyx oblique at orifice; the tube somewhat 5-sulcate below the sinuses; the posterior tooth equalling and the others shorter than the tube; all oblong or ovate, rather shorter than the bright yellow (3 or 4 lines long) rather obscurely bilabiate corolla: lobes of the latter nearly equal, usually a pair of brown-purple spots on the lower: capsule oblong-ovate, acute. — *Bot. King*, 225; *Gray, l. c.* *M. exilis*, Durand in *Pacif. R. Rep.* v. 12, t. 12. *Herpestis (Minuloides) pilosa*, Benth. in *Comp. Bot. Mag.* ii. 57, & *DC. l. c.* 394. — Gravelly soil along streams, nearly throughout California, and along the borders of Nevada to Arizona.

14. STEMÓDIA, L. (Name shortened by Linnæus from *P. Browne's Stemodiæra*, meaning stamens with two tips, in reference to the disjointed stipitate anther-cells.) — Chiefly tropical species, herbaceous or slightly shrubby, one reaching our borders.

S. durantifolia, Swartz. Annual with indurated base, or sometimes perennial, viscid-pubescent: leaves either opposite or 3-4-nate, from oblong- to linear-lanceolate, serrate or denticulate, narrowed below and with somewhat dilated partly clasping base: inflorescence spiciform, leafy below: calyx 2-bracteolate: corolla purplish, quarter inch long. — *Obs.* t. 240; Benth. in *DC. Prodr.* x. 383. *Capraria durantifolia*, L. *Stemodia verticillaris*, Link; *Reichenb. Ic. Exot.* ii. t. 149. — Wet grounds, S. Arizona. (*Trop. Am.*)

15. CONÓBEA, Aublet. (Unexplained name.) — Low or spreading annuals, all American; with opposite leaves, and small flowers on axillary pedicels, 2-bracteolate under the calyx. — Our species belong to

§ 1. **LEUCÓSPORA.** Leaves pinnately 3-7-parted into cuneate-linear divisions: anther-cells completely disjointed but contiguous: seeds striate-costate. — *Leucospora*, Nutt., with *Schistophragma*, Benth. in *Endl. Gen. & DC. Prodr.* x. 392.

C. multifida, Benth. l. c. A span high, diffusely branched, minutely viscid-pubescent: pedicels as long as the greenish-white and purplish corolla: sepals very slender: capsule ovate: seeds small, white, longitudinally costate. — *Capraria multifida*, Michx. *Fl.* ii. 22, t. 35. *Stemodia multifida*, Spreng. *Syst.* ii. 811. *Leucospora multifida*, Nutt. in *Jour. Acad. Philad.* vii. 87. *Sutera multifida*, Walp. *Rep.* iii. 271. — Along streams and shores, Ohio to Illinois, Arkansas, and Texas: also adventive below Philadelphia.

C. intermédia, Gray. More viscid-pubescent: pedicels shorter than the calyx: sepals narrowly linear-lanceolate; the posterior one rather longer: corolla larger (3 lines long): capsule ovoid-lanceolate: seeds larger, spirally costate. — *Bot. Mex. Bound.* 117. — New Mexico and Arizona, *Wright, Rotlrock.*

16. **HERPÉSTIS**, Gærtn. f. (*Ἑρπῆστις*, a creeping thing, the original species creeping.) — Low herbs (chiefly American), commonly glabrous; with opposite leaves, and mainly axillary flowers, in summer.

§ 1. Corolla obviously bilabiate; the two posterior lobes being united to form the upper lip: pedicels and calyx ebracteolate: style dilated and 2-lobed at the apex, or stigma bilamellar. — § *Mercadonia*, *Mella*, & *Chaetodiscus*, Benth. in DC. Prodr. & Gen. ii. 952.

* Erect or ascending glabrous perennials, drying blackish: leaves pinnately veined, mostly petioled and serrate or crenate: anther-cells divergent: style curved at apex: stigmas obovate.

H. nigréscens, Benth. A foot or two high, mostly erect, very leafy: leaves from oblong to cuneate-lanceolate, serrate, with entire tapering base (1 or 2 inches long): pedicels equalling and the upper surpassing the leaves: upper sepals oblong-lanceolate, not much broader than the narrowly-lanceolate lower ones: corolla whitish or purplish: valves of the capsule often 2-cleft. — Comp. Bot. Mag. ii. 56, & DC. Prodr. x. 394. *Gratiola acuminata*, Walt. Car. 61; Ell. Sk. i. 15; Curtis, Pl. Wilningt. in Jour. Bost. Nat. Hist. i. 130. — *G. inaequalis*, Walt. l. c. ? *Gerardia cuneifolia*, Pursh, Fl. ii. 422. *Matourea nigrescens*, Benth. in Comp. Bot. Mag. i. 173. — Wet places, Maryland (*A. Hay*), and North Carolina to Texas, along and near the coast.

H. chamædryoides, HBK. A span or two high, generally diffuse or decumbent: leaves ovate or oblong, serrate (half or three-fourths inch long), mostly surpassed by the pedicels: upper sepal ovate; the lower ones ovate or oblong: corolla yellow. — Nov. Gen. & Spec. ii. 369; Benth. l. c. *Erinus procumbens*, Mill. Dict. *Mercadonia ovata*, Ruiz & Pav. ? *Lindernia dianthera*, Swartz. *Microcarprea Americana*, Spreng. Syst. ii. 368. — Moist ground, Texas. (Mex., W. Ind., S. Amer.)

Var. **pedunculáris** (*H. peduncularis*, Benth. l. c.) is founded on a form with erect and simpler stems, smaller and narrower leaves, and filiform pedicels of thrice their length. — Texas, *Drummond*, also *Berlandier*, &c. A similar form, but with diffuse or procumbent stems (*H. peduncularis*, Chapm. Fl. 291), is from Key West, Florida.

* * Creeping, or ascending from a creeping base, stoloniferous-perennial, rather succulent: stems villous-pubescent or glabrate: leaves closely sessile and partly clasping, nervose from the base, entire or obscurely crenulate: capsule 4-valved: corolla blue or violet, varying to white.

+ Leaves pellucid-punctate, aromatic when bruised: ovary girt by a slenderly 10-12-toothed hypogynous disk: anthers somewhat sagittate: stigma dilated, obscurely 2-lobed: upper lip of corolla obcordate.

H. amplexicaúlis, Pursh. Stems a span to a foot or two long, creeping at base, then ascending and nearly simple, very leafy: leaves ovate, obtuse, half to nearly an inch long, sometimes a little pubescent: pedicels shorter than calyx or hardly any: upper sepal cordate: corolla 5 lines long, ephemeral. — Fl. ii. 413; Benth. l. c. *Obolaria Caroliniana*, Walt. Car. 166. *Monniera amplexicaulis*, Michx. Fl. ii. 22. — Margin of pine-barren ponds, New Jersey (?) and Maryland to Louisiana.

+ + Leaves not punctate: hypogynous disk obscure and entire or none: anthers parallel: stigma 2-lamellar: upper lip of corolla merely emarginate.

H. répens, Cham. & Schl. Glabrous, or summit of the creeping stems puberulent: leaves oval and with broad clasping base (quarter to half inch long): pedicels about the length of flower and fructiferous calyx: upper and lower sepals broadly oval or subcordate, reticulate-veiny, in flower almost equalling the white or whitish corolla. — Linnaea, v. 107; Griseb. Fl. W. Ind. 430. *H. micrantha*, Benth. l. c., mainly (not Pursh, which is chiefly *Micranthemum*); Ell. Sk. ii. 105, ex char. *Gratiola repens*, Swartz, Fl. Ind. Occ. i. 39, & Ic. t. 3. — Wet soil, S. Carolina, &c. (W. Ind., Brazil.)

H. rotundifolia, Pursh. Larger: spreading and creeping stems usually villous-pubescent; leaves obovate or rotund, with cuneate-narrowed but partly clasping flabellately many-nerved base, often an inch long: pedicels longer than the flower (commonly in threes): corolla blue, almost twice the length of the ovate and oval sepals. — Fl. ii. 418; Benth. l. c. *Monniera rotundifolia*, Michx. l. c. — Margin of ponds, Illinois and Missouri to Louisiana and Texas. (Possibly also in "S. Carolina and Georgia," but *H. rotundifolia* of Elliot is probably the *H. amplexicaulis*.)

HYDRANTHÉLIUM EGENSE, Poepp. of Brazil, with aspect of *Herpestis*, was picked up in New Orleans by the late J. Hale, and is enumerated in Mann's Catalogue, also by Chapman in Bot. Gazette, iii. 10: but it is probably a ballast waif and transient.

§ 2. Corolla obscurely bilabiate; the limb being almost equally 5-lobed; tube somewhat campanulate: stamens hardly didynamous: anthers sagittate: stigma capitate. — *Bramia*, Lam. § *Bramia*, Benth.

H. Monniéra, HBK. Glabrous perennial, prostrate and creeping, somewhat fleshy: leaves spatulate to obovate-cuneate, entire or obsoletely somewhat toothed, sessile (4 to 8 lines long), nearly veinless: pedicels at length longer than the leaves, 2-bracteolate at apex: upper sepal ovate: corolla (4 or 5 lines long) pale blue. — Hook. Bot. Mag. t. 2577. *H. cuneifolia*, Pursh, Fl. ii. 418. *H. Brownei*, Nutt. Gen. ii. 42. *Gratiola Monniéra*, L. *Monniéra cuneifolia*, Michx. l. c. — River-banks and shores near the sea, Maryland to Texas. (Cosmopolite near the tropics.)

17. GRATIOLA, L. HEDGE HYSSOP. (From the Latin *gratia*, grace or favor, i. e. Herb-of-grace.) — Low herbs, of wide distribution; with opposite and sessile entire or dentate leaves, and solitary axillary pedicels, usually 2-bracteolate under the calyx: fl. summer.

§ 1. **GRATIOLARIA, Benth.** Anther-cells transverse and separated by a membranaceous dilated connective: capsule ovate or globular: soft-herbaceous and diffusely branching, either annuals or fibrous-rooted perennials from a creeping base, growing in wet soil.

* Sterile stamens wanting or reduced to minute rudiments.

† Calyx ebracteolate: Pacific species.

G. ebracteata, Benth. A span high or less, erect, nearly glabrous, obscurely viscid: leaves lanceolate, entire, or sometimes sparingly and acutely denticulate: pedicels slender, in fruit strict: sepals foliaceous, 3 or 4 lines long, equalling the yellowish corolla, mostly surpassing the globular and somewhat 4-angled capsule: seeds oblong. — DC. Prodr. x. 595; Gray, Bot. Calif. i. 570. — Oregon and N. California.

†† A pair of foliaceous bractlets close to the calyx and equalling it: Atlantic species, one extending westward to the Pacific.

††† Pedicels filiform, equalling or exceeding the leaves: seeds oblong or oval.

= Corolla golden yellow: capsule ovate-conical, acute, much exceeding the reflexed or spreading calyx.

G. pusilla, Torr. Minutely viscid, almost glabrous, slender, 2 or 3 inches high: leaves oblong-linear, obtuse, entire (1½ to 4 lines long): corolla 4 lines long; lobes retuse or emarginate: capsule 2 lines long: seeds comparatively large, obliquely obovate-oblong. — Benth. in DC. Prodr. x. 402. — Arkansas and the adjacent parts of Texas, *Leavenworth, Wright, &c.*

= = Corolla yellowish or whitish, commonly with a tinge of purple: capsule broadly or globose-ovate, equalled by the calyx.

G. gracilis, Benth. l. c. Glabrous or nearly so, small and slender, erect: leaves from oblong- to linear-lanceolate, entire or sparingly dentate: corolla 3 lines long: capsule globular, but acutish. — E. Texas, *Drummond, &c.* Little known.

G. Floridána, Nutt. Glabrous or nearly so, erect, a span or two high: leaves oblong-lanceolate or broader, entire or repand, sometimes remotely dentate, narrow at base (an inch long): corolla 8 lines long, with yellowish tube 2 or 3 times the length of the calyx, and the rather large white lobes all emarginate: capsule broadly ovate. — Jour. Acad. Philad. vii. 103; Benth. in DC. l. c. (with var. ? *intermedia*, a form verging to next species); Chapm. Fl. 292. — Florida, Georgia, and Alabama. Tennessee, *Gattinger*.

G. Virginiana, L. Viscid-puberulent or more pubescent, or below nearly glabrous, divergently branched from the base, a span or less high: leaves commonly glabrous, oblong-lanceolate, acute, from entire to denticulate-serrate, mostly narrow at base (the larger an inch or two long): corolla 4 or 5 lines long, with yellowish tube barely twice the

length of the calyx; lobes nearly white, the two upper emarginate: capsule ovate.—Spec. i. 17; Torr. Fl. 13; Benth. l. c. *G. officinalis*, Michx. Fl. i. 6, not L. *G. Carolinensis*, Pers. Syn. i. 14. *G. neglecta*, Torr. Cat. Pl. N. Y. *G. Missouriana*, Beck in Am. Jour. Sci. x. 253, the viscid form. *Conoclea borealis*, Spreng. Syst. ii. 771.—Canada to Florida and Texas, and west (chiefly northward) to British Columbia, Oregon, and the eastern part of California.

++ ++ Pedicels short, mostly shorter than the calyx: seeds linear.

G. sphærocárpa, Ell. Glabrous or nearly so: stem thick, erect or ascending from a procumbent creeping base, a span to a foot high: leaves from oblong-lanceolate to obovate-oval, from acutely dentate to repand, narrow at base (an inch or two long): corolla 5 or 6 lines long, white: capsule globose, large (2 lines in diameter), pointless, usually somewhat surpassed by the calyx and bractlets.—Ell. Sk. i. 14; Benth. l. c.; Chapm. Fl. 292. *G. acuminata*, Vahl, Enum. i. 92, not Walt. *G. Virginica*, Pursh, l. c., as to short pedicel, excl. syn. Gronov., &c. *G. Carolinensis*, LeConte in Ann. Lyc. N. Y. i. 105.—Maryland and Illinois to Florida and Texas. Remarkable for the size and rotundity of the capsule, and the short pedicel. (Mex.)

* * Sterile stamens conspicuously represented by a pair of filiform filaments with a minutely capitate tip: cauline leaves seldom at all narrowed at the partly clasping base: pedicels slender: stems all more or less creeping at base, and somewhat quadrangular above.

— Corolla golden yellow.

G. aúrea, Muhl. Glabrous or obscurely viscid-puberulent: leaves lanceolate, mostly entire (5 to 10 lines long): upper pedicels equalling the leaves: bractlets equalling the calyx, longer than the globose-ovate capsule: corolla half an inch long: sterile filaments short.—Cat. ed. 1, 1813; Pursh, Fl. i. 12 (but the sterile filaments overlooked), excl. syn.; Ell. Sk. i. 13; Lodd. Bot. Cab. t. 1399; Benth. in DC. Prodr. x. 404.—Lower Canada to Florida, chiefly eastward.

— Corolla white or purplish-tinged, and the tube yellowish within.

++ Bractlets conspicuous, either surpassing, equalling, or little shorter than the calyx.

G. officínalis, L. Wholly glabrous: stem quadrangular, a foot or more high: leaves lanceolate, distinctly 3-nerved, entire or sparingly serrulate (an inch or more long), all exceeding the pedicels and flower: bractlets usually exceeding the calyx: corolla 8 or 10 lines long: sterile filaments elongated: capsule ovate, acute.—Schkuhr, Handb. t. 2; Fl. Dan. t. 363; Benth. l. c.; Chapm. l. c. (but corolla not “pale yellow”), not Michx.—Georgia, LeConte, in herb. Torr. As this specimen is the only known authority, it is questionable whether it is really of American origin. (Eu., N. Asia.)

G. viscosa, Schwein. Viscid-puberulent or pubescent, a span high, rather simple: leaves oblong or ovate-lanceolate, acutely dentate or denticulate, conspicuously clasping (one or two-thirds inch long), shorter than the pedicels: sepals and bractlets broadly or ovate-lanceolate: corolla 5 lines long: sterile filaments short: capsule shorter than calyx.—LeConte in Ann. Lyc. N. Y. i. 106; Benth. l. c.—N. Carolina and Kentucky to Georgia, in the upper country.

G. Drummóndi, Benth. l. c. Puberulent and somewhat viscid, a span or two high: leaves lanceolate, acute, sparsely and acutely serrate (6 to 10 lines long), about equalling the pedicels: sepals and bractlets linear-subulate, much longer than the capsule: corolla from 5 to 6 lines long: sterile filaments short.—Chapm. Fl. 293.—Georgia to Arkansas, Louisiana, and Texas.

++ ++ Bractlets minute or obsolete.

G. ramósa, Walt. Minutely viscid-puberulent, a span or more high: leaves lanceolate or linear-lanceolate, acute, serrate with sharp coarse teeth (6 to 10 lines long), equalling or shorter than the pedicels: sepals linear (2 or 3 lines long), half the length of the corolla: sterile filaments filiform.—Car. 61. *G. Virginica*, Lam. Ill. t. 16, fig. 2. *G. quadridentata*, Michx. Fl. i. 6; Ell. l. c.; Benth. l. c. (this specific name later and no better than that of Walter).—S. Carolina to Florida.

§ 2. **SOPHIRONÁNTHE**, Benth. l. c. Anther-cells vertical, contiguous; the connective not dilated: herbs with erect and strict rigid stems, hirsute or hispid, growing in less wet soil: flowers sessile, small: sterile filaments manifest,

filiform, with minutely capitate tip : capsule oblong-conical, acuminate, about the length of the 2-bracteolate calyx : seeds oval or short-oblong : corolla white or purplish-tinged.

G. pilósa, Michx. Stem a foot or two high from an apparently annual root : leaves ovate or ovate-lanceolate, sparingly and acutely denticulate, closely sessile by a broad base : corolla 3 or 4 lines long, little exceeding the calyx ; the tube oblong. — Fl. i. 7 ; Pursh, l. c. ; Benth. l. c. ; Chapm. Fl. 293. *G. Peruviana*, Walt. l. c., not L. — New Jersey to Florida and Texas.

G. subuláta, Baldw. A span high from a ligneous perennial root, very leafy : leaves linear-lanceolate, obtuse, entire, with revolute margins, rigid : corolla half inch long, somewhat salverform ; its slender tube nearly thrice the length of the calyx, marcescent and recurving in age. — Benth. in DC. l. c. ; Chapm. l. c. *Sophranthe hispida*, Benth. in Lindl. Introd. Nat. Syst. ed. 2, 445. — Coast of Florida, in sandy pine barrens.

G. MEGALOCÁRPA, Ell. Sk. i. 16, is a factitious species, established by Elliott wholly upon Pursh's *G. acuminata*, which is based upon Walter's character, but evidently confused with some other plant.

G. MICRÁNTHA, Nutt. in Am. Jour. Sci. v. 287 (E. Florida, *Ware*), is characterized as having an erect angulate stem, a foot high, lanceolate and serrate acute leaves attenuate at base, peduncles shorter than the leaves, ebracteolate calyx 4-parted, and stamens 4. Probably *Scoparia dulcis*.

18. ILYSÁNTHES, Raf. (*Νεξ*, mud, and *ἄθη*, blossom.) — Low and rather small flowered annuals, or chiefly so, glabrous, branching ; with opposite undivided leaves, all but the lowest sessile, and flowers on filiform ebracteolate pedicels, which are either axillary or by reduction of the leaves racemose or paniculate, in fruit usually refracted. Calyx-lobes narrow. Corolla violet or bluish, or partly white. Sterile filaments in ours glandular with a glabrous lateral lobe. Flowering all summer, in wet soil. — Raf. Ann. Nat. 1820, 13 ; Benth. in DC. Prodr. x. 418.

I. grandiflóra, Benth. l. c. Stems creeping at base, leafy throughout : leaves roundish, entire, thickish : peduncles all much surpassing the leaves : corolla (3 or 4 lines long) about thrice the length of the calyx : lobe of sterile filaments rather long and borne below the middle. — *Lindernia grandiflora*, Nutt. Gen. ii. 43. — Eastern Georgia and Florida, Nuttall, Garber, &c.

I. gratioloídes, Benth. l. c. Diffusely spreading from the base, or at first simple and erect, leafy : leaves ovate or oblong, often slightly and acutely few-toothed ; the later ones reduced to bracts : corolla (3 lines long) hardly twice the length of the calyx : lobe of sterile filaments short : capsule ovoid, equalling the calyx. — *Capraria gratioloídes*, L. Spec. ed. 2, 876. *Gratiola anagallidea*, Michx. Fl. i. 5. *G. dilatata*, Muhl. Cat. *G. attenuata*, Spreng. Syst. i. 39. *G. tetragona*, Ell. Sk. i. 15 ? *Lindernia pyxidaria*, Pursh, Fl. ii. 419, not Allioni. *L. dilatata* & *L. attenuata*, Muhl. in Ell. Sk. i. 16 ; Bart. Fl. Am. Sept. i. 31. *Herpestis callitrichoides*, HBK. *Ilysanthes riparia*, Raf. l. c. — Canada to Florida and Texas ; also Oregon and California. (S. Am., E. Asia, and nat. in W. Eu.)

I. refrácta, Benth. l. c. Stems a span or two high, erect from a rosulate tuft of spatulate-oblong or obovate radical leaves (of an inch or less in length), filiform, below bearing one or two pairs of small and oblong or oblong-linear entire or obscurely serrate leaves, and above only linear-subulate bracts, which are many times shorter than the almost capillary racemose pedicels : corolla narrow (3 to 6 lines long), four times the length of the calyx : capsule oblong, from one half to twice longer than the calyx : root perhaps biennial. — *Lindernia refracta*, Ell. Sk. i. 579. *L. monticola*, Nutt. Gen. addend. — Mostly on dripping rocks, Western N. Carolina to Florida.

Var. saxícola. Apparently only a smaller form, barely a span high, with more leafy stems, shorter internodes, and capsule (as far as seen) little surpassing the calyx. — *Lindernia monticola*, Muhl. Cat. 61 ? *L. saxicola*, M. A. Curtis in Am. Jour. Sci. xlv. 83. *Ilysanthes saxicola*, Chapm. Fl. 294. — Mountains of S. W. North Carolina to E. Florida.

19. **MICRÁNTHEMUM**, Michx. (Composed of μικρός, small, and ἄνθεμον, flower.) — Creeping or depressed small (American) annuals, in mud or shallow water, glabrous, branching, leafy throughout; the leaves opposite, rounded or spatulate, sessile, usually 3–5-nerved, entire. Flowers solitary in alternate axils, white or purplish, inconspicuous. — Gray, Man. ed. 5, 330. *Hemianthus*, Nutt., includes the species with limb of corolla as it were halved, the upper lip wanting or nearly so.

M. orbiculátum, Michx. Creeping freely: leaves roundish, 2 to 4 lines long: pedicels shorter than calyx: corolla white, hardly equalling the 4-cleft calyx; its upper lip or lobe manifest: stigma capitate. — Fl. i. 10, t. 2. *M. emarginatum*, Ell. Sk. i. 18. — N. Carolina to Texas. (S. Am.)

M. Nuttállii, Gray. Creeping, with ascending branches an inch or two high: leaves oblong-spatulate or oval-obovate, 2 or 3 lines long: pedicels equalling the campanulate 4-toothed calyx: corolla purplish or white, with obsolete upper lip; middle lobe of the lower lip linear-oblong, nearly twice the length of the lateral ones: appendage of the stamens nearly equalling the filament itself: stigma of 2 subulate lobes. — Man. ed. 5, 331. *Herpestis micrantha*, Ell. Sk. ii. 105? *Hemianthus micranthemoides*, Nutt. in Jour. Acad. Philad. i. 123, t. 6. — Tidal mud of rivers, New Jersey to Florida: fl. late summer and autumn.

20. **AMPHIÁNTHUS**, Torr. (Ἀμφι, on both sides, ἄνθος, a flower; a blossom produced both at base and apex of the stem.) — Single species.

A. pusillus, Torr. A minute annual, glabrous, bearing a radical tuft of oblong or obovate leaves (each a line or two long) and a subsessile flower, also sending up a capillary scape an inch or two high and terminated by another similar flower subtended by a pair of leaves: corolla white. — Ann. Lyc. N. Y. iv. 82; Benth. in DC. l. c. 425. — Shallow pools on flat rocks, Upper Georgia, particularly on Stone Mountain, *Leavenworth, Canby, &c.*: fl. early spring.

21. **LIMOSÉLLA**, L. MUDWORT. (*Limus*, mud, and *sella*, seat.) — Small annuals, or proliferous-perennial by stolons, glabrous (of wide distribution); with fibrous roots and a cluster of entire fleshy leaves at the nodes of the stolons, and short scape-like naked pedicels from the axils, bearing a small and white or purplish flower, in summer.

L. aquática, L. Tufts an inch or two high: clustered leaves longer than the pedicels, when scattered on sterile shoots alternate, in the typical form with a spatulate or oblong blade on a distinct petiole; this in mud rather short, in water elongating to the length of 2 to even 5 inches. — Reichenb. Ic. Germ. t. 1722. — From Hudson's Bay to S. Colorado and the Sierra Nevada, California, in brackish mud, and in fresh water; also on the Pacific coast? (Eu., N. Asia, Australia, S. Am.)

Var. tenuifólia, Hoffm. Leaves subulate or filiform, with little or no distinction of petiole and blade, seldom over an inch or so in length. — Gray, Man. l. c.; Reichenb. Ic. Germ. l. c. *L. tenuifolia*, Nutt. Gen. ii. 43. *L. subulata*, Ives in Am. Jour. Sci. i. 74, with plate. *L. australis*, R. Br. Prodr. 443. — Brackish river-banks and shores. Canada to New Jersey. (S. Am., Australia, Eu., &c.)

22. **SCOPARIA**, L. (*Scopæ*, twigs used for brooms.) — Tropical American undershrubs or herbs, much branched; with small and slender-pedicelled flowers in the axils of the opposite and verticillate leaves.

S. dulcis, L. Annual or suffrutescent, almost glabrous: leaves from oblong-spatulate to narrowly lanceolate, tapering at base, the larger serrate and incised: sepals 4: corolla white, 3 lines wide. — Lam. Ill. t. 85. *Gratiola micrantha*, Nutt. in Am. Jour. Sci. v. 287? — S. Florida and perhaps on the Mexican border. (Mex., Trop. & Subtrop. Am., and now in Asia, &c.)

23. **CAPRÁRIA**, L. (*Caprarius*, relating to goats, i. e. Goat-weed. — Tropical American herbs or undershrubs; with rather small white or flesh-colored flowers, on slender often geminate pedicels, in the axils of the alternate serrate leaves. One species barely reaches our southern border.

C. biflóra, L. Suffrutescent, 2 to 4 feet high, pubescent or glabrous: leaves oblong-lanceolate, sharply serrate above the middle: sepals linear-subulate, equalling the capsule. — Key West, and S. Texas on the coast; the glabrous form, mostly 5-androus, *C. Mexicana*, Moricand in DC. (Tropical shores.)

24. **SÝNTHYRIS**, Benth. (From *σύν*, together, and *θύρῆς*, little door or valve, the valves of the capsule long adhering below to the short placentiferous axis.) — W. North American perennials, nearly related to *Wulfenia* of S. E. Europe and the Himalayas; but the anther-cells not confluent and seeds discoidal. Leaves largely radical and petioled; those of the simple stem or scape and the bracts all alternate. Flowers small, purplish or flesh-color, in a simple spike or raceme; in summer. Stamens inserted close to the sinuses of the corolla. — DC. Prodr. x. 454, & Gen. ii. 963.

§ 1. Ovules and seeds only a pair in each cell, on a short partition: capsule divaricately 2-lobed; the cells transversely oblong: seeds with thickish margins incurved at maturity: acaulescent, with naked scapes.

S. rotundifólia. Rootstock short and creeping, bearing a tuft of cordate-orbicular doubly crenate or crenate-incised leaves (glabrous or slightly hairy), and weak scapes hardly exceeding the petioles (3 or 4 inches long): pedicels of loose short raceme longer than the bluish flowers (about half inch long): sepals spatulate: corolla campanulate. — *S. reniformis*, Gray, Bot. Calif. i. 571, chiefly, not Benth. — Oregon, in shady coniferous woods of the Columbia and Willamette, *Nuttall*, *E. Hall*; and probably first collected in woods N. E. of Fort Vancouver by *Gairdner*.

Var. cordáta, a form with smaller and thicker almost simply crenate leaves of cordate outline. — *S. reniformis*, var. *cordata*, Gray, l. c. — Gravelly hillsides, Mendocino Co., California, *Kellogg* & *Harford*.

§ 2. Ovules and usually seeds several or numerous in each cell: capsule merely emarginate: seeds plauve or meniscoidal, thin-edged.

* Flowers racemose rather than spicate: leaves of the preceding section: capsule orbiculate, much compressed, acute-edged.

S. renifórmis, Benth. l. c. A span or so high: leaves orbicular-reniform, crenate and crenately somewhat incised, an inch or two in diameter: surpassed by the somewhat bracteate slender scape: pedicels mostly shorter than the bluish flowers: capsule truncate-emarginate. — *Wulfenia reniformis*, Dougl. in Hook. Fl. ii. 102, t. 71. (Fig. 3 represents the capsule much too long and too turgid.) — Oregon and Washington Terr. "Grand Rapids of the Columbia and Blue Mountains," *Douglas*.

Var. major, Hook. Leaves of thicker texture and with multilobulate margin, the lobelets crenate: raceme spiciform: capsule strongly emarginate. — Kew Jour. Bot. v. 257. — Idaho. Fertile northerly slopes of snowy mountains, highlands of Nez Percé, *Geyer*, in fruit. Porphyry Peak, *Prof. Marcy*, in flower.

* * Flowers in a dense spike terminating a stouter and more or less bracteate or leafy scape or stem: rootstock or caudex short, thickish, not creeping: capsule turgid, from short-oval to elliptical, slightly emarginate or retuse.

+ Leaves laciniately cleft or divided, all radical: corolla cylindraceous, considerably longer than the calyx, 4-cleft to the middle.

S. pinnatifida, Watson. Tomentulose-pubescent and glabrate: leaves slender-petioled, from round-reniform to oblong in circumscription, from palmately to pinnately 3-7-parted or below divided, and the divisions again laciniately cleft or parted: scape sparingly bracteate, a span high: spike narrow: flowers subsessile: corolla whitish. — Bot.

King, 227, t. 22, wrongly depicted with 2 styles! — Utah, in Wahsatch Mountains at 9,000 feet, *Watson*. S. Idaho, on mountains near Virginia City, *Hayden*.

Var. laciniata. Leaves all of roundish or reniform outline, and laciniately many-cleft to the middle or less. — Fish-Lake Mountain, Utah, 11,700 feet, *L. F. Ward*.

+ + Leaves undivided, merely crenate or crenulate: scape or stem leafy-bracteate.

++ Corolla mostly 2-parted, rarely 3-parted, and stamens inserted on its very base.

S. alpina, Gray. A span or only an inch or two high, early glabrate except the very lanuginous inflorescence: radical leaves oval or subcordate, an inch or so long on a longer petiole: base of stem or scape naked: spike very dense, oblong or cylindraceous: bracts and lanceolate sepals very long-woolly-villous at margins: corolla violet-purple, very unequal; its broad upper lip twice the length of the calyx, the 2-3-parted lower one small and included. — *Am. Jour. Sci.* ser. 2, xxxiv. 251. — Colorado Rocky Mountains in the alpine region, first collected by *Parry*.

S. plantaginæa, Benth. A foot or less high, rather stout; tomentulose-pubescent when young, tardily glabrate: radical leaves oblong, rarely cordate, usually obtuse at base, pale or dull, 2 to 4 inches long: scape very leafy-bracteate: dense spike 3 to 5 inches long: bracts and ovate sepals glabrate and villous-ciliate: corolla purplish; its upper lip little exceeding the calyx, twice the length of the 2-3-lobed lower one. — *Prodr.* l. c.; *Gray*, l. c. — Rocky Mountains of Colorado and New Mexico, in subalpine woods, first collected in Long's expedition, by *James*.

S. Houghtoniána, Benth. A foot or two high, pubescent: radical leaves cordate or ovate, 2 or 3 inches long: scape or stem strict, very leafy-bracteate: spike 4 to 8 inches long, dense, or at base open: bracts and oblong-lanceolate sepals soft-pubescent: corolla greenish or dull yellowish, not longer than the calyx, variously 2-4-parted; the divisions almost equal in length. — *Gray*, *Man.* ed. 5, 331. — Oak-barrens and prairies, Michigan and Wisconsin to W. Illinois. Rarely with 3-celled ovary, or 5-merous calyx, or 4 stamens, the additional pair later.

++ ++ Corolla wanting: stamens inserted on the outside of the hypogynous disk.

S. rubra, Benth. l. c. A span to a foot or more high, rather stout, more or less pubescent, and the spike (2 to 5 inches long) tomentose: radical leaves ovate or obscurely cordate (1 to 3 inches long), thickish; the cauline similar, but small and sessile: sepals oblong: capsule turgid. — *Gymnandra rubra*, *Dougl.* in *Hook. Fl.* ii. 103, t. 172. — Along streams, interior of Oregon to Brit. Columbia, Montana, and N. Utah. Name inappropriate: perhaps the stamens are reddish.

25. VERÓNICA, L. SPEEDWELL, BROOKLINE. (Flower of *St. Veronica*?) — Herbs in all the northern temperate regions, &c. (in Australia and New Zealand, in a peculiar section, shrubby or even arborescent, and with a turgid septical capsule), of various habit; the leaves opposite or verticillate, or sometimes the upper alternate, as are the bracts. Flowers small, racemose, spicate, or solitary in the axils, never yellow; in spring or summer.

§ 1. **LEPTÁNDRA, Benth.** in DC. Corolla salverform; the tube longer than the lobes: stamens and style much exerted, the former inserted low on the tube: capsule ovate, turgid, hardly at all compressed, not at all emarginate, dehiscent at apex by all four sutures, at length more loculicidal: seeds numerous, oval and terete, with minutely reticulated coat: tall perennials: leaves mostly verticillate: flowers in dense terminal and also upper axillary spikes, minutely bracteate. — *Leptandra*, *Nutt. Gen.* i. 7. *Eustachya* & *Callistachya*, *Raf.*

LEPTANDRA ANGUSTIFOLIA, *Lehm.* *Del. Sem.* Hamb. 1839 (*Veronica angustifolia*, *Steud.*), mistakenly said to have been raised from New Orleans seed, is *V. tubiflora*, *Fischer & Meyer*, of E. Siberia.

V. Virginica, L. (*CULVER'S PHYSIC.*) Nearly glabrous, or foliage pubescent: simple stems 2 to 6 feet high: leaves in whorls of 3 to 9, lanceolate and slender-acuminate, some-

times oblong, very closely and sharply serrate, 3 to 5 inches long: terminal spike 6 to 10 inches long, with commonly several shorter ones from upper axils: corolla white, sometimes bluish. — Spec. i. 9 (Pluk. Alm. t. 70, fig. 2); Hoffm. Comm. Gett. xv. t. 1; Thunb. Fl. Jap. 20; Michx. Fl. i. 5. *Eustachya alba* & *purpurea*, & *Callistachya Virginica*, &c., Raf. *Leptandra Virginica*, Nutt. l. c. *L. purpurea*, Raf. Med. Bot. t. 59. *Veronica Sibirica*, L. Spec. ed. 2, i. 12. *V. Japonica*, Steud.; Miq. Prol. Jap. 50. — Moist woods and banks, from Canada and Winipeg Valley to Alabama and Missouri: fl. summer. (Japan and E. Siberia.)

§ 2. *VERONICA* proper. Corolla rotate with very short tube: stamens at the upper sinuses: capsule from emarginate to obcordate—2-lobed: seeds more or less compressed anteriorly and posteriorly, or plano-convex, or the inner face hollowed: low herbs.

* Perennials, stoloniferous or creeping at base: racemes in the axils of the opposite leaves.

+ Capsules many-seeded, turgid, orbicular and mainly emarginate: seeds merely compressed or plano-convex: lower part of stems rooting in shallow water: racemes commonly from opposite axils, loose and elongated: pedicels slender, widely spreading: corolla pale blue, often purple-striped.

V. Anagallis, L. Glabrous, or inflorescence glandular-puberulent: leaves sessile by broadish somewhat clasping base, and tapering gradually to the apex, oblong-lanceolate, entire or obscurely serrate. — Fl. Dan. t. 903; Engl. Bot. t. 781. — Canada to Illinois, New Mexico, and Brit. Columbia. (Eu., Asia.)

V. Americana, Schwein. Glabrous: leaves all or mostly petioled, ovate or oblong, truncate-subcordate at base, usually obtuse: pedicels more slender. — Herb. Hook.; Benth. in DC. l. c. *V. intermedia*, Schwein. in Am. Jour. Sci. viii. 268, name only. *V. Beccabunga* of older Am. authors. *V. Anagallis*, Bong. Veg. Sitk., &c. — Canada and N. Atlantic States to New Mexico, California, and Alaska.

+ Capsule several-seeded, strongly compressed contrary to the partition: seeds very flat: racemes or spikes from alternate or sometimes from opposite axils: corolla mostly pale blue.

V. scutellata, L. Glabrous: stem slender, ascending from a stoloniferous base, a span or two high: leaves sessile, linear or linear-lanceolate, acute, remotely denticulate (2 or 3 inches long): racemes several, filiform, flexuous: flowers scattered on filiform elongated and widely spreading pedicels: capsule biseutelliform, being deeply emarginate at apex and slightly at base. — Fl. Dan. t. 209; Engl. Bot. t. 782; Michx. l. c. — Swamps, Hudson's Bay and N. Atlantic States to British Columbia and N. California. (Eu., N. Asia.)

V. Chamædryas, L. Stem ascending from a creeping base, pubescent, at least in two lines: leaves ovate or cordate, incisely crenate, subsessile: racemes loosely-flowered: pedicels little longer than calyx: blue corolla rather large: capsule triangular-obcordate. — Engl. Bot. t. 673. — Sparingly introduced into Canada, New York, and Penn. (Nat. from Eu.)

V. officinalis, L. Soft-pubescent throughout: stems creeping and procumbent: leaves short-petioled or subsessile, obovate-oval or oblong, obtuse, serrate, pale (an inch long): spikes few, alternate or solitary, rarely from opposite axils, densely many-flowered: pedicels shorter than calyx: capsule obovate-triangular or cuneate, with a broad and shallow notch at the apex. — Fl. Dan. t. 248; Lam. Ill. t. 13; Engl. Bot. t. 765; Michx. l. c. — Dry hills and open woods, New England to Michigan, and south to the mountains of N. Carolina and Tennessee. (Eu., N. W. Asia.)

V. Kamtschatica, L. f. Villous with somewhat viscid hairs: stems ascending, 1 to 3 inches long, bearing 3 to 5 pairs of leaves separated by short internodes: leaves 6 to 18 lines long, broadly oval, obscurely serrate, contracted into a short petiole-like base: peduncles 1 to 3, erect, surpassing the leaves, somewhat corymbosely 3-8-flowered: pedicels about the length of calyx and bracts: corolla half inch or more in diameter, perhaps bright blue. — Suppl. 83. *V. grandiflora*, of Gærtn. in Comm. Act. Petrop. xiv. t. 18, not of Don, &c. *V. aphylla*, var. (Willd. Spec. i. 60; Cham. & Schlecht. in Linn. ii. 556) *grandiflora*, Benth. in DC. Prodr. x. 476; Ledeb. Fl. Ross. iii. 245. — Kiska, one of the Aleutian Islands, Dall. (Kamtschatka and adjacent islands.)

* * Low perennials, with ascending or erect flowering stems terminated by a single raceme: cauline leaves above passing into bracts: seeds numerous, much compressed or somewhat meniscoidal. (Specimens disposed to turn dark in drying.)

V. fruticulosa, L., of Europe, is in Greenland, beyond our limits.

- + Capsule ovate, elliptical, or oblong, merely emarginate: stems erect from a slender creeping rootstock: leaves all sessile or nearly so: corolla blue or violet.
- V. Cusickii.** A palm high, glabrous or pubescent: leaves ovate or oblong, entire (half to three fourths inch long); the pairs crowded up to the naked peduncle of the 3-9-flowered raceme: pedicels slender, often as long as the flower and longer than the oblong-linear bracts: corolla 4 or 5 lines in diameter, with ample rounded lobes: these surpassed by the filiform filaments and style; the latter thrice the length of the deflorate calyx. — Alpine region of the Blue Mountains, W. Oregon, *W. C. Cusick*, a form with glabrous thickish leaves. Scott Mountains in N. California, at 8,000 feet, *E. L. Greene*, form with narrower and hirsute-pubescent leaves, rarely with a denticulation or two. Nearly related to *V. macrostemon* of Bunge.
- V. Stelleri, Pall.** A palm high, hirsute, leafy up to the sessile corymbose raceme: leaves ovate, copiously crenate-serrate (three fourths inch long): pedicels slender, longer than the flowers: corolla as in the foregoing: stamens barely equalling its lobes: slender style not surpassing the calyx: "capsule ovate, hardly emarginate." — Rœm. & Sch. Syst. Mant. i. 102; Cham. in Linn. ii. 557; Benth. in DC. Prodr. x. 481. — Unalaska and other Aleutian Islands. (Kamtschatka and Curile Islands.)
- V. alpina, L.** A span or rarely a foot high, hirsute-pubescent or glabrate: leaves mostly shorter than the internodes of the simple stem, ovate to oblong, crenulate-serrate or entire (half to full inch long): raceme spiciform or subcapitate, dense, or interrupted below: pedicels erect, shorter than the calyx (at least in flower), much shorter than the bracts: corolla with comparatively small limb, 2 or 3 lines in diameter, surpassing the stamens and short style: capsule elliptical-ovate, emarginate. — Fl. Lapp. 7, t. 9, fig. 4; Spec. i. 11; Fl. Dan. t. 16; Benth. l. c.; Ledeb. Fl. Ross. iii. 248. *V. Wormskioldii*, Rœm. & Sch. Syst. i. 101 (villous inflorescence); Hook. Bot. Mag. t. 2975 (as var. of *alpina*), the larger-leaved and villous-pubescent form, commonest in N. America. *V. nutans*, Bong. Veg. Sitk. 39. — Alpine regions, White Mountains of New Hampshire, Rocky Mountains and Sierra Nevada for nearly their whole length, and north to Labrador, subarctic regions, and Aleutian Islands. (Eu., Asia, Greenland.)
- + + Capsule oblatly orbicular and obcordate: lower leaves short-petioled; upper sessile: corolla usually bluish or pale with blue stripes.
- V. serpyllifolia, L.** Glabrous or puberulent: stems creeping and branching at base, with flowering summit ascending 3 to 9 inches high: leaves oval or roundish, entire or crenulate (half inch or less long); the upper passing into bracts of the leafy spiciform raceme: pedicels erect, as long as the calyx. — Fl. Dan. t. 492; Engl. Bot. t. 1075. — Open and grassy grounds. Labrador to the mountains of Georgia, New Mexico, and across the continent to California and Aleutian Islands. (Eu., Asia, S. Am.)
- * * Low annuals: flowers in the axils of ordinary or of the upper more or less reduced and commonly alternate leaves: corolla mostly shorter than the calyx. (All but the first naturalized from the Old World.)
- + + Seeds flat or flattish, small and numerous: flowers very short-pedicelled, appearing somewhat spicate, the floral leaves being reduced or unlike the others.
- V. peregrina, L. (NECKWEED.)** Glabrous, or above minutely pubescent or glandular: stem and branches erect, a span or two high: leaves thickish; lowest petioled and oblong or oval, dentate; the others sessile, from oblong to linear-spatulate, mostly alternate; uppermost more bractlike and entire: capsule orbicular and slightly obcordate. — *V. Marilandica*, Murr. Comm. Goett. 1782, 11, t. 3, not L. *V. Caroliniana*, Walt. Car. 61. *V. Xalapensis*, HBK. — Low grounds, and a weed in damp cultivated soil, throughout the U. S. and Canada to Brit. Columbia. (S. Am., and now almost cosmopolite.)
- V. arvensis, L.** Pubescent, a span or two high, soon spreading: lower leaves ovate, crenate, short-petioled: floral sessile, lanceolate, entire: capsule broadly obcordate. — Cult. and waste ground, Atlantic States to Texas: rather rare. (Nat. from Eu.)
- + + Seeds fewer, cyathiform, much hollowed on the ventral face (§ *Omphalospora*, Bess.): prostrate or spreading annuals: flowers on slender at length recurving pedicels from the axils of ordinary and petioled leaves.
- V. agræstis, L.** Pubescent: leaves from round-ovate or subcordate to oblong, crenate-serrate, about equalling the pedicels: sepals oblong, surpassing the small corolla: ovules numerous: capsule orbicular with a deep and narrow emargination, maturing few or solitary seeds. — Sandy fields, New Brunswick to Louisiana: rare. (Nat. from Eu.)

V. BUXBAUMII, Tenore. More pubescent: leaves mainly roundish, crenate-dentate, shorter than the filiform pedicels: corolla larger, nearly half inch in diameter, blue: sepals divaricate in fruit, ovate-lanceolate: capsule broadly obovate-triangular, with a widely open emargination, ripening several or rather numerous seeds. — Waste grounds, rare in Atlantic States. (Nat. from Eu.)

V. HEDERÆFOLIA, L. Hairy: leaves roundish, often subcordate (half inch long), somewhat 3-5-lobed, commonly shorter than the pedicels: sepals triangular-subcordate, acute, at length erect: corolla small: capsule turgid, 2-lobed, 4-ovuled, 2-4-seeded. — Moist banks, New Jersey, Penn., &c.: rather rare. (Nat. from Eu.)

V. MARILÍNICA, L. Spec. i. 14 (Pl. Gronov. Fl. Virg.) is *Polypremum procumbens*.

V. CAROLINIÁNA, Poir, Dict. viii. 520, appears to be *Mitreola petiolata*.

V. RENIFÓRMIS, Raf. in Med. Rep. & Jour. Bot. i. 228, is not made out: perhaps *V. hederæfolia*, but its flowers are not "subsessile," nor are they said to be so in the original character in Med. Repository.

V. PÚRSHII, Don, Syst. iv. 573 (*V. reniformis*, Pursh, Fl. i. 10), collected by Lewis and Clark "on the banks of the Missouri," is not identified, although described in detail; probably not of this genus.

26. BÚCHNERA, L. (*I. G. Buchner*, an early German botanist.) — Erect perennials or biennials (of both worlds), drying blackish, scabrous; with undivided leaves, the lower opposite, and the upper gradually reduced to subulate bracts of a terminal spike; the flowers white, bluish or rose-purple, produced in summer.

B. Americána, L. Rough-hispid: stem strict, 2 feet high: lowest leaves obovate or oblong, obtuse; the others from ovate-oblong to linear-lanceolate, coarsely and sparsely dentate, somewhat veiny, sessile: spike short, rather dense, or interrupted: calyx not half the length of the tube of the purple (inch long) corolla: lobes of the latter cuneate-obovate, 3 or 4 lines long. — Spec. ii. 360; Michx. Fl. ii. 18; Benth. in DC. l. c. 498. — Moist sandy or gravelly ground, Western New York and Wisconsin to Virginia, Arkansas, and Louisiana.

B. elongáta, Swartz. Scabrous, but seldom hispid, slender, a foot or more high, long-naked above: radical leaves obovate; lower oblong or lanceolate, obscurely or rarely dentate; upper linear: spike slender, often few-flowered: tube of purple ("blue or white") corolla not twice the length of the calyx; its rounded lobes not over 2 lines long. — Fl. Ind. Occ. ii. 1061; Benth. l. c. — Pine barrens, S. Carolina to Florida and Texas. (W. Ind., S. Am.)

27. SEYMÉRIA, Pursh. (*Henry Seymer*, an English amateur-naturalist.) — Erect and mostly branching herbs (mainly of Atlantic States and Mexico, one in Madagascar!); annuals or some perennials; with copious and mostly opposite incised or dissected leaves, the uppermost reduced to bracts of the somewhat racemose or spicate and comparatively small yellow flowers, produced in late summer.

§ 1. Style filiform and long: stigma simple or slightly capitate: corolla glabrous within, except a line at the insertion of the stamens: anthers dehiscent from the apex and tardily to near the base: leaves small: stems paniculately much branched.

* Leaves filiformly dissected: corolla very deeply cleft; the lobes oblong.

S. tenuifólia, Pursh. Glabrous, or the branches puberulent, very slender, 2 to 4 feet high: leaves (half inch long) copiously 1-2-pinnately parted: pedicels filiform: corolla about 3 and capsule 2 lines long: calyx-lobes setaceous: filaments minutely woolly at base: anther-cells acutish. — Fl. ii. 737; Benth. in DC. Prodr. x. 511. *Anonymos cassioides*, Walt. *Afzelia cassioides*, Gmel. Syst. 927. *Gerardia Afzelia*, Michx. Fl. ii. 20. — Low pine barrens, N. Carolina to Florida and Texas.

* * Leaves or their divisions linear or broader: corolla-lobes obovate or oval, about the length of the tube and throat: pedicels short.

+ Capsule ovate and gradually acuminate, 4 or 5 lines long, glabrous or nearly so: anthers sagittate, the cells very acute.

S. scábra, Gray. Hispidulous-scabrous, not glandular, slender, 2 feet high: leaves sparingly pinnately parted into few narrow linear divisions, or the upper few-lobed or entire: calyx-lobes subulate-linear: corolla glabrous. — Bot. Mex. Bound. 118. — Mountains near Rio Limpio, S. W. Texas, *Wright*.

+ + Capsule broadly ovate and merely acute, 2 lines long, glandular-hairy: anthers very obtuse.

S. pectináta, Pursh, l. c. Minutely viscid-pubescent or glabrate, about a foot high, slender: leaves pinnately parted into rather few short- or oblong-linear divisions, or the upper incisely few-toothed or entire: calyx-lobes linear: corolla hairy outside, especially in the bud. — Ell. Sk. ii. 122; Chapm. Fl. 297. — Dry sandy soil, N. Carolina to Florida and Alabama, and perhaps to Texas.

S. bipinnatisécta, Seem. Very glandular-pubescent and viscid, a foot or two high, stouter: leaves rather copiously 1-3-pinnately parted; the divisions from linear to oblong, small, often incisely toothed; even the bracts and sometimes the oblong-linear calyx-lobes lobed or incised: corolla somewhat glandular-pubescent outside. — Bot. Herald, 323, t. 59; Gray in Bot. Mex. Bound. 117, as var. *Texana*, with short pedicels, &c.; but early flowers more slender-pedicelled. — W. and S. Texas, *Lindheimer, Wright, Bigelow, &c.* (N. Mex.)

§ 2. Style short, with enlarged and compressed tip: corolla densely woolly within above the insertion of the very woolly filaments: anthers oblong, freely dehiscent to base: leaves ample. — § *Brachygne, Benth.*

S. macrophýlla, Nutt. Somewhat pubescent or glabrate; stems rather simple, 4 or 5 feet high: lower leaves pinnately parted, and the divisions lanceolate and incisely toothed or pinnatifid; upper leaves lanceolate or oblong, mostly entire: flowers very short-pedicelled in the axils of the upper leaves and bracts: calyx-lobes from oval to lanceolate, about the length of the tube: corolla barely half inch long; the ovate lobes not longer than the tube: capsule globose-ovate, with a flat mucronate point. — Gen. ii. 49; Benth. in DC. l. c. *Gerardia macrophylla*, Benth. in Comp. Bot. Mag. i. 205. — River banks and copses, Ohio to Illinois, Arkansas, and Texas.

28. MACRANTHÉRA, Torr. (*Μακρός*, long, and *ἀνθηρός*, used for anther, but it is here the filaments which are long.) — Genus of a single species, most related to *Esterhazyia* of Brazil. Fl. autumn.

M. fuchsioides, Torr. Tall biennial, minutely puberulent or glabrate, 3 to 5 feet high, with some strict virgate branches: leaves all opposite, short-petioled, from entire to pinnatifid or pinnately parted (the larger 4 to 8 inches long); uppermost reduced to linear or lanceolate bracts of the elongated virgate raceme: pedicels (near an inch long) divaricate or decurved with incurved apex, so that the flowers are erect: tube of the calyx very short and broad; the divisions distant, narrowly linear or somewhat spatulate, often pinnatifid-incised, rather shorter than the minutely puberulent orange-colored corolla: tube of the latter cylindrical, half to three-fourths inch long, slightly curved at summit; the lobes ovate, about 2 lines long: filaments with short and lax glandular beard: anthers less bearded or glabrate; the linear cells mucronate-pointed at base. — Comp. Bot. Mag. i. 203, & Ann. Lye. N. Y. iv. 81; Benth. l. c., & DC. Prodr. x. 513; Chapm. Fl. 297. *Conradia fuchsioides*, Nutt. Jour. Acad. Philad. vii. 88, t. 11, 12. *Dusystema tubulosa*, Bertol. Misc. 13, t. 3. — Pine barrens, Georgia, Alabama, and Florida (not "Louisiana"), *Dr. Gates, &c.*

Var. Lecónteï, Chapm. l. c. Calyx smaller, with subulate wholly entire lobes usually much shorter than the tube of the corolla: but passing into the preceding form. — *M. Lecontei*, Torr. l. c. 83, t. 4. — Lower Georgia, *LeConte*. Middle Florida, *Chapman*.

29. GERÁRDIA, L. (*John Gerarde*, the English herbalist of the 16th century.) — Annual or perennial erect and branching herbs (all American and mostly of Atlantic U. S.); with mainly opposite leaves, the uppermost reduced to bracts of the racemose or paniculate showy flowers. Corolla rose-purple or yellow; the former color rarely varying to white. Fl. late summer and autumn.

§ 1. *DASYSTOMA*, Gray, Man. Corolla more or less funnellform, yellow; the proper tube within, as also anthers and filaments, pubescent or villous-woolly: anthers all alike, hardly included; the cells aristate at base: rather tall and large-flowered perennials or biennials; with calyx-lobes sometimes foliaceous and incised, and comparatively broad leaves often incised or pinnatifid. (For root-parasitism, see Gray, Struct. Bot. t. 145.) — *Dasystoma*, Raf. in Jour. Phys. lxxxix. 99; Benth. in DC. Prodr. x. 520.

* Pubescence partly glandular and viscid, especially on the slender pedicels and calyx; corolla pubescent outside: root biennial or annual.

G. pediculária, L. Paniculately much branched, 2 or 3 feet high, soft-pubescent or villous and viscid, or the foliage hardly so: leaves mostly sessile, an inch or two long, oblong- or ovate-lanceolate in outline, all pinnatifid; the divisions crowded and incisely pinnatifid or toothed: pedicels 4 to 12 lines long: calyx-lobes foliaceous, from linear to oblong, equalling or longer than the tube, often denticulate or incisely serrate: corolla from 1 to 1½ inches long. — Spec. ii. 611; Lam. Dict. ii. 529; Ell. Sk. ii. 121. *Dasystoma pedicularia*, Benth. in DC. l. c. — Canada and west to the Mississippi, south to Florida.

Var. pectináta, Nutt. A southern more villous and glandular form, with rather narrower leaves, and more foliaceous lobes of the calyx longer than its tube. — Gen. ii. 48. *G. pectinata*, Torr. in Benth. Comp. Bot. Mag. i. 206. *Dasystoma pectinata*, Benth. in DC. l. c.; Chapm. Fl. 298. — N. Carolina to Florida and Arkansas.

* * No glandular pubescence: corolla glabrous outside: root perennial.

G. grandiflóra, Benth. Densely cinereous-puberulent: stem much branched, 2 or 3 feet high, leafy to the top: leaves somewhat petioled, ovate to oblong-lanceolate in outline, incisely and often lyrate pinnatifid, or the lower more divided and the upper merely lacinate-dentate (2 inches long): inflorescence leafy: pedicels shorter or rarely twice longer than the turbinate calyx-tube: lobes of the calyx lanceolate, entire or sparingly toothed, equalling or shorter than the tube: corolla inch and a half long. — Comp. Bot. Mag. l. c.; Gray, Man. ed. 5, 335. *Dasystoma Drummondii*, Benth. in DC. l. c. — Oak openings, &c., Wisconsin and Iowa to Tennessee and Texas.

Var. integriúscula. A form with slender branches, bearing either sparsely serrate or entire leaves; or the lower lacinate-pinnatifid. — *G. serrata*, Torr., Benth. l. c. *Dasystoma Drummondii*, var. *serrata*, Benth. in DC. — W. Louisiana, Hale.

G. fláva, L. Densely puberulent and somewhat cinereous: stem nearly simple, 3 or 4 feet high: leaves ovate-lanceolate or oblong, obtuse, entire, or the lower sparingly sinuate-toothed or pinnatifid (2 to 4 inches long): pedicels very short: calyx-lobes oblong or lanceolate, entire, about the length of the tube: corolla inch and a half long, much dilated upward. — Spec. ii. 610, as to syn. Gronov. & Pluk., not herb.; Michx. Fl. ii. 19; Pursh, Fl. ii. 423; Torr. Fl. N. Y. ii. 47, t. 74. *Dasystoma pubescens*, Benth. in DC. l. c. — Open woods, Canada to Wisconsin and Georgia.

G. quercifólia, Pursh. Glabrous: stem at first glaucous, 3 to 6 feet high, simple or commonly branching: lower leaves once or twice pinnatifid or incised (3 to 5 inches long) and the lobes acute; the upper often entire and lanceolate, acute: pedicels equalling or shorter than the calyx: corolla not rarely 2 inches long, more funnellform and narrower below than in the preceding. — Fl. ii. 423, t. 19. *G. flava*, L., as to herb. *Rhinanthus Virginicus*, L., as to Syn. Gronov. *G. glauca*, Eddy, Cat.; Spreng. Syst. ii. 807. *Dasystoma quercifolia*, Benth. in DC. l. c. — Dry woods, from New England and W. Canada to Illinois and south to Florida and Louisiana.

G. lævigáta, Raf. Glabrous or obscurely puberulent, not glaucous: stem slender, a foot or two high: leaves lanceolate (1½ to 4 inches long); all the upper entire; the lower often incised or irregularly pinnatifid: pedicels and lobes of the calyx shorter than its tube: corolla much dilated above the short tube, an inch long and the limb fully as broad. — Ann. Nat. (1820), 13. *G. integrifolia*, Gray, Man. ed. 1, 307, ed. 5, 335. *Dasystoma quercifolia*, var. ? *integrifolia* (& var. *intermedia* ?), Benth. in DC. l. c. — Oak barrens, &c., Penn. to Illinois and the mountains of Georgia.

G. pátula, Chapm. Obscurely pubescent or glabrate, not glaucous: stem weak and slender, loosely branching above, 2 or 3 feet long: leaves as of the preceding, but thinner:

pedicels filiform, 8 to 15 lines in length, widely spreading, mostly longer than the bracts or upper floral leaves: calyx-lobes about twice the length of the tube, spreading: corolla funnellform, an inch and a quarter long. — Chapm. in herb. *Dasytonia patula*, Chapm. in Bot. Gazette, iii. 10, 1878. — Upper Georgia, in the mountains, on the banks of Horse-leg Creek, a tributary of the Coosa River, Floyd Co., *Chapman*.

§ 2. *OTOPHYLLA*, Benth. Corolla short-funnelform with very ampliate throat, purple (rarely white), naked within, as also the filaments: anthers muticous, glabrous or sparingly villous; those of the shorter stamens smaller: scabrous-hispid or hirsute annular; with sessile entire or divided leaves, sessile flowers, and deeply cleft calyx. — *Otophylla*, Benth. in DC. l. c.

G. auriculata, Michx. A foot or two high, branching above: leaves lanceolate or ovate-lanceolate, an inch or two long, sessile by a broad base, entire, or some (at least the upper) bearing an oblong or lanceolate lobe on each side at base: corolla seldom an inch long. — Fl. ii. 20; Gray, Man. ed. 5, 335. *Seymeria auriculata*, Spreng. Syst. ii. 810. *Otophylla Michauxii*, Benth. in DC. Prodr. x. 512. — Prairies and low grounds, W. Penn. to W. North Carolina, and west to Wisconsin and Missouri.

G. densiflora, Benth. More hispid and rough, very leafy: leaves rigid, pinnately parted into 3 to 7 narrowly linear acute divisions; those subtending the densely spicate flowers similar and much crowded: corolla over an inch long. — Comp. Bot. Mag. i. 206. *Otophylla Drummondii*, Benth. in DC. l. c. — Prairies, Kansas to Texas.

§ 3. *EUGERARDIA*, Benth. Corolla from short-funnelform to nearly campanulate, purple or rose-color (with one exception), varying occasionally to white: calyx-teeth or lobes short: anthers all alike; the cells either muticous or mucronulate at base: cauline leaves linear or narrower and entire, rarely reduced to mere scales; the radical rarely broader and sometimes incised: flowers from middle-sized to small; the corolla externally and the anthers usually more or less pubescent or hairy: herbage glabrous or merely hispidulous-scabrous.

* Root perennial: leaves erect, very narrowly linear, acute: pedicels erect, as long as floral leaves: calyx truncate: anther-cells mucronate-pointed at base.

G. Wrightii, Gray. Very scabrous-puberulent: stems (a foot or two high) and virgate branches strict: leaves nearly filiform, with revolute margins: calyx-teeth short and subulate: corolla glabrous within (and stamens nearly so), three-fourths inch long, light yellow! — Bot. Mex. Bound. 118. — Valleys and hillsides along the Sonoita, &c., Arizona, *Wright*, *Bigelow*, *Rotkrock*.

G. linifolia, Nutt. Glabrous and smooth: stems 2 or 3 feet high, sparingly or paniculately branched: leaves flat, thickish, a line wide: calyx-teeth minute: corolla an inch long, minutely pubescent outside, villous within and lobes ciliate: anthers and filaments very villous. — Gen. ii. 47; Benth. in DC. l. c. (not of Comp. Bot. Mag.); Chapm. Fl. 299. — Low pine barrens, Delaware to Florida. (Cuba, *C. Wright*.)

* * Root annual: stems more or less leafy: herbage blackish in drying except in the last.

+ Pedicels little if at all longer than the calyx and capsule: inflorescence racemose or spiciform.

++ Calyx-lobes as long as the turbinate tube, and the sinuses very acute.

G. heterophylla, Nutt. Nearly smooth, a foot or two high, paniculately branched, or the branches virgate: leaves rather erect, thickish or rigid; the lowest 3-cleft or lacinate (according to *Nuttall*); the others narrowly linear, mucronate-acute, scabrous on the margins; those of the branchlets short and somewhat subulate: pedicels very short, alternate: calyx-lobes subulately attenuate from a broad base, very acute, in age spreading: corolla an inch or less long. — Trans. Am. Phil. Soc. n. ser. v. 180; Benth. Comp. Bot. Mag. i. 207, & Prodr. l. c. 517. — Prairies, Arkansas (*Nuttall*) and Texas.

++ ++ Calyx-lobes shorter than the tube, and mostly separated by broad or open sinuses.

G. áspera, Dougl. Stem and branches strict: leaves rather erect, strongly hispidulous-scabrous, all filiform-linear: pedicels mostly equalling and sometimes moderately exceeding the calyx, erect, most of them alternate: calyx-lobes deltoid-subulate or triangular-lanceolate from a broad base, acute, about half the length of the tube: anthers obscurely

if at all mucronulate at base: capsule elliptical in outline, 4 lines long: otherwise nearly like a scabrous form of the next, into which it may pass. — Benth. in DC. l. c.; Gray, Man. l. c. *G. longifolia*, Benth. in Comp. Bot. Mag. i. 208, not Nutt. — Plains and prairies, from Saskatchewan and Dakota to W. Arkansas, and east to Wisconsin and Illinois.

G. purpurea, L. Commonly a foot or two high, with virgate rather spreading branches: leaves usually spreading, narrowly linear, either somewhat scabrous or smooth with merely scabrous margins: pedicels shorter than calyx, mainly opposite: teeth of the calyx acute, from very short and distant to half the length of the broad tube (then with broad base and narrower sinuses): corolla an inch or less long: anther-cells cuspidate-mucronate at base: capsule globular, 2 or 3 lines long. — Spec. ii. 610, in part (confounded with *G. tenuifolia*), & of syn. Pluk., &c.; Bart. Fl. Am. Sept. iii. t. 97. *G. maritima*, var. *major*, Chapm. Fl. 300. — Low and moist grounds, Canada to Florida and Texas near the coast, also Great Lakes to Illinois, &c. (Cuba.) A polymorphous species, of which the following are extreme forms.

Var. fasciculata, Chapm. Usually taller, 2 to 5 feet high: leaves (and mostly branches) often alternate (and the cauline fascicled in the axils), very scabrous, narrowly linear or nearly filiform: pedicels in great part alternate: corolla commonly a full inch long. — Fl. 300. *G. fasciculata*, Ell. Sk. ii. 115. — S. Carolina to Florida, Texas, and Arkansas, usually in brackish soil.

Var. paupercula. A span to a foot high, smoother: stem more simple or with stricter branches: pedicels mainly opposite: flowers decidedly smaller: corolla usually only half inch long, lighter rose-purple: calyx-teeth deltoid-subulate from a broad base, leaving comparatively narrower sinuses, sometimes over half the length of the tube. — *G. purpurea*, Sims, Bot. Mag. t. 2048; Hook. Fl. ii. 204. *G. intermedia*, Porter, in herb., a name to be adopted if a distinct species. — Lower Canada to Saskatchewan, and southward from coast of New England to Penn., N. Illinois and Wisconsin. A maritime form has many spreading branches.

G. maritima, Raf. A span or two high, with short branches from below, smooth: leaves fleshy, obtuse; the floral small: flowers accordingly in a more naked simple raceme: pedicels about the length of the calyx: teeth of the latter broad, short, and very obtuse: corolla glabrous, half inch, or in a Texan form (var. *grandiflora*, Benth., *G. spiciflora*, Engelm. Pl. Lindh. i. 19), three-fourths inch long: anther-cells mucronulate at base: capsule globular or ovoid, 2 or 3 lines long. — N. Y. Med. Rep. ii. 361; Nutt. Gen. ii. 46; Benth. l. c. *G. purpurea*, var. *crassifolia*, Pursh, Fl. ii. 422. — Salt marshes on the coast, Maine to Florida and Texas.

++ Pedicels from once to thrice the length of the calyx, always much shorter than the corolla: inflorescence or ramification paniculate; some flowers appearing terminal: anthers mucronulate at base.

G. Plukenetii, Ell. Commonly 2 feet high, with many slender spreading branches: leaves all filiform, smooth or barely scabrous, seldom in fascicles, only some of the upper alternate: pedicels 2 to 4 lines long and alternate in upper axils, and solitary terminating leafy filiform branchlets: calyx truncate and with very short subulate teeth: corolla three-fourths to near an inch long, loosely long-villous in throat, as are the filaments and anthers. — Sk. ii. 114. *Antirrhinum purpureum*, &c., Pluk. Alm. 34, t. 12, fig. 4, poor. *G. linifolia*, Benth. Comp. Bot. Mag. i. 209, not Nutt. *G. filifolia*, var. *Gatesii*, Benth. in DC. l. c. *G. setacea*, Chapm. Fl. 300, not Walt. ? nor Ell. ? nor Pursh, nor Nutt., &c. — Sandy or wet pine barrens, Middle Georgia, Alabama, and Florida. Larger leaves an inch long.

Var. microphylla. Slender: cauline leaves setaceous, half inch or less long, rather few, and on the branchlets reduced to minute subulate bracts (mostly less than a line long): corolla half to two-thirds inch long. — *G. aphylla*, var. *grandiflora*, Benth. Comp. Bot. Mag. l. c. — Louisiana, *Drummond, Hale*. Keys of Florida, *Blodgett, &c.* Plukenet's figure (Alm. t. 12, fig. 4) may be rightly referred here; but it is not characteristic.

++ Filiform pedicels about equalling or commonly exceeding the corolla in length: woolly anthers cuspidate or almost aristate at base.

++ Leaves all but the lowest cauline alternate and copiously fascicled in the axils.

G. filifolia, Nutt. Smooth, often 2 feet high, paniculately branched above, very leafy up to the loose paniculate-racemose inflorescence: leaves numerous in the fascicles, filiform

and slightly clavate, rather fleshy, less than an inch long: pedicels mostly from an inch to half inch long: calyx-teeth short, triangular-subulate: corolla an inch or three-fourths long.—Gen. ii. 48; Ell. Sk. ii. 116; Benth. l. c. (excl. var.); Chapm. l. c.—Low pine barrens, S. Georgia, Alabama, and Florida.

++ ++ All or most of the cauline (or even the rameal) leaves opposite, and few or none fascicled in the axils,

= Blackening more or less in drying: capsule globular, hardly surpassing the calyx.

G. setacea, Walt. Mostly scabrous, at least the setaceous-filiform leaves, and loosely and paniculately much branched: inflorescence more or less paniculate: pedicels ascending, from half to an inch and a half long: calyx-teeth subulate, from minute to a fourth of the length of the tube: corolla three-fourths to about an inch long, often pubescent outside; the margins of the lobes thickly lanose-ciliate: anther-cells short-aristate.—Car. 170; Pursh, Fl. ii. 422, excl. hab.; Nutt. Gen. ii. 47; Ell. l. c.; not Benth., nor Chapm. *G. filifolia* & *tenuifolia*, var. *filiformis* (*leptophylla* in Comp. Bot. Mag. i. 209), Benth. l. c. in part. *G. tenuifolia*, var. *filiformis*, Chapm. Fl. 300.—Pine barrens, &c., South Carolina to Florida and Texas.

Var. longifolia (*G. longifolia*, Nutt. Trans. Am. Phil. Soc. n. ser. v. 180, *G. filifolia*, var. *longifolia*, Benth. in DC. l. c.) is described from simple-stemmed specimens, collected on the "banks of the Arkansas," Nuttall, which have long (but not "2 inch") leaves, setaceous-subulate calyx-teeth about half the length of the tube (not "nearly its length") as in some Texan specimens, and corolla barely three-fourths inch long.

G. tenuifolia, Vahl. Smooth or usually so, about a foot high, paniculately much branched, but the inflorescence racemose: leaves mostly narrowly linear and plane, equaling the lower but mostly shorter than the uppermost (half to inch long and commonly spreading) pedicels: calyx-teeth very short: corolla about half inch long, nearly glabrous outside, except the minutely ciliate margins of its nearly equal lobes: anther-cells cuspidate-mucronate at base.—Symb. iii. 79, excl. syn. Pluk.; Pursh, l. c.; Nutt. l. c.; Bart. Fl. Am. Sept. iii. t. 82. *G. purpurea*, L. in part (as to ped. filiformibus, &c.). *G. erecta*, Walt. l. c.?; Michx. Fl. ii. 20.—Low or dry ground, Canada and Minnesota to Georgia and Louisiana. This sometimes has very narrow leaves, approaching filiform: it varies on the other hand into

Var. macrophylla, Benth. Stouter: larger leaves $1\frac{1}{2}$ to 2 inches long and almost 2 lines wide, scabrous: pedicels ascending: calyx-teeth usually larger: corolla little over half inch long.—Comp. Bot. Mag. i. 209.—Western Iowa to Colorado and W. Louisiana.

G. strictiflora, Benth. Obscurely scabrous, excessively paniculate-branched, rigid, a foot or more high: leaves filiform-linear passing on the branches into subulate; these erect and half to quarter inch long, rigid, shorter than the erect or ascending (half to three-fourths inch) pedicels: calyx-teeth short but conspicuous, subulate, very acute: corolla half inch long or more: anther-cells aristulate at base.—Comp. Bot. Mag. & Prodr. l. c.—Texas, Drummond, &c.

G. divaricata, Chapm. Smoothish throughout, very slender, a foot or so high, with numerous lax and long branches and elongated racemose inflorescence: leaves filiform, widely spreading; the larger over half inch long; upper gradually reduced to small setaceous bracts: pedicels opposite, divaricate, capillary, about inch long: calyx-teeth minute: corolla barely half inch long; the "two posterior lobes shorter, truncate, and erect:" anther-cells abruptly aristulate at base.—Fl. 299. *G. Mettaueri*, Wood, Class Book, 1861.—Low sandy pine barrens, W. & S. Florida, Chapman, &c.

= = Herbage drying green.

G. Skinneriana, Wood. Somewhat scabrous: stem simple or paniculately branched, strongly striate, a span to 18 inches high, slender: leaves mostly filiform, ascending; the larger an inch long; those of the branches much smaller, the uppermost reduced to small bracts: pedicels racemose-paniculate, ascending, 4 to 8 lines long: calyx-teeth mostly minute: corolla a third to half inch long, glabrous outside, delicately ciliate, usually rose-color.—Class Book, 1847, excl. syn. *G. setacea*, Benth. in Comp. Bot. Mag. & DC. l. c.; Gray, Man., &c., not of Walt., nor of Chapm. *G. parvifolia*, Chapm. Fl. (1860) 200.—Sandy low ground, coast of Massachusetts (*W. E. Davenport*, *Mrs. Piper*, but rare north-eastward), and Penn. to Iowa, and south to Florida and Louisiana.

* * * Root annual: stems leafless: cauline leaves represented by minute subulate scales.

G. filicaulis, Chapm. l. c. Smooth, glaucescent, apparently leafless: stem about a foot long, filiform and weak, diffusely much branched; the elongated paniculate branchlets terminated by a flower or bearing a few short lateral pedicels: minute scales or bracts mostly opposite: calyx-teeth minute: corolla 3 to 5 lines long; the two posterior lobes more erect and shorter: anther-cells aristulate at base. — *G. aphylla*, var. *filicaulis*, Benth. in Comp. Bot. Mag. i. 210. *G. Mettaueri*, var. *nuda*, Wood, Class Book, 1861, 530, & later *G. nuda*, Wood. — Low and grassy pine barrens of Florida and Louisiana, *Drummond*, *Chapman*, &c.

G. aphylla, Nutt. Smooth: slender stem 1 to 3 feet high, strict and simple below, about 4-angled, simple or mostly paniculate-branched above; radical leaves (rarely seen) small and oval or oblong, thickish, hispidulous, half inch or less long; cauline reduced to appressed subulate and mostly scattered minute scales: pedicels short, rather crowded in virgate mostly spiciform naked racemes: calyx-teeth minute: corolla 6 to 8 lines long, villous within; "the upper lobes reflexed:" anther-cells hardly mucronulate at base. — Gen. ii. 47; Ell. l. c.; Benth. l. c. excl. varieties; Chapm. l. c. — Low and sandy pine barrens, coast of N. Carolina to Florida and Louisiana.

30. CASTILLÉIA, Mutis. PAINTED-CUP. (*D. Castillejo*, a botanist of Cadiz.) — Herbs (American, mostly N. American, and two in N. Asia); with alternate entire or lacinate leaves, passing above into usually more incised and mostly colored conspicuous bracts of a terminal spike; the flowers solitary in their axils and ebracteolate, red, purple, yellowish, or whitish; but the corolla almost always duller-colored than the calyx or bracts, mostly of yellow or greenish tinge. Fl. in summer. (Primary divisions generally received are not distinct enough for subgenera, except *Epichroma* of Mexico, with a funnellform calyx. Ours accordingly may all be embraced in § **EUCHROMA**, *Euchroma*, Nutt. Gen. ii. 55.) — Gray in Am. Jour. Sci. ser. 2, xxxiii. 335, & Bot. Calif. i. 573.

* Annuals or some biennials with fibrous root: at least the upper part of the bracts and sometimes of the calyx petaloid (bright red or scarlet, occasionally varying to yellowish): pubescence villous or soft-hirsute.

+ Atlantic species, flowering in spring or early summer, a span to a foot high: floral leaves or bracts dilated: calyx equally cleft before and behind into 2 broad or upwardly dilated entire or retuse lobes: galea (upper lip) shorter than the tube of the corolla, little surpassing the calyx, much exceeding the short lower lip.

C. coccínea, Spreng. (PAINTED-CUP.) Biennial, at least northward: rosulate radical leaves mostly entire, obovate or oblong; cauline and bracts lacinate or 3-5-cleft; the middle lobe of latter dilated: calyx-lobes quadrate-oblong. — Syst. ii. 775; Benth. in DC. Prodr. x. 259. *Bartsia coccinea*, L. Spec. ii. 602. (Pluk. Alm. t. 102, fig. 5.) *Euchroma coccinea*, Nutt. l. c. — Low sandy ground, Canada and Saskatchewan to Texas.

C. indivisa, Engelm. Leaves lanceolate-linear and entire, or sometimes with 2 or 3 slender lateral lobes: bracts and calyx-lobes obovate-dilated, bright red. — Pl. Lindh. i. 47; Benth. in DC. l. c. — Texas, *Berlandier*, *Drummond*, *Lindheimer*, &c. Winter-annual, flowering in spring, no tuft of radical leaves surviving.

+ + Ultramontane and Pacific annuals, with virgate stems, mostly tall and slender: leaves and bracts all linear-lanceolate and entire; the latter or at least the upper with petaloid (red) linear tips: flowers all pedicellate, the lower rather remote in the leafy spike: calyx gibbous and broadest at base, ovoid or oblong in fruit, wholly green, about equally cleft before and behind to near the middle; the segments lanceolate and acute or acutely 2-cleft at apex: galea of the narrow and straight corolla very much longer than the small not callous lip: capsule oblong.

C. minor, Gray. A foot or two high: corolla half to three-fourths inch long, yellow: the oblong galea much shorter than the tube. — Bot. Calif. i. 573. *C. affinis*, var. *minor*, Gray, Bot. Mex. Bound. 119, & Am. Jour. Sci. l. c. — Wet ground, New Mexico and Nebraska to W. Nevada.

C. stenántha. Taller, 1 to 5 feet high: corolla linear, double the length of that of the preceding species; the slightly falcate and commonly reddish galea one-half longer than the tube. — *C. affinis*, Benth. Pl. Hartw.* 329, in part (no. 1897); Gray, l. c. in part. —

Moist grounds, California from Monterey to San Diego, and through the southern part of the Sierra Nevada.

* * Perennials.

+ Calyx deeper cleft before than behind, tubular-cylindrical, mostly colored red, as are a part of the bracts: corolla large, an inch or two long, well exerted from the lower side of the spatheous calyx and at length somewhat arcuate or falcate, exposing the protuberant and very short callous lip; its galea about equalling the tube: lower flowers commonly pedicellate.

C. affinis, Hook. & Arn. A foot or two high, mostly strict, villous-pubescent or glabrate: leaves narrowly lanceolate, entire, or some of the upper laciniate-toothed at apex; lower floral or bracts similar; upper shorter and broader, red: spike or raceme lax below: calyx narrowly cylindrical, red, an inch long, its anterior fissure hardly twice the depth of the posterior; narrowly oblong lobes acutely 2-cleft at apex: corolla $1\frac{1}{2}$ to $1\frac{1}{2}$ inches long. — Bot. Beech. 154, 380; Benth. in DC. l. c., & Pl. Hartw. no. 1896; Meyer, Sert. Petrop. ii. t. 15? — California, in moist grounds about San Francisco Bay, on the Sacramento, and south to Tejon, &c.

C. laxa, Gray. A foot high, weak and slender, short-pubescent: leaves linear-lanceolate, entire, barely 2 inches long, 3-nerved, spreading: bracts similar or broader, the upper reddish: flowers few and crowded: calyx broadly cylindraceous, inch long, its anterior fissure not twice the depth of the posterior, both short; the lobes broad and broadly 2-toothed: corolla inch and a half long, nearly straight; its galea shorter than the tube. — Bot. Mex. Bound. 119 & Am. Jour. Sci. l. c. — Mountain side, southern border of Arizona near Santa Cruz, Wright.

C. oblongifolia. Two feet or more high, very leafy, densely villous or pubescent: leaves widely spreading, 5-nerved, 1 or 2 inches long, narrowly elliptical and very obtuse, or the uppermost oblong-ovate and acute: bracts similar, the upper reddish: spike many-flowered: calyx-lobes narrowly lanceolate or linear: corolla 2 inches long; somewhat falcate narrow galea as long as the tube; lip very protuberant and fleshy globular-saccate, its minute lobes subulate. — Southern borders of San Diego Co., California, Palmer. Collected along with *C. miniata*.

C. linariæfolia, Benth. Mostly tall and strict, 2 to 5 feet high, glabrous below, the several-many-flowered spike somewhat pubescent or villous: leaves linear, entire, or some of the upper sparingly laciniate, and the uppermost and bracts 3-parted, 1-3-nerved; divisions not dilated: calyx narrowly cylindrical, over an inch long, mostly red or crimson, sometimes pale; the anterior fissure very much deeper than the posterior; the long upper lip acutely 4-toothed or 2-cleft and the lobes 2-toothed: corolla $1\frac{1}{2}$ or 2 inches long; its narrow falcate and much exerted galea as long as the tube. — DC. l. c.; Gray, l. c., & Bot. Calif. i. 573. *C. candens*, Durand in Pacif. R. Rep. v. 12, a pubescent form. — Through the mountains of Colorado and Wyoming to New Mexico, Arizona, and Sierra Nevada of California.

+ + Calyx about equally cleft before and behind: floral leaves or bracts more or less dilated and petaloid-colored (red or crimson, varying to yellowish or whitish).

++ Pubescence never tomentose nor cinereous-tomentulose.

= Galea equalling or longer than the tube of the corolla; the lip very short.

C. latifolia, Hook. & Arn. A foot or two high, diffusely branched from the base, villous-hirsute and viscid: leaves short (half inch or more), dilated-obovate or oval, very obtuse, some 3-5-lobed: spike leafy: calyx 2-cleft to the middle; the oblong-obovate lobes entire or emarginate, almost equalling the small (8 lines long) corolla. — Bot. Beech. 154. — Coast of California.

C. parviflora, Bong. A span to 2 feet high, villous-hirsute, at least above: leaves variously laciniately cleft into linear or lanceolate lobes, or sometimes the cauline mainly entire and narrow (rarely oblong): calyx-lobes oblong and 2-cleft at apex or to below the middle: corolla an inch or less long; only the upper part of the narrow galea exerted; the small lip not protuberant. — Veg. Sitk. 157; Gray, l. c. *C. Toluccensis*, Cham. & Schlecht. in Linn. ii. 579? *C. coccinea*, Lindl. Bot. Reg. t. 1136. *C. hispida*, Benth. in Hook. Fl. ii. 105, & DC. l. c. 532. *C. Douglasii*, Benth. in DC. l. c. 530; narrow-leaved and large-flowered form of coast of California. *Euchroma Bradburii*, Nutt. in Jour. Acad. Philad. vii. 47. *E. angustifolia*, Nutt. l. c., a low and small-flowered subalpine form: same as *C. desertorum*, Geyer, in Hook. Kew Jour. v. 258. — Dry or moist ground, Sitka to S. California and

mountains of Arizona, east to Dakota and Colorado. A most polymorphous species, and the oldest name not a good one. Bracts, as in other species, varying from red to yellow or white.

C. miniata, Dougl. A foot or two high, mostly simple and strict, glabrous or nearly so except the inflorescence; leaves lanceolate or linear, or the upper ovate-lanceolate, acute, entire (rarely lacinate-3-cleft): spike dense and short: bracts from lanceolate to oval, mostly bright red, rarely whitish, seldom lobed: calyx-lobes lanceolate, acutely 2-cleft: corolla over an inch long; the galea exserted, linear, longer than the tube; very short lip protuberant and callous, as deep as long, with ovate short teeth involute. — Hook. Fl. ii. 106; Benth. l. c.; Gray, Bot. Calif. i. 574. *C. pallida*, var. *Unalaschensis*, Cham. & Schlecht. l. c., partly. *C. pallida*, var. *miniata*, Gray in Am. Jour. Sci. l. c. 337. — Alaska to Saskatchewan and southward along the higher mountains through Colorado, Utah and California.

== Galea decidedly shorter than the tube of the corolla and not over twice or thrice the length of the lip.

C. pallida, Kunth. A foot or so high, strict, commonly villous with weak cobwebby hairs, at least the dense and short leafy-bracted spike, or below glabrous, not glandular or viscid: leaves membranaceous, mainly entire; the lower linear; upper lanceolate or ovate-lanceolate: bracts oval or obovate, partly white or yellowish, equalling the (half to inch long) corolla: calyx cleft to or below the middle and again more or less 2-cleft; the lobes oblong or lanceolate: galea 2 to 4 lines long, barely twice the length of the lip, its base not exserted from the calyx. — Syn. Pl. Æquin. ii. 100; Benth. l. c.; Gray, Bot. Calif. i. 575. *C. Sibirica*, Lindl. Bot. Reg. under 925. *Bartsia pallida*, L. Spec. ii. 602. — Subarctic N. W. coast and islands, *Chamisso*, &c. (Siberia.) Passes into

Var. septentrionalis, Gray. A span to 2 feet high, sometimes almost glabrous: bracts greenish-white, varying to yellowish, purple, or red: lip smaller, from half to hardly a third the length of the galea. — Bot. Calif. l. c. *C. septentrionalis*, Lindl. Bot. Reg. t. 925; Benth. l. c. *C. pallida*, Hook. Kew Jour. Bot. v. 258. *C. pallida*, var. *Unalaschensis*, *latifolia*, Cham. & Schlecht. l. c. *C. acuminata*, Spreng. l. c. *Bartsia acuminata*, Pursh, Fl. ii. 429. — Labrador, alpine summits of White Mountains and Green Mountains of New England, and north shore of Lake Superior, to the Rocky mountains of Colorado and Utah, and north-westward to Alaska, Aleutian Islands, &c. Some larger forms appear to pass into *C. miniata*.

Var. occidentalis, Gray. Dwarf and narrow-leaved form, 2 to 6 inches high: bracts comparatively broad, mostly incised or cleft, the tips and flowers whitish: lip about half the length of the rather broad galea. — Bot. Calif. l. c. *C. occidentalis*, Torr. in Ann. Lyc. N. Y. ii. 230; Benth. l. c. — High alpine region of the Rocky Mountains, Colorado, and Sierra Nevada, California.

Var. Haydeni. More slender, 3 to 5 inches high: linear leaves sometimes with one or two slender-subulate lobes: bracts merely ciliate-pubescent, laciniately 3-5-cleft into linear lobes, bright crimson: lip not half the length of the galea. — Alpine region of the Sierra Blanca, S. Colorado, *Hayden*, *Hooker*, & *Gray*. Seemingly very distinct from *C. pallida*, but connected through the preceding variety.

C. viscidula. A span high, tufted, pubescent with very short stiff mostly glandular-tipped hairs and somewhat viscid, only the dense naked spike with some short villous hairs: stems slender: leaves linear, attenuate, entire, or uppermost 3-cleft: bracts 3-5-cleft, more or less dilated; the upper rather shorter than the flowers, with reddish or whitish lobes: calyx-segments shorter than the cylindraceous tube, 2-parted into linear-lanceolate lobes: corolla three-fourths inch long; galea hardly one-third the length of the tube, twice the length of the lip; lobes of the latter elongated-oblong, equal in length to the ventricose obscurely 3-carinate but not callous lower portion. — Nevada, in the E. Humboldt Mountains, at 9,000 feet, *Watson* (part of no. 810).

C. Lemmóni. A span or more high, pubescent, and the dense oblong spike somewhat hirsute-villous, not glandular: leaves narrowly linear, entire or 3-cleft; uppermost more dilated and cleft: bracts 3-cleft, the upper with reddish lobes and equalling the flowers: calyx-segments as long as the tube, oblong, petaloid, emarginate or barely 2-cleft at apex: corolla fully three-fourths inch long; galea oblong, about a quarter the length of tube, hardly twice the length of the ventricose lip; lobes of the latter ovate, rather shorter than

the saccate portion, the 3 narrow obtuse keels or plicæ of which terminate under the lobes in as many conical gibbosities. — Sierra Co., California, probably in the alpine region, *Lemmon*. Referred in Bot. Calif. to *C. pallida*, var. *occidentalis*. One of the transitions to the first section of *Orthocarpus*.

++ ++ Herbage white-woolly throughout; the tomentum loose or flocculent with age: leaves linear and entire: bracts 3-parted: the divisions more or less spatulate-dilated and petaloid: calyx-lobes broad and with rounded entire or slightly 2-lobed summit: corolla almost included, 7 to 9 lines long, slender; the narrow galea little shorter than the tube; lip very short.

C. foliolósa, Hook. & Arn. A foot or two high, and many-stemmed from a woody base: woolly hairs intricately branched: leaves narrowly linear (inch or less long), crowded below and fascicled in lower axils: spike close: galea shorter than the tube of the corolla. — Bot. Beech. 154; Benth. l. c.; Gray in Am. Jour. Sci. l. c. & Bot. Calif. i. 574. — Dry hills, coast of California from San Diego to Mendocino Co.

C. lanáta, Gray. Apparently herbaceous to base, branching, white with appressed arachnoid wool: leaves larger (inch or two long); the galea longer than the tube: flowers larger, more scattered in the spike: corolla rather more exerted. — Bot. Mex. Bound. 118. — S. W. Texas to Arizona. (Adjacent Mex.)

++ ++ ++ Tomentulose or cinereous-puberulent, or the stem only lanate-tomentose: bracts, &c., conspicuously petaloid: primary calyx-segments 2-cleft or 2-parted into narrow usually acute lobes: corolla more exerted, inch long or over; galea shorter than the tube;

== Lip very short; its lobes not longer than the more or less callous saccate portion.

C. íntegra, Gray. A span to a foot high: stem rather stout, tomentose: leaves cinereous-tomentulose, linear ($1\frac{1}{2}$ to 3 inches long, 1 to 3 lines wide), entire: bracts of the short spike linear- or obovate-oblong, red or rose-color, entire or sometimes incised: corolla inch and a quarter long; galea rather broad; lip strongly tri-callous, its lobes very short. — Bot. Mex. Bound. 119, & Am. Jour. Sci. l. c. *C. angustifolia*, Gray, Bot. Mex. Bound. 118, in part, not Nutt. *C. tomentosa*, Gray, l. c., a more tomentose form. — Dry grounds, W. Texas to Colorado and Arizona.

C. Lindheimeri. A span or two high, branched or many-stemmed from the base, cinereous-puberulent or the stem tomentulose: leaves narrowly linear, entire or sparingly lacinate, or the upper 3-5-cleft, as are the bracts of the dense spike; these mostly petaloid and dilated, from brick-red to rose-color or sulphur-yellow: calyx equally colored: corolla (inch or so in length) rather slender; the lobes of the lip ovate, not longer than the callous saccate portion — *C. purpurea*, Gray in Am. Jour. Sci. l. c. 338, not Don & Benth. — Stony or fertile mountain prairies, on the PIEDRALES and GUADALUPE, W. TEXAS, *Lindheimer*, &c. Much more showy than the next, and with different corolla.

== Lip of corolla with longer and narrow lobes, and base less saccate.

C. purpúrea, Don. A foot or less high, minutely cinereous-pubescent and the stem appressed-tomentose: leaves narrowly linear and entire, or mostly once or twice 3-cleft or lacinate, with divisions and lobes all narrowly linear: bracts similar or with cuneate-dilated base; the broader lobes of the upper and the calyx magenta-color or purple: corolla (over an inch long) narrow; galea very much shorter than the tube, only twice the length of the lip: lobes of the latter elongated-oblong, plane and petaloid, very much longer than the obscurely saccate and not callous basal portion. — Syst. iv. 615; Benth. l. c. *Euchroma purpurea*, Nutt. in Trans. Am. Phil. Soc. n. ser. v. 180. — Hilly prairies, Arkansas, *Nuttall*. E. Texas, *Drummond* (iii. no. 286 in part), *Miss Hobart*, *Reverchon*.

+ + + Calyx deeper cleft before than behind: corolla either slender or small, with galea much shorter than its tube and lip comparatively long; bracts and calyx if colored at all yellowish: leaves or their divisions narrowly linear, rather rigid: stems numerous from the root.

++ Lip of corolla half the length of the short galea, more or less trisaccate and little if at all callous below the narrow lobes: flowers yellowish or greenish white: clefts of the calyx moderately unequal.

== Cinereous-pubescent: leaves mostly 3-5-cleft and the slender divisions sometimes again 2-3-cleft: bracts similar or with more dilated base, not even their tips colored.

C. sessiliflora, Pursh. A span or two high, very leafy, cinereous-pubescent: leaves 2 inches or more long, with slender lobes, rarely entire: lobes of the tubular calyx slender: corolla exerted, about 2 inches long: lip with linear-lanceolate lobes very much longer than the obscurely saccate base. — Fl. ii. 738; Benth. l. c.; Gray, l. c. *C. grandiflora*, Spreng. Syst. ii. 775. *Euchroma grandiflora*, Nutt. Gen. ii. 55. — Prairies, Wisconsin and Illinois to Saskatchewan, Dakota, and south to W. Texas and New Mexico.

C. breviflora, Gray. Barely span high, more pubescent: lower leaves often entire and upper only 3-5-parted, an inch or so long: bracts of the dense spike more dilated, not surpassing the flowers: calyx ovoid-oblong; its lobes lanceolate: corolla little exerted, less than inch long: lip with somewhat callous oblong plicæ or saccate keels about the length of the oblong obtuse lobes. — Am. Jour. Sci. 1. c. 338. — Rocky Mountains of Colorado and Wyoming, in the alpine region, *Nuttall, Parry, &c.*

= = Very glabrous up to the merely pubescent naked dense spike: cauline leaves all entire: bracts shorter than the flowers, dilated and 3-cleft; the lobes with petaloid yellowish tips.

C. linoïdes. Stems strict, a foot high, rigid, branching at summit, very smooth, as also the rigid leaves (these 1 or 2 inches long, a line or less wide): calyx and corolla nearly of *C. breviflora*, the former with narrower lobes and the latter only half inch long. — Clover Mountains, Nevada, *Watson*. In Bot. King, included under "*C. pallida*, var."

++ ++ Lip of corolla very short, globular-saccate and callous, and with very short ovate lobes: anterior cleft of calyx deeper.

C. flava, *Watson*. A foot high, with numerous slender stems, cinereous-puberulent, at least above, and the elongated spike more pubescent: leaves entire or the upper with one or two lobes: bracts 3-cleft and with dilated base; the upper and calyx yellowish: corolla hardly an inch long; narrow galea little shorter than the tube. — Bot. King, 230. — Mountains of E. Utah and Wyoming, in and near the Uintas, *Watson, Porter*.

31. ORTHOCÁRPUS, Nutt. (Ὀρθός, upright, and καρπός, fruit; the capsule not oblique as in *Melampyrum*.) — Low herbs, almost all annual (W. North American and one Chilian); with mainly alternate entire or 3-5-parted and laciniate leaves; the upper passing into bracts of the dense spike and not rarely colored, as also the calyx-lobes; the corolla yellow, or white with purple or rose-color, often much surpassing the calyx. Seeds numerous or rather few. Fl. spring and summer. — Benth. in DC. Prodr. x. 535; *Watson*, Bot. King, 230, 457; *Gray*, Bot. Calif. i. 575.

§ 1. **CASTILLEIOIDES**, Gray. Corolla with lip (i. e. lower lip) simply or somewhat triply saccate, and with conspicuous mostly erect lobes; the galea (i. e. upper lip) either broadish or narrow: anthers all 2-celled: bracts with more or less colored tips: seeds with very loose and arilliform cellular-favose coat. — Bot. Calif. l. c.

* Root *perennial*: lips of the short and yellowish corolla more equal and less dissimilar than in any of the following; lower one rather obscurely saccate; galea broadish, obtuse: filaments glabrous. Transition to *Castilleia*.

O. pallescens, Gray. Cinereous-puberulent, not hairy: leaves 3-5-parted into linear lobes, or the lower entire: bracts similar with dilated base, or upper with shorter obscurely whitish or yellowish lobes: calyx deeply 2-cleft, with broad lobes merely 2-cleft at apex: corolla over half inch long. — Am. Jour. Sci. ser. 2, xxxiv. 339, & Proc. Am. Acad. vii. 384, in part, but only as to *Nuttall's Euchroma pallescens* in herb. *O. Parryi*, Gray in Am. Naturalist, viii. 214. — Rocky Mountains of N. W. Wyoming to E. Oregon, *Nuttall, Parry, Cusick*.

O. pilosus, *Watson*. From soft-villous to hirsute-pubescent, a span or two high, very leafy: leaves of the preceding or more divided: bracts usually more dilated and colored, from yellow or whitish to dull crimson: calyx-segments deeply cleft or parted; the lobes linear. — Bot. King, 231; *Gray*, Bot. Calif. i. 576. *O. pallescens*, Gray, l. c., except as to *Nuttall's* plant. — Sierra Nevada, California, at 5-10,000 feet, to Oregon. Varies with lax and with rather rigid leaves, with soft-villous and with hirsute pubescence, &c.

* * Root annual: filaments glabrous: galea narrow and nearly straight, lanceolate-triangular or broadly subulate, naked: lip moderately ventricose and somewhat plicate-trisaccate for its whole length; the teeth or lobes conspicuous, erect, oblong-linear: capsule oblong or oval.

O. attenuátus, Gray. Erect, slender, a span or two high, hirsute-pubescent above: leaves linear and attenuate, often with a pair of filiform lobes: spike virgate: lower flowers scattered: bracts with slender lobes barely white-tipped: corolla narrow throughout,

half inch long, white or whitish: narrow teeth of purple-spotted lip nearly equalling the galea. — Pacif. R. Rep. iv. 121, & Bot. Calif. l. c. — Moist ground, San Francisco Bay to Puget Sound.

O. densiflorus, Benth. Erect or diffusely branched from base, 6 to 12 inches high, above soft-pubescent: leaves linear or linear-lanceolate, attenuate upward, entire or with a few slender lobes: spike dense, many-flowered, at length cylindrical, or lowest flowers rather distant: bracts 3-cleft, about equalling the flowers; their linear lobes and (8 to 10 lines long) corolla purple and white: teeth of the lip shorter than the galea. — Scroph. Ind. 13, & DC. Prodr. x. 536; Gray, l. c. — Coast of California, in low grounds. San Luis Obispo to Sonoma Co.

O. castilleioides, Benth. l. c. At length diffuse and corymbosely branched, 5 to 12 inches high, minutely pubescent, or below glabrate and above somewhat hirsute: leaves from lanceolate to oblong, commonly lacinate; the upper and bracts cuneate-dilated and incisely cleft, herbaceous, or the obtuse tips whitish or yellowish: spikes dense, short and thick: corolla nearly inch long, dull white or purplish-tipped; lip ventricose-dilated: seeds longer or larger than in the preceding. — Pine woods and low grounds near the seashore, from Monterey, California, to Puget Sound or nearly.

* * * Root annual: filaments mostly pubescent: galea attenuate upward, densely bearded on the back with many-jointed hairs, uncinatate or incurved at the obtuse tip, rather longer and very much narrower than the open-saccate lip, the summit of which under the short and small recumbent lobes is trisacculate and the middle sacculus didymous: stigma very large, depressed-capitate: capsule ovate. (Transition to § *Triphysaria*.)

O. purpurascens, Benth. l. c. Erect, rather stout, at length much branched from base, 6 to 12 inches high, hirsute: leaves with lanceolate base or body, and laciniately 1-2-pinnately parted into narrow linear or filiform lobes, or the upper palmately cleft: spike thick and dense: bracts equalling the (inch or less long) flowers, somewhat dilated: their lobes and calyx-lobes with upper part of corolla crimson to rose-color, or sometimes paler and duller. — California, common along and near the coast from Humboldt Co. southward.

Var. Palmeri. Flowers smaller: galea more linear: filaments glabrous or almost so. — Arizona, near Wickenburg, *Palmer*.

§ 2. TRUE ORTHOCARPUS, Benth. Corolla with simply saccate lip inconspicuously or obsoletely 3-toothed, and moderately smaller ovate-triangular galea; its small tip or mucro usually somewhat inflexed or uncinatate: stigma small, entire: anthers all 2-celled: seed-coat very loose, costate-reticulated: root annual. — *Orthocarpus*, Nutt. Gen. ii. 56. *Oncorrhynchus*, Lehm.

* Bracts abruptly and strikingly different from the leaves, much dilated, entire or the lower with narrow lateral lobes, more or less petaloid (purplish), becoming papyraceous and imbricated in the dense fructiferous (oblong or at length cylindrical) spike, toward base often hispid-ciliate, otherwise naked: corolla mostly rose-color: cauline leaves linear-attenuate; lower mostly entire and upper 3-5-parted.

O. pachystachyus. A span high, scabrous-puberulent and the stem hirsute: bracts an inch long, all the upper entire and oblong, rose-purple as is the (1½ inch) glabrous corolla: tube of the latter much longer than the calyx: galea with conspicuous and slender incurved tip: anther-cells linear-lunate, mucronate-attenuate at base, glabrous. — N. California, near Yreka, Siskiyou Co., *Greene*.

O. tenuifolius, Benth. More slender, taller, somewhat pubescent or hirsute: bracts about half inch long, oblong or oval, partly purplish: corolla purplish, half inch long, puberulent; the tube little surpassing the calyx; inflexed tip of galea minute and inconspicuous: anther-cells oblong, sparsely pubescent. — Scroph. Ind. 12, & DC. l. c.; Gray, Bot. Calif. i. 577. *O. imbricatus*, Torr. in Watson, Bot. King, 458. *Bartsia tenuifolia*, Pursh, Fl. ii. 429, excl. "flowers deep yellow," which must refer to *O. luteus*. — Dry ground, Montana to Brit. Columbia and south to the Sierra Nevada, California.

* * Bracts herbaceous, not colored, less or little different from the leaves, all 3- (rarely 5-) cleft and with acute lobes.

+ Spike dense or close, mostly many-flowered: seeds costate.

O. bracteosus, Benth. l. c. Hirsute-pubescent: stem strict, a foot or less high: leaves as of the preceding or the upper broader: bracts of the thickish and dense spike broadly

cuneate-dilated, shorter than the flowers, the divergent lobes broadly lanceolate: corolla rose-purple, half inch long; tube moderately longer than the calyx: galea with minute inflexed tip. — Gray, Bot. Calif. l. c. — Dry ground, Brit. Columbia to Oregon and northern portion of Sierra Nevada, California.

O. luteus, Nutt. Pubescent and hirsute, sometimes viscid: stem strict, a span to a foot high: leaves from linear to lanceolate, occasionally 3-cleft: bracts of the dense spike broader or with more dilated base, completely herbaceous, mostly 3-cleft, about equalling the flowers: corolla golden yellow, less than half inch long, twice or thrice the length of the calyx; tip of galea obtuse and straight. — Gen. ii. 57. *O. strictus*, Benth. l. c.; Hook. Fl. ii. 104, t. 172. — Plains, &c., N. Minnesota and Saskatchewan to Colorado, eastern borders of California, and Brit. Columbia.

O. Tolmiei, Hook. & Arn. Puberulent, a span or two high, loosely branched: leaves narrowly lanceolate-linear, chiefly entire: bracts of the small and short spikes little dilated, often 3-cleft, the upper shorter than the flowers: corolla bright yellow, half inch long, 3 or 4 times longer than the calyx; minute tip of galea inflexed. — Bot. Beech. 379; Benth. in DC. Prodr. x. 536; Watson, Bot. King, 230. — Utah, in the Wahsatch Mountains, to S. Idaho.

— Spike looser, few-flowered: seeds with loose reticulated coat.

O. purpureo-álbus, Gray. Minutely pubescent, somewhat viscid, simple or branched, a span or two high: leaves entire or mostly 3-cleft, filiform: bracts similar or somewhat dilated at base: corolla three-fourths inch long, purple and often partly white, with tube twice or thrice the length of the calyx; tip of galea mucroniform, inflexed. — Watson, Bot. King, 458; Bot. Calif. l. c. — New Mexico and S. Utah, *Woodhouse, Newberry, Parry, Mrs. Thompson.*

§ 3. **TRIPHYSAÏA, Benth.** Corolla with conspicuously trisaccate lip very much larger than the slender straight galea; its teeth minute or small; tube filiform or slender: stigma capitate, sometimes 2-lobed: bracts all herbaceous and similar to the leaves (or with somewhat colored tips in two species): root annual. — *Triphysaria*, Fisch. & Meyer, Ind. Sem. Petrop. ii. 52.

* Anthers 1-celled: lip of corolla saccately 3-lobed from the end: seed-coat close, conformed to the nucleus, apiculate at one or both ends.

— Stamens early escaping from their enclosure in the less involute oblong-lanceolate galea.

O. pusillus, Benth. Small and weak or diffuse, branched from the base, a span or less high, somewhat pubescent: leaves once or twice pinnatifid and bracts 3-5-parted into filiform or setaceous divisions: flowers scattered, small and inconspicuous, shorter than the bracts: corolla purplish, 2 or 3 lines long; tube not surpassing the calyx; lip moderately 3-lobed, beardless: capsule globose. — Scroph. Ind. 12, & DC. l. c.; Gray, Bot. Calif. i. 578. — Low ground, San Francisco Bay to Oregon.

O. floribúndus, Benth. l. c. Erect, a span or more high, branched above, almost glabrous: upper part of leaves pinnately parted into linear-filiform divisions, some again cleft: bracts of the mostly dense many-flowered spike 3-5-cleft and dilated at base; upper ones not surpassing the calyx: corolla white or cream-color, half inch long; tube twice the length of calyx; lip with 3 divergent oval sacs, 2 hairy lines within; the teeth lanceolate, erect, scarious. — Gray, Bot. Calif. l. c. *Chloropyron palustre*, Behr in Proc. Calif. Acad. i. 62, 66? — Hillsides, California, around San Francisco Bay, &c.

— Stamens more strictly enclosed in the acute involute-subulate galea: lip of 3 obovate or globular-inflated sacs, not more than a quarter of the length of the filiform and mostly densely pubescent tube, the two folds separating the sacs within villous-bearded: flowers numerous in a rather dense spike: upper bracts not exceeding the calyx; lower and the leaves pinnately parted above the broader entire base into setaceous or filiform divisions.

O. eriánthus, Benth. l. c. Erect, a span or more high, fastigiately much branched, pubescent: corolla sulphur-color, with slightly falcate galea brown-purple: tube 6 to 8 lines long, thrice the length of the calyx. — Low grounds, coast of California, from Monterey northward.

Var. róseus, Gray, l. c. Corolla rose-colored, or probably cream-colored changing to rose-purple; the tube shorter. — *Triphysaria versicolor*, Fisch. & Meyer, l. c.? — Sandy fields, Noyo, Mendocino Co., *Bolander, &c.*

O. faucibarbatús, Gray. Aspect of the preceding, but nearly glabrous up to the short-hirsute or appressed puberulent bracts, less branched: divisions of the leaves rather coarser: corolla apparently white, with smaller sacs and less beard within the lip; the straight galea pale. — *Pacif. R. Rep.* iv. 121; *Bot. Calif.* i. 579. — Moist ground, San Francisco Bay to Mendocino Co., California.

* * Anthers 2-celled (lower cell mostly imperfect in the first two succeeding species): seed-coat loose and arilliform, coarsely reticulated.

+ Lip of corolla very broad; its sacs deeper horizontally than long.

++ Galea truncate at tip: sacs small, somewhat conical: capsule oblong, obtuse.

O. grácilis, Benth. l. c. Minutely pubescent, or below glabrous, branched from the base: slender branches a span or more high: leaves mostly 3-parted, linear-filiform: upper bracts of the rather dense spike shorter than the flowers; the tips of their lobes purplish-tinged: corolla pubescent, purplish (over half inch long); slender tube twice the length of the calyx: lip decidedly shorter than galea. — California, near San Francisco or Monterey, *Douglas, Nuttall*. Little known.

++ ++ Galea subulate: sacs ample, very ventricose: stem simple or few-branched: spike thickish and dense, at least above: capsule ovate.

O. campéstris, Benth. Glabrous below, but the calyx hirsute: stem 2 to 4 inches high: leaves and bracts narrowly linear and entire or nearly so: corolla white (9 lines long, and lip 2 lines deep): teeth of the lip scarious, slender, rather conspicuous. — *Pl. Hartw.* 329; *Gray, l. c.* — Fields, Butte and Plumas Co., California, *Hartweg, Mrs. Ames*.

O. lithospermóides, Benth. Copiously hirsute above, pubescent below: stem a span to a foot high, strict, simple or with some erect branches, very leafy: leaves lanceolate or somewhat linear, 2-5-cleft, or lowermost simple: bracts of the dense many-flowered spike cuneate-dilated and 3-5-cleft, about equalling the flowers: corolla an inch or less long, cream-color, often turning pale rose-color; sacs 3 lines deep; the teeth short and inconspicuous. — *Scroph. Ind. & DC.* l. c.; *Gray, Bot. Calif.* i. 579. — Moist and dry ground, California, from San Francisco Bay northward.

+ + Lip not so ample, surpassed by the subulate galea; sacs not deeper than long: stems strict and simple, or branched above: leaves or their lobes linear, mostly attenuated: spikes leafy: calyx-lobes slender: pubescence hirsute.

++ Corolla yellow; the sacs nearly as deep as long.

O. lasiorhýnchus, Gray. Soft-hirsute: leaves mostly 3-parted and bracts 4-5-cleft: corolla an inch long, with filiform tube; lip 3 or 4 lines long; galea subulate-linear, densely white-villous. — *Proc. Am. Acad.* xii. 82. — S. E. California, on and near the Mohave River, *Palmer, Parry & Lemmon*.

O. lácerus, Benth. Rather soft-hirsute and above viscid: leaves pinnately and bracts palmately 3-7-cleft or parted: corolla half or two-thirds inch long; the lip only 2 lines long: subulate galea glabrous or merely puberulent. — *Pl. Hartw.* 329; *Gray, Bot. Calif.* i. 579. *O. hispidus*, *Watson, Bot. King*, 230, in part. — Dry ground, California; common throughout the whole length of the Sierra Nevada, and valley of the Sacramento.

++ ++ Corolla white or merely purplish; sacs longer than deep.

O. hispídus, Benth. Soft-hirsute rather than hispid: stem strict, mostly simple: leaves with few and slender divisions, or the lower entire: leafy spike virgate: calyx-lobes much shorter than the tube: corolla white, half inch long; lip barely a line deep. — *Scroph. Ind. & DC.* l. c., at least in part; *Gray, Bot. Calif.* l. c. — Low grounds, W. Oregon and northern part of California.

O. linearilobus, Benth. Hirsute or nearly hispid: stem stouter, more branched: divisions of the leaves and bracts long and slender; the latter equalling the densely spicate flowers, their tips sometimes purplish-tinged: calyx-lobes much longer than the tube: corolla three-fourths inch long (white or purplish?): sacs deeper than in the preceding at the upper part, narrowing gradually downward. — *Pl. Hartw.* 350; *Gray, l. c.* — N. California, in mountain pastures, &c., Butte Co. to Mendocino Co., *Hartweg, Bolander*.

32. CORDYLÁNTHUS, Nutt. (*Κορδύλη*, a club, and *ἄθος*, flower, the corolla somewhat clavate.) — W. North American branching annuals; with alternate and narrow leaves, either entire or 3-5-parted, and mostly dull-colored

flowers in small terminal heads or clusters, or more scattered along the branches; the bracts and calyx not colored, and corolla seldom much surpassing the calyx. Seeds comparatively few and large, often apiculate or appendiculate at one or both ends. Fl. summer. — Benth. in DC. Prodr. x. 597; Gray, Proc. Am. Acad. viii. 381, & Bot. Calif. i. 580; Watson, Bot. King, 450. *Adenostegia*, Benth. in Lindl. Nat. Syst. ed. 2, 445, & in DC. Prodr. x. 537, but the name abandoned in the same volume for the more appropriate one of Nuttall.

§ 1. *ANISOCHEILA*. Calyx diphyllous: corolla cleft to the middle; the lower lip only half the length of the upper, entire, hardly saccate: stamens 4, with one-celled anthers (and rarely a vestige of the lower cell): both divisions of the calyx 6-nerved: no gland at tip of leaves: corolla "bright yellow."

C. laxiflorus, Gray. A foot or two high, much branched, very hirsute, above somewhat viscid: leaves short, linear, entire, or the uppermost 3-cleft: flowers approximate or scattered on the leafy branchlets (8 lines long), either sessile and ebracteolate or short-peduncled and 1-2-bracteolate: corolla little longer than the calyx: filaments villous below: seeds coarsely favose, not appendaged. — Bot. Mex. Bound. 120, & Proc. Am. Acad. l. c. 333. — Hills and ravines, *Thurber, Palmer, Rothrock*. The habitat "Salt Lake, Utah, *Fremont*," needs confirmation.

§ 2. *ADENOSTEGIA*, Gray, l. c. Calyx diphyllous: corolla 2-lipped at summit; lower lip about equalling the upper, 3-crenate: flowers short-peduncled or subsessile, 2-4-bracteolate: upper leaves and bracts commonly with a depressed gland or callosity at the truncate or retuse apex: corolla greenish-yellow or purplish. — *Adenostegia*, Benth. in DC. Prodr. x. 537.

* Corolla more exserted and conspicuous, fully inch long: stamens 4: anthers 2-celled: seeds coarsely favose.

C. Wrightii, Gray. A foot or two high, loosely branched, almost glabrous, or above puberulent-scabrous: leaves setaceous-filiform, 3-5-parted; floral similar, the tips not dilated: flowers several in the mostly dense terminal heads: corolla purplish, with rather long lips: anthers villous. — Bot. Mex. Bound. 120, & Proc. Am. Acad. l. c. — S. W. borders of Texas to N. Arizona, *Wright, Rothrock*.

* * Corolla almost included, half to three-fourths inch long. (Natives of California and adjacent districts.)

+ Stamens 4: anthers 2-celled: filaments villous: both divisions of calyx 5-6-nerved; the posterior entire or emarginate.

++ Seeds rather numerous, about 20, delicately favose.

C. ramósus, Nutt. l. c. A span or two high, diffusely much branched, cinereous-puberulent: leaves filiform, all but the lower usually 3-7-parted; no distinct apical gland or dilatation: flowers few in the small terminal heads or upper axils: corolla dull yellow, barely half inch long. — Watson, l. c.; Gray, l. c. — Dry interior region of Oregon and W. Nevada, to Wyoming.

++ ++ Seeds fewer and larger, mostly apiculate or appendiculate at one end; the coat close, minutely and closely lineolate with sinuous lines or reticulations, or at maturity smooth and even through their obliteration: callous gland generally apparent at the tip of some of the upper leaves or bracts.

C. filifolius, Nutt. Tall, 1 to 3 feet high, loosely branched above, roughish-puberulent and somewhat viscid or nearly glabrous below, commonly more or less hispid above, especially the margins of the floral leaves: leaves 3-5-parted or some of the lower entire; the divisions from filiform to linear; those of the upper and the more dilated bracts usually broadening upward and with retuse tip: heads rather many-flowered, often proliferous: corolla purplish, over half inch long. — Benth. l. c. *Adenostegia rigida*, Benth. in Lindl. Nat. Syst. & DC. l. c. 537. (Name replaced in the same volume by the then unpublished one of Nuttall.) — Dry and moist banks, throughout all but perhaps the northern part of California. Varies greatly in foliage, pubescence, &c., but generally well marked by the hispid- or setose-ciliate bracts and floral leaves.

Var. brevibracteatus, Gray, is glabrous up to the floral leaves, these hispid-ciliate with short bristles, also shorter and fewer, as are the flowers in the head. — Bot. Calif. i. 622. — Soda spring, Kern Co., *Rothrock*.

C. pilosus, Gray. Paniculately branched, 2 to 4 feet high, soft-villous throughout, somewhat viscid, no rigid hairs: leaves linear, all but the floral entire; these commonly 3-parted and with emarginate or callous-3-toothed tip: flowers few in the irregular terminal clusters, or some lateral and solitary; corolla yellowish or purplish, half inch or more long. — Proc. Am. Acad. vii. 383, & Bot. Calif. i. 581. — W. California, in open dry ground from Santa Clara Co. northward.

Var. Bolánderi, Gray, l. c. Lower, less pilose, more viscid or glandular: flowers all scattered. — Mendocino Co., *Bolander*. Also from Plumas Co. to Tuolumne Co. in the foothills of the Sierra.

C. tenuis, Gray, l. c. Effusely paniculate, a foot or two high, minutely cinereous-puberulent, at summit sometimes more pubescent and glandular: leaves very narrowly linear, entire: flowers scattered along the almost filiform branches, or some loosely clustered at their summit: flowers as of the preceding or smaller and the upper sepal narrower. — Dry ground, California from the mountains of Mendocino Co. to Lake Tahoe, and adjacent borders of Nevada.

+ — Stamens 2: anthers 1-celled: filaments nearly glabrous: posterior division of calyx only 2-nerved, 2-cleft at apex: seeds few, minutely favose.

C. capitatus, Nutt. A foot or two high, paniculately much branched, soft-pubescent and cinereous: leaves very narrowly linear, or those subtending the several-flowered terminal head broader and 3-5-cleft: corolla purplish, half inch long: capsule 8-seeded. — Benth. l. c. 597; Watson, Bot. King, 231, 459; Gray, Bot. Calif. l. c. — S. Idaho and N. Nevada, *Nuttall*, *Watson*.

§ 3. **HEMISTÉGIA, Gray**, l. c. Calyx monophyllous; the anterior division wanting: flowers strictly sessile in the axil of a clasping bract or leaf, ebracteolate: corolla purplish or yellowish: no callous gland at the tip of leaves: herbage not glandular: seeds (those of *C. maritimus* not seen mature) rather numerous, scarious-appendaged; the coat cellular-favose.

* Stamens 2: anthers 2-celled: filaments glabrous: seeds somewhat reniform.

C. mollis, Gray. Barely a foot high, rather stout, much branched, villous-hirsute: leaves and bracts oblong-linear, obtuse, entire or the upper lacinate-toothed or pinnatifid: flowers in a thickish short spike: corolla three-fourths inch long. — Proc. Am. Acad. viii. 384, & Bot. Calif. l. c. — Salt marshes of San Francisco Bay, California, around Vallejo, *Wright*, *Greene*.

* * Stamens 4: anthers of longer stamens 2-celled, of the shorter with only the small lower cell: filaments glabrous or nearly so: leaves and even bracts all entire, pale or canescent; lower ones linear: upper, and especially the loosely imbricated bracts, lanceolate or broader and concave or somewhat conduplicate: inflorescence at first capitate, becoming short-spicate.

C. maritimus, Nutt. l. c. A span or two high, corymbosely branched, cinereous-pubescent: leaves glabrate, slightly fleshy: pairs of filaments very unequal. — Gray, l. c. — California, in sandy salt marshes, from San Diego to San Francisco Bay.

C. canescens, Gray, l. c. A foot or less high, corymbosely much branched, canescent with soft and short villous pubescence: uppermost leaves and bracts from oblong- to ovate-lanceolate: smaller filaments sometimes obscurely hairy. — Saline soil, Sierra Nevada, on the eastern border of California to Salt Lake, Utah.

Var. Párryi. A slender form, with narrower bracts and sparser flowers: smaller filaments with some scattered hairs. — *C. Parryi*, Watson in Am. Naturalist, ix. 346. — S. W. Utah, *Parry*, *Palmer*.

* * * Stamens 4: anthers all 2-celled: filaments villous: leaves and bracts mostly 3-5-parted into linear-filiform divisions: habit and inflorescence of § *Adenostegia*.

C. Kingii, Watson. A foot or less high, diffusely branched, viscid-pubescent or villous: leaves 1 or 2 inches long: flowers loosely glomerate or somewhat scattered at the summit of the slender branchlets: calyx 4-6-nerved: corolla less than an inch long, purplish. — Bot. King, 233, t. 22. — W. Nevada, *Watson*. S. Utah, *Parry*, *Siler*. S. W. Colorado, *Brandegee*.

33. **SCHWÁLBEA**, Gronov. CHAFF-SEED. (*C. G. Schwalbe*, who wrote a tract on Sarsaparilla in 1715.) Clayt. Fl. Virg. ed. 1, 71. — Single species.

S. Americána, L. Perennial herb, minutely soft-pubescent: stem strict, 2 feet high, leafy: leaves sessile, ovate or oblong, 3-nerved, entire, an inch or more long; upper gradually reduced to bracts of the loose virgate spike: corolla full inch long, yellowish and purplish: bractlets linear. — Spec. ii. 606 (Pluk. Mant. t. 348, fig. 2); Benth. in DC. Prodr. x. 538. — Low sandy ground, Mass. to Louisiana, near the coast. Fl. early summer.

34. **EUPHRÁSIA**, Tourn. EYEBRIGHT. (Greek for hilarity, from reputed power to restore impaired eye-sight.) — Genus of wide distribution, but only a single and insignificant N. American species.

E. officínalis, L. Low annual: leaves from round-ovate to oblong, incisely dentate; the upper with very strong setaceous-tipped teeth; lowest crenate: galea and lobes of lower lip of the purplish or bluish corolla deeply emarginate. — N. E. coast of Maine and Canada: depauperate and small-flowered forms, perhaps introduced from Europe. Alpine region of White Mountains of New Hampshire, shore of L. Superior, northern Rocky Mountains to Aleutian Islands and far northward; chiefly the var. *Tartarica*, Benth. in DC. (*E. latifolia*, Pursh, Fl. ii. 430); a low form with small flowers (2 or 3 lines long), and mostly rounded leaves (3 to 6 lines long): fl. summer. (Eu., N. Asia.)

35. **BÁRTSIA**, L. (*Dr. I. Bartsch*, an early friend of Linnæus, who died in Surinam.) — Herbs, the genuine species chiefly of mountains or cold regions, both of the Old and New World; with opposite sessile leaves, and subsessile flowers, in the upper axils and in a terminal leafy spike.

B. alpína, L. A span high, simple from a perennial root, pubescent, leafy: leaves ovate, crenate-dentate, half inch long: spike short: corolla over half inch long, purple, with obovate somewhat arching galea: anthers hairy on the back. — Spec. ii. 602; Engl. Bot. 361; Pursh, Fl. ii. 430. — Labrador. (Greenland, Arct. & Alp. Eu.)

B. Odontítes, Huds. A span or two high from an annual root, branching, scabrous-pubescent: leaves oblong-lanceolate, coarsely and remotely serrate: spikes elongated, loosely flowered, partly in the axils of ordinary leaves: corolla small, rose-red: anthers nearly naked. — Fl. Angl. 268; Engl. Bot. t. 1415. *Euphrasia Odontites*, L. *Odontites rubra*, Pers. Syn. ii. 150. — Coast of Maine and of Nova Scotia. (Sparingly nat. from Eu.)

36. **PEDICULÁRIS**, Tourn. LOUSEWORT. (*Pediculus*, a louse; no obvious application, unless the herb was used as an insectifuge.) — Large genus, of perennial herbs, or rarely biennial or annual (as in *P. palustris* and *P. euphrasioides*); many arctic-alpine, rather few N. American, still fewer S. American. Leaves commonly pinnately cleft or dissected, mainly alternate; flowers in a terminal bracteate spike, rarely in a raceme or scattered; in spring or summer. — Benth. in DC. Prodr. x. 560; Maxim. Diagn. in Bull. Acad. Petrop. x. 1877.

* Cauline leaves and flowers verticillate or mostly so: calyx 5-toothed: galea toothless.

P. Menziésii, Benth. About 10 inches high, nearly glabrous, simple: leaves deeply pinnatifid or pinnately parted into oblong incisely toothed divisions: lower whorls of the spike rather distant: calyx inflated-globose; the teeth short, ciliate, somewhat crested: tube of corolla exceeding the calyx; galea straightish, slightly if at all rostrate, shorter than the depending lower lip. — Prodr. l. c. 563. — N. W. Coast, *Menzies*, in herb. Smith. Not identified; char. copied. Corolla of *P. versicolor*, but with much-dilated throat.

P. verticilláta, L. A span high, glabrate or above pilose: leaves 1-2-pinnately parted or pinnatifid into small ovate or oblong divisions or lobes: spikes interrupted: calyx-teeth entire or serrulate: corolla red (half inch long): galea short, barely incurved at the blunt apex, nearly equalled by the lower lip. — Jacq. Austr. iii. t. 206; Benth. l. c.; Reichenb. Ic. Germ. t. 1762. — Alaska to arctic regions, and Aleutian Islands. (Asia, Eu.)

P. Chamissónis, Stev. Commonly a foot high, robust, glabrous: leaves deeply pinnatifid; divisions lanceolate, serrate or incised: lower whorls of the spike remote: calyx-teeth entire: corolla yellow (over half inch long); galea with incurved acuminate beak, becoming straitish. — Monogr. in Mem. Soc. Nat. Mosc. vi. 20, t. 4, fig. 1; Hook. Fl. ii. 107. *P. Romancoviï*, Cham. in Spreng. Syst. ii. 778. — Aleutian Islands, *Chamisso*, *Dall*, &c. (Adjacent W. Asia.)

* * Leaves alternate, or some occasionally opposite.

+ Galea produced into a filiform porrect or soon upturned beak; throat with a tooth on each side; tube of corolla nearly included in the 5-toothed calyx: leaves lanceolate in outline, pinnately parted; the linear or lanceolate divisions acutely or laciniately serrate, or the larger again pinnatifid: stems simple, strict, from a span to a foot and a half high: spike dense and many-flowered, naked: corolla dull rose-red or crimson-purple.

P. Grœnlândica, Retz. Glabrous: spike 1 to 6 inches long: calyx-teeth short: beak of the galea half inch or more long, twice the length of the rest of the corolla, decurved on the accumbent lower lip, thence porrect and soon upwardly recurved. — Fl. Scand. ed. 2, 45; Fl. Dan. t. 1166 (with flowers not well developed); Torr. Ann. Lye. N. Y. ii. 223; Hook. l. c. *P. Grœnlândica* & *surrecta*, Benth. l. c. 566. *P. incarnata*, Retz, Fl. Scand. ed. 1, 117, & Obs. iv. 27, t. 1 (representing well developed ascending beak), not Jacq. &c. — Wet ground, Labrador and Hudson's Bay to Alpine and subalpine Rocky Mountains, extending south to borders of New Mexico, west to Brit. Columbia, and south in the Sierra Nevada to King's River, California, *Dr. Matthews*. (Greenland.)

P. attóllens, Gray. More slender: spike loosely lanate-pubescent when young: flowers smaller: calyx-teeth nearly as long as the tube: corolla dull violet purple: galea much shorter than the broad lower lip, about half the length of the obtuse and abruptly upturned or retrocurved filiform beak, which is only 2 or 3 lines long. — Proc. Am. Acad. vii. 384, & Bot. Calif. i. 582. — Wet ground, Sierra Nevada, California, from the Yosemite district to Placer Co., at 6-10,000 feet, *Bridges*, *Brewer*, &c.

+ + Galea of the (short, half inch long) white corolla produced into a slender elongated-subulate circinate-incurved beak, nearly reaching the apex of the broad lower lip: calyx cleft in front: whole plant glabrous.

P. contórta, Benth. A foot or less high, simple: leaves pinnately parted into linear incisely serrate lobes; the upper reduced to simpler small bracts: spike naked, cylindrical, rather loosely many-flowered: galea with the slender beak almost circinate. — Hook. Fl. ii. 108, & DC. l. c. 575. — Mountains of Oregon and Idaho, *Tolmie*, *Hayden*, &c.

P. racémósa, Dougl. A foot or so high, simple or sometimes branching, leafy to the top: leaves lanceolate, undivided, minutely and doubly crenulate (2 to 4 inches long): flowers short-pedicelled, in a short leafy raceme or spike, or the lower in remote axils and uppermost with bracts hardly surpassing the 2-toothed calyx: slender beak of galea hamate-deflexed. — Hook. l. c., & DC. l. c. — Subalpine regions, British Columbia to N. California, Utah, and Colorado.

+ + + Galea falcate and with a conical or thick-subulate beak, edentulate: leaves at least pinnatifid: flower about half inch long.

++ Stems more or less leafy, low: leaves simply pinnatifid: corolla ochroleucous.

P. Lappónica, L. Merely puberulent: stems clustered, a span or more high, leafy up to the short close spike: leaves lanceolate, pinnatifid half way down in many and close small oblong and incisely toothed lobes: calyx cleft in front, minutely 2-toothed behind: galea erect, with abruptly incurved conical short beak. — Fl. Lapp. t. 4, fig. 1; Fl. Dan. t. 2; Pursh, Fl. ii. 309. — Labrador and Arctic America: apparently uncommon. (Greenland, Lapland to Kamtschatka.)

P. Párryi, Gray. Glabrous, or the inflorescence slightly pubescent: stem a span or two high, very leafy at base, slightly so above: leaves linear-lanceolate in outline, deeply pinnately parted; the divisions linear-lanceolate, acute (2 or 3 lines long), closely callous-serrate; uppermost leaves reduced to narrow linear bracts: spike dense, $1\frac{1}{2}$ to 4 inches long: calyx 5-toothed; the teeth entire: corolla ochroleucous or more yellow; galea strongly falcate, with decurved subulate-conical beak, of about the length of the width of the galea. — Am. Jour. Sci. ser. 2, xxxiii. 250; Porter & Coulter, Syn. Fl. Colorad. 97. — Rocky Mountains, from Wyoming or Montana through Colorado to Utah, within and on the border of the alpine region.

++ ++ Stem scapiform, or sometimes bearing a pair of leaves, low: leaves doubly pinnatifid: corolla probably purple: decurved or porrect narrow beak longer than the breadth of the galea: plants nearly glabrous, only a span high.

P. pedicelláta, Bunge. Leaves pinnately parted, and the oblong or lanceolate divisions incisely pinnatifid; lobes very small, dentate: spike capitate and with one or two more distant pedicellate leafy-bracted flowers at base: calyx-lobes toothed or incised: corolla fully half inch long: lower lip much smaller than the galea. — Walp. Repert. iii. 432 (name only) & in Ledeb. Fl. Ross. iii. 278; Maxim. l. c. 111. *P. nasuta*, Bong. Sitk., not Bieb. *P. subnuda*, Benth. in DC. l. c. 577. — Sitka, Mertens, &c. Norfolk Sound, Eschscholtz. Also Labrador, according to Bunge, l. c.

P. ornithorhýncha, Benth. Habit, foliage, &c., of the preceding, according to the character: "spike interrupted: calyx ovate-inflated; the teeth nearly entire." — Hook. l. c. & DC. l. c. — "On Mount Ranier, Oregon, *Tolmie*." Said to be related to *P. rostrata*, but with more dissected leaves, having very acute lobes, and a smaller lip.

+ + + + Galea falcate, arcuate, or with apex more or less incurved, or anteriorly curvilinear; the beak very short and thick, or commonly none.

++ Stems branching from a biennial or perhaps annual root: flowers from the axils and in short terminal spikes: galea about the length of the lip, slender-bidentulate at the lower part of the apex.

P. euphrasióides, Stephan. A span or more high, puberulent: leaves lanceolate; lower pinnately parted into lanceolate incisely serrate divisions; upper pinnatifid; uppermost closely crenate: calyx cleft in front and with 2 or 3 entire teeth behind: corolla half inch long, yellowish and purplish; galea little shorter than the tube, with a very short and truncate horizontal beak. — Willd. Spec. iii. 204; Reichenb. Iconogr. i. t. 14; Benth. l. c. *P. Labradorica*, Houtt. Linn. Syst. viii. 39, t. 57. — Labrador to Behring Straits. (Kamts. to Greenland.)

P. palústris, L., var. Wlassoviána, Bunge. A foot high, glabrous: leaves all pinnately parted; the small segments oblong, incisely crenate: calyx 2-cleft; lobes incisely cristate: corolla narrow, half inch long, purplish; lips much shorter than the tube; galea not at all rostrate, nearly straight, the anterior face curvilinear, a pair of minute additional denticulations at the throat. — Ledeb. Fl. Ross. iii. 283; Maxim. l. c. *P. Wlassoviana*, Stev. Monogr. 27, t. 9, fig. 1; Benth. l. c. *P. parviflora*, Smith, ex Benth. — Hudson's Bay to Kotzebue Sound, and south to Oregon. (Siberia.)

++ ++ Stems simple, from a perennial root, leafy, and along with the spike longer than the leaves.

= Atlantic States species, not alpine: leaves pinnatifid: spike short and dense.

P. Canadénsis, L. Hirsute-pubescent and glabrate, a span to a foot high: leaves oblong-lanceolate, rather deeply pinnatifid; lobes short-oblong, obtuse, incisely and the larger doubly dentate: spike leafy-bracteate: calyx cleft in front: corolla ochroleucous or tinged or variegated with purple, narrow, less than inch long; cucullate summit of the galea incurved, its slightly produced tip emarginate-truncate and below conspicuously cuspidate-bidentate: capsule gladiate-lanceolate. — Mant. 86; Sims, Bot. Mag. t. 2506; Sweet, Brit. Fl. Gard. t. 67. *P. gladiata*, Michx. Fl. ii. 18. *P. æquinoctialis*, HBK. Nov. Gen. & Spec. ii. 232. — Moist woodlands and gravelly banks, Canada to the Saskatchewan, south to Florida, and west to the Colorado Rocky Mountains. (Mex.)

P. lanceoláta, Michx. Glabrous or sparsely pubescent: stem robust, 1 to 3 feet high: leaves not rarely opposite, thickish, lanceolate or oblong, moderately pinnatifid and the short and broad lobes doubly crenate-dentate, or the upper leaves merely crenate and the teeth minutely crenulate: leafy bracts shorter than the flowers: calyx 2-lobed; lobes crested with a roundish appendage: corolla straw-color, an inch long, rather broad; cucullate summit of the galea incurved and produced into a somewhat beak-like evenly truncate and edentulate apex: capsule ovate, oblique. — Fl. ii. 18; Benth. l. c. 582. *P. 17-ginica*, Poir. Dict. v. 126. *P. pallida*, Pursh, Fl. ii. 424. *P. auriculata*, Smith, ex Benth. — Swamps, Connecticut to Virginia, Ohio and the Saskatchewan. Perhaps this is also *P. resupinata*, Pursh, l. c., from Canada.

= = Rocky Mountain species, tall or slender, not alpine.

a. Leaves undivided: galea bidentulate at tip, equalled by the lip.

P. crenuláta, Benth. Villous-pubescent, at length glabrate: stems a foot or less high: leaves oblong-linear or narrower, obtuse ($1\frac{1}{2}$ to 3 inches long), closely crenate and the

broad crenatures minutely crenulate: spike short and dense: calyx cleft in front, 2-3-toothed posteriorly: corolla whitish or purplish, three-fourths of an inch long, like that of *P. Canadensis*, but the teeth at the apex of galea less conspicuous. — Prodr. l. c. 568; Porter & Coulter, Fl. Colorad. 97. — Meadows and parks, Colorado Rocky Mountains, at 7 to 10,000 feet, *Fremont, Vasey, &c.*

b. Leaves all pinnately parted and the lower divided, ample: divisions lanceolate or linear-lanceolate, acutely lacinate-serrate or the larger pinnatifid: spike naked, many-flowered: bracts unlike the leaves: calyx 5-cleft; the lobes slender and entire: galea almost straight, cucullate at summit.

P. bracteósa, Benth. Glabrous, or the dense cylindraceous ($1\frac{1}{2}$ to 3 inch) and usually pedunculate spike somewhat pilose: stem 1 to 3 feet high: divisions of the leaves $\frac{1}{2}$ to 2 inches long, linear-lanceolate: bracts ovate, acuminate, shorter than the flowers: calyx-lobes slender-subulate, equalling the tube: corolla less than inch long, narrow, pale yellow; galea much longer and larger than the lip, its cucullate summit slightly produced at the entire edentulate orifice, but not rostrate. — Hook. Fl. & DC. l. c. *P. recutita*, Pursh, Fl. ii. 425, probably. *P. elata*, Pursh? not Willd. — Mountain and subalpine woods, Saskatchewan to British Columbia, and south to Utah and the Colorado Rocky Mountains.

P. prócera, Gray. Puberulent: stem robust, $1\frac{1}{2}$ to 4 feet high: leaves pinnately divided into lanceolate (1 to 3 inches long) and irregularly pinnatifid segments, or the uppermost deeply pinnately parted; lobes mucronately serrate or incised: bracts lanceolate, caudate-acuminate, mostly longer than the flowers, serrate or denticulate, or the upper entire: spike 8 to 15 inches long: calyx-lobes lanceolate or subulate, much shorter than the tube: corolla about an inch and a half long, sordid yellowish and greenish-striate; galea hardly longer than the ample lip; its broad cucullate summit slightly incurved, hardly at all extended at the orifice, the lower angle with a short triangular tooth on each side: capsule broadly ovate. — Am. Jour. Sci. ser. 2, xxxiv. 251. — Low or wooded grounds of the Rocky Mountains in Colorado and New Mexico, at 8 or 9,000 feet. Leaves more compound, the bracts and calyx-lobes longer, and corolla larger than in the allied Siberian *P. striata*, Pall.

=== Rocky-Mountain-alpine: stem few-leaved, only a span or so high.

P. scopulórum. Glabrous, except the arachnoid-lanate dense oblong spike: calyx-teeth triangular-subulate, entire, membranaceous, very much shorter than the tube: galea of the reddish-purple (three-fourths inch long) corolla with its somewhat produced apex obliquely truncate, edentulate or produced on each side into an obscure triangular tooth: otherwise as the following. — *P. Sudetica*, var., Gray in Am. Jour. l. c. — Colorado Rocky Mountains, at 12 to 14,000 feet, *Parry, Hall & Harbour, &c.*

=== Arctic-alpine, in America only in high northern regions.

a. Galea falcate-incurved and with somewhat produced bidentulate summit.

P. Sudética, Willd. Glabrous, or the spike commonly hirsute-villous or lanate: stem a span high, few-leaved: leaves simply pinnately-parted; divisions lanceolate, incisely serrate or crenate; the teeth somewhat cartilaginous: spike dense, mostly short: calyx-teeth lanceolate or linear, little shorter than the tube, serrulate: corolla purple (9 or 10 lines long); galea longer than the crose-crenulate lobes of the lip; the tooth at the lower side of truncate apex on each side conspicuous and cuspidate, sometimes shorter and triangular-acuminate. — Spec. iii. 209; Stev. Monogr. 44, t. 15; Reichenb. Iconogr. iv. t. 390, & Ic. Germ. t. 1750; Bunge in Ledeb. l. c. — Kotzebue Sound, St. Paul and St. Lawrence Islands, &c. (Adjacent Arctic Asia, N. Siberia to Lapland, E. Alps.)

b. Galea less falcate or straightish, with rounded-obtuse summit not at all produced anteriorly, yet sometimes bidentulate: calyx 5-toothed: capsule acuminate, usually double the length of the calyx: spike dense, its evolution according to Maximowicz centrifugal or nearly coetaneous (but this hardly apparent), except in true *P. Langsdorffii*.

P. Langsdórffii, Fisch. Stem stout, glabrous below, at base bearing numerous leafless brown scales, 3 to 8 inches high, including the at length elongated leafy-bracteate more or less hirsute or lanate spike: leaves pectinately pinnatifid or the radical parted into small oblong denticulate lobes: bracts mostly like the upper leaves: calyx-teeth or most of them denticulate: corolla rose-color or purple (rarely yellowish, 9 or 10 lines long), with oblong-linear somewhat falcate galea longer than the lip, commonly with a slender tooth on each side below the apex: filaments all or one pair more or less pilose above: capsule gladiate-lanceolate. — Stev. Monogr. 49, t. 9, fig. 2; Hook. Fl. ii. 109; Ledeb. Fl. Ross. iii.

288; Maxim. l. c. *P. purpurascens*, Cham. in Spreng. Syst. ii. 781. — Aleutian and more northern Islands, Kotzebue Sound, &c. (Adjacent N. E. Asia.) Evidently passes into

Var. lanáta. Spike conspicuously and densely lanate: galea rather shorter, nearly equalled by the lip, often edentulate: one pair of filaments glabrous: capsule ovate-acuminate. — *P. Langsdorffii*, var., Stev. l. c. *P. lanata*, Willd. ex Cham. in Linn. ii. 583; Bunge, l. c. *P. arctica*, R. Br. App. Parry, 280, ex char. *P. hirsuta*, Benth. l. c., in part. *P. Kanei*, Durand in Jour. Acad. Philad. n. ser. ii. 195. — Same range as the type on the north-west coast; also arctic coast and islands, and high northern Rocky Mountains. (Greenland, Nova Zembla, Arctic Asia.)

P. hirsúta, L. More sparsely-leaved, 2 to 10 inches high: leaves pinnately parted or divided down to the broad rachis, which is almost as wide as the length of the (line long) divisions: spike capitate, lanate, or the calyx rather hirsute: corolla smaller, not over half inch long, flesh-colored; the closed galea not excised or notched anteriorly: filaments all glabrous. — Fl. Lapp. t. 4, fig. 3; Fl. Dan. t. 1105; Bunge, l. c. — Arctic seacoast, *Capt. Parry*. (Greenland, Spitzbergen, Lapland, Arct. Siberia.)

P. flámmea, L. Rather sparsely-leaved, glabrate or glabrous, 2 to 4 inches high: leaves deeply pinnately parted; divisions crowded, ovate or oblong, incisely and doubly serrate (hardly 2 lines long): bracts of the narrow naked spike shorter than the pedicellate flowers, linear-lanceolate, merely denticulate: calyx-teeth lanceolate, unequal, much shorter than the cylindraceous tube: corolla narrow, half inch long, citron-yellow with crimson or dark purple tip to the oblong almost equal-sided but slightly arcuate galea, which much exceeds the small lip: filaments all glabrous. — Fl. Lapp. t. 4, fig. 2; Fl. Dan. t. 30, & t. 1878; Bunge, l. c. — Labrador to the northern Rocky Mountains and northward. (Greenland, Arct. Eu.)

P. versicolor, Wahl. Like the preceding, mostly larger: calyx more deeply 5-toothed: corolla three-fourths inch long, with more arcuate and gibbous galea, dilated throat, and larger lip: two longer filaments hairy. — Veg. Helvet. 118 (not Fl. Suec.); Cham. & Schlecht. in Linn. ii. 585; Hook. l. c.; Bunge, l. c. — N. W. Coast? Island of St. Lawrence, *Chamisso*. (Arctic E. Asia to Himalayas and Swiss Alps.)

++ ++ ++ Stem scapiform, leafless or one-leaved, and with the head of few large flowers surpassing the radical leaves: galea edentulate: anthers mucicous.

P. capitáta, Adams. Pubescent or glabrate: leaves pinnately divided; divisions ovate, pinnately incised and dentate: scape 1 to 4 inches high: bracts foliaceous: calyx campanulate, 5-cleft; the lobes incisely dentate: corolla over an inch long, "white" or "yellow;" its tube little exserted; galea elongated, arcuate-incurved, of equal breadth throughout, obscurely produced at the orifice, twice the length of the lip: filaments glabrous. — Mem. Soc. Nat. Mosc. v. 100; Stev. Monogr. l. c. 19, t. 3, fig. 2; Cham. & Schlecht. l. c.; Trantv. Imag. 55, t. 36. *P. Nelsoni*, R. Br. in Richards. Frankl. App. 743; Hook. in Parry, App. 402, t. 1. *P. verticillata*, Pursh, Fl. ii. 426, not L. — Arctic seacoast, Kotzebue Sound, Unalaska, and more northern islands. (Arct. Asia.)

++ ++ ++ ++ Stem short or hardly any: radical leaves exceeding the short spike or head: galea edentulate: anther-cells mucronate or aristate at base: lower lip nearly the length of the galea: calyx 5-cleft into lanceolate unequal lobes: capsule ovate, nearly included in the calyx.

P. semibarbáta, Gray. Nearly acaulescent, depressed, pubescent and glabrate: leaves (6 to 9 inches long) in a radical tuft and as bracts to the lowest flowers, on petioles mostly exceeding the irregular sessile spikes, twice pinnately parted or nearly so, and the oblong lobes laciniately few-toothed: corolla yellowish and purplish, pubescent outside, two-thirds inch long; the almost straight galea rounded obliquely at summit, not cucullate: longer filaments villous above the middle: anthers mucronate at base. — Proc. Am. Acad. vii. 385, & Bot. Calif. i. 583. — Open woods of the Sierra Nevada, California, at 5 to 10,000 feet, south to San Bernardino Co.

P. centranthéra, Gray. Glabrous: leaves (2 to 5 inches long) moderately exceeding the short and dense spike, deeply pinnatifid; the ovate or oblong divisions doubly crenate-dentate and their margins thickly bordered with minute white-cartilaginous teeth: bracts shorter than the flowers, similarly margined and toothed, or the upper and calyx-lobes nearly entire: corolla inch long, purple and yellowish; the galea slightly incurved and conspicuously cucullate at summit: filaments glabrous: anthers aristate at base. — Bot. Mex. Bound. 120. — W. New Mexico and S. Utah to S. E. California, *Bigelow, Newberry, Mrs. Thompson, Palmer, &c.*

+ + + + + Galea completely straight and anteriorly rectilinear, edentulate, very much longer and larger than the depauperate lip, slightly broader upwards; the whole corolla therefore more or less clavate.

P. densiflora, Benth. Pubescent or glabrate: stem stout, 6 to 20 inches high, leafy: leaves ample (4 to 12 inches long), of oblong outline, twice pinnatifid or pinnately parted, and the lobes laciniate-dentate; the irregular salient teeth cuspidate-tipped: spike at first very dense, oblong (2 or 3 inches long), in age looser and longer (sometimes a foot or more long); lower bracts leaf-like; uppermost almost entire and equalling or shorter than the short-pedicellate or sessile flowers: calyx deeply 5-toothed; the teeth lanceolate or subulate: corolla scarlet-red, fully an inch long; lip a line or two long: filaments glabrous. — Hook. Fl. ii. 110, & DC. l. c. 574; Gray, Bot. Calif. i. 583. *P. attenuata*, Benth. in DC. l. c. — Dry hills, almost throughout California, at least in the western part of the State. A variable but most distinct species.

37. RHINÁNTHUS, L. YELLOW-RATTLE. (Formed of *ῥίη*, snout, and *ἄνθος*, flower, now meaningless, for the species with beak to the upper lip of the corolla have been removed to another genus.) — Comprises a very few annuals of northern temperate zone; with erect stem, opposite leaves, and mostly yellow subsessile flowers in the axils, the upper ones crowded and secund in a leafy-bracted spike; in summer. Seeds when ripe rattle in the inflated dry calyx, whence the popular name.

R. Crista-gálli, L. About a foot high, glabrous, or slightly pubescent above; leaves from narrowly oblong to lanceolate, coarsely serrate; bracts more incised and the acuminate teeth setaceous-tipped: corolla barely half inch long, only the tip exerted; transverse appendages of the galea transversely ovate, as broad or broader than long: seeds conspicuously winged. — Spec. ii. 603, mainly; Engl. Bot. t. 657. *R. minor*, Ehrh. Beitr. vi. 144. — Coast of New England, rare, and perhaps introduced. Alpine region of the White Mountains, New Hampshire, Labrador and Newfoundland, Lake Superior, Rocky Mountains, extending south to New Mexico, and north-west to Alaska and Unalaska; clearly indigenous. (Greenland, Eu., Asia.) Varies much in size, but apparently we have no *R. major*, Ehrh.

38. MELAMPÝRUM, Tourn. COW-WHEAT. (The name, from *μέλας* and *πυρός*, means black wheat: in Europe some species are weeds in grain fields.) — Low and branching annuals; with opposite leaves; chiefly European, one Atlantic N. American: fl. summer.

M. Americánum, Michx. Nearly glabrous, a foot or, so high, loosely branched: leaves lanceolate or linear-lanceolate, short-petioled; lower entire; upper with abrupt base and one or two bristly-acuminate teeth, or nearly hastate: calyx-teeth longer than the tube, subulate-filiform, one-third the length of the slender pale yellow (barely half inch) corolla: flowers scattered in the axils of ordinary leaves. — Fl. ii. 16; Gray, Man. 338. *M. lineare*, Lam. Dict. iv. 23. *M. latifolium*, Muhl. Cat.; Nutt. Gen. ii. 58. *M. sylvaticum*, Hook. Fl. ii. 106, not L. *M. pratense*, var. *Americanum*, Benth. in DC. Prodr. x. 584. *M. brachiatum*, Schwein. in Keating, Narr. St. Peter R. Appx. 115, a slender form. — Thickets, &c., Hudson's Bay to Saskatchewan, and through Atlantic States, chiefly eastward, to the mountains of N. Carolina.

ORDER XCVII. OROBANCHACEÆ.

Root-parasitic herbs, destitute of green foliage (whitish, yellowish, reddish or brown), with alternate scales in place of leaves, the two (single or double) multi-ovulate placenta parietal, and ovary consequently one-celled, the very small and innumerable seeds with a minute embryo having no obvious distinction of parts, otherwise nearly as *Scrophulariaceæ*. Flowers hermaphrodite, 5-merous as to

perianth, with didynamous stamens and the dimerous pistil of all the related orders, but the stigmas and the placenta sometimes divided or separated so as apparently to be four: all the flower commonly marcescent-persistent. Corolla ringent. Anthers always 2-celled. Ovary ovoid, pointed with a mostly long style: stigma sometimes peltate or disc-shaped and entire, often bilabiate, occasionally 4-lobed, i. e. the anterior and posterior stigma each 2-lobed, and sometimes these lobes or half-stigmas combine laterally, forming two right and left stigmas which therefore are superposed to (instead of alternate with) the parietal placenta. When the latter are four, it is because the half-placenta are borne more or less within the margin of each carpel. Capsule 2-valved, each valve bearing on its face a single placenta or a pair. Hypogynous gland not rarely at the base of the ovary on one side. Flowers solitary in the axils of bracts or scales, sometimes on scapiform peduncles, sometimes collected in a terminal spike: evolution always centripetal.

* Flowers all alike and fertile.

— Anther-cells deeply separated from below, mucronate or aristulate at base.

++ Foreign, sparingly introduced from Europe.

1. **OROBANCHE.** Flowers spicate, sessile. Calyx cleft before and behind almost or quite to the base into a pair of lateral and usually 2-cleft divisions. Corolla bilabiate; upper lip erect, 2-lobed or emarginate; lower spreading, broadly 3-lobed. Stamens included. Lobes of the stigma when distinguishable right and left.

++ ++ Indigenous and peculiar to North America.

2. **APHYLLON.** Flowers pedunculate or pedicellate, sometimes subsessile and thyrsoid-spicate. Calyx 5-cleft; lobes nearly equal, acute or acuminate. Corolla somewhat bilabiate; upper lip more or less spreading, mostly 2-lobed, lower spreading. Stamens included. Stigma peltate or somewhat crateriform, or bilamellar, the lobes anterior and posterior. Style deciduous. Placenta 4, either equidistant or contiguous in pairs.

3. **CONOPHOLIS.** Flowers in a dense simple scaly-bracted spike, 2-bracteolate. Calyx spathaceous, deeply cleft in front, posteriorly about 4-toothed. Corolla ventricose-tubular, strongly bilabiate; upper lip fornicate and emarginate; lower shorter, spreading, 3-parted. Stamens somewhat exserted; the pairs little unequal (rarely the 5th stamen present). Stigma capitate, obscurely 2-lobed; the lobes anterior and posterior. Placenta 4, almost equidistant. Seeds oval, with a thick coat.

— — Anther-cells closely parallel and mucous at base.

4. **BOSCHNIAKIA.** Flowers sessile in a dense simple scaly-bracted spike, ebracteolate. Calyx short, cupuliform, posteriorly truncate or obliquely shorter, and with 3 distant teeth in front. Corolla ventricose; upper lip erect or fornicate, entire; lower 3-parted. Stamens slightly exserted. Stigma dilated and bilamellar (the lobes right and left) or 4-lobed. Seeds with a thin reticulated coat.

* * Flowers dimorphous; lower cleistogamous; upper commonly infertile.

5. **EPIPHEGUS.** Flowers subsessile and spicately scattered along slender paniculate branches. Calyx short, 5-toothed. Corolla cylindraceous, slightly curved and upwardly enlarged, almost equally 4-lobed at summit; the rather larger upper lobe or lip fornicate or concave, barely emarginate. Stamens slightly exserted: anther-cells parallel, mucronate at base. Broad gland adnate to base of the ovary on the upper side. Style filiform: stigma capitate-2-lobed. Cleistogamous flowers short unopened buds: style hardly any. Capsule 2-valved at apex: a pair of contiguous placenta on each valve. Seeds with a thin and shining striate-reticulated coat.

1. **OROBÁNCHE, L. BROOM-RAPE.** (*ὄροβος* and *ἀρχόνη*, a vetch-strangler.) — Old-World parasites, on roots of various plants, very numerous in species or forms, one species sparingly and probably recently introduced into the Atlantic United States.

O. MÍNOR, L. Parasitic on clover, New Jersey to Virginia, a span to a foot high, pubescent, pale yellowish-brown, or with purplish-tinged flowers in a rather loose spike: corolla half inch long. (Nat. from Eu.)

2. **APHÝLLON**, Mitchell. **CANCER-ROOT**. (From *α* privative, and *φύλλον*, foliage, i. e. leafless.) — North American and Mexican, brownish or whitish, low, commonly viscid-pubescent or glandular, and with violet-purple or yellowish flowers. — Nov. Gen. in Act. Phys.-Med. Acad. Nat. Cur. viii. (1748), 221; Gray, Man. ed. 1, 290, & Bot. Calif. i. 584; Benth. & Hook. Gen. ii. 983.

§ 1. **GYMNOCAÚLIS**, Benth. & Hook. l. c. Peduncles or scapes long and slender from the axils of fleshy loose scales of a short and commonly fasciculate root-stock or caudex, naked, not bracteolate under the flower: calyx regularly 5-lobed: corolla with elongated somewhat curved tube, and widely spreading somewhat equally 5-lobed limb, only obscurely bilabiate: stigma peltate and slightly bilamellar, broad and thin: placentæ nearly equidistant: seed-coat thin and minutely reticulated. Fl. summer. — *Aphyllon*, Mitchell, l. c. *Orobanche* § *Gymnocaulis*, Nutt. Gen. ii. 59. *O.* § *Anoplon*, Wallr. Orobanch. 66. *Anoplanthus* § *Euano-plon*, Endl. Gen. 727.

A. uniflorum, Gray. Scaly stem short and nearly subterranean, bearing few scapes (a span high): calyx-lobes mostly much longer than the tube, subulate, usually attenuate: corolla violet-tinged (and flower violet-scented, inch long); the lobes obovate and rather large. — Man. l. c. & Bot. Calif. i. 584. *Orobanche uniflora*, L.; Bart. Med. Bot. t. 50. *O. biflora*, Nutt. l. c. *Phelipæa biflora*, Spreng. Syst. ii. 818. *Anoplanthus uniflorus*, Endl. Iconogr. t. 72 (stigma wrong); Reuter in DC. Prodr. xi. 41. *Anoplon biflorum*, Don, Syst. iv. 633. — Damp woodlands, Newfoundland to Texas, California, and Brit. Columbia: flowers early.

A. fasciculatum, Gray, l. c. More pubescent and glandular: stem often emergent and mostly as long as the numerous fascicled peduncles, not rarely shorter: calyx-lobes broadly or triangular-subulate, not longer than the tube, very much shorter than the dull yellow or purplish corolla; lobes of the latter oblong and smaller. — *Orobanche fasciculata*, Nutt. l. c.; Hook. Fl. ii. 93, t. 170. *Phelipæa fasciculata*, Spreng. l. c. *Anoplanthus fasciculatus*, Walp. Repert. iii. 480; Reuter in DC. l. c. — Sandy ground, Lake Michigan and Saskatchewan, southward west of the Mississippi to Arizona, and west to Oregon and California; on *Artemisia*, *Eriogonum*, &c.

Var. luteum, a very caulescent and short-peduncled form, with sulphur-yellow corolla, and whole plant light yellow. — *Phelipæa lutea*, Parry in Am. Naturalist, viii. 214. — Wyoming, Parry. Parasitic on roots of grasses.

§ 2. **NOTHAPHÝLLON**, Gray. Caulescent, and the inflorescence racemose, thyrsoidal, or spicate: pedicels or calyx 1–2-bracteolate: corolla manifestly bilabiate; upper lip less or not at all 2-cleft: stigma sometimes crateriform: seed-coat favose-reticulated: placentæ approximate in pairs.

* Flowers all manifestly pedicellate: corolla lobes oblong, spreading; upper lip less so.

A. comosum, Gray. Low, puberulent: short stout stem branching close to the ground: pedicels corymbose or paniculate-racemose, shorter than the (inch or more long) flower: bractlets one or two on the pedicel or sometimes at the base of the flower: calyx deeply 5-parted; lobes subulate-linear and attenuate, about half the length of the pink or pale purple corolla: anthers woolly. — Bot. Calif. i. 584. *Orobanche comosa*, Hook. Fl. ii. 93, t. 169 (but lobes of lower lip seldom so notched). *Anoplanthus comosus*, Walp. l. c. *Phelipæa comosa*, Gray in Pacif. R. Rep. iv. 118. — Dry hills, parasitic on *Artemisia*, &c., Washington Terr. to California.

A. Californicum, Gray, l. c. More pubescent and viscid, and with stouter and simpler stem, about a span high: flowers crowded in an oblong dense raceme or thyrsus: pedicels shorter than calyx: bractlets close to the calyx, and with the subulate-linear lobes of the latter almost equalling the yellowish or purplish corolla; the lobes of which are shorter and less spreading: anthers glabrous or slightly hairy. — *Orobanche Californica*, Cham. & Schlecht. in Linn. iii. 134. *Phelipæa Californica*, Don. l. c. *P. erianthera*, Watson, Bot. King, 225, not Engelm. — California and W. Nevada. Lower pedicels sometimes half inch long; upper very short.

* * Flowers nearly sessile or the lower ones short-pedicelled, simply spicate or thyrsoid: calyx bibracteolate, deeply 5-cleft into linear-lanceolate lobes: upper lip or all the lobes of the more tubular corolla less spreading: whole plant viscidly pruinose-puberulent.

A. multiflorum, Gray, l. c. A span or two high: calyx almost 5-parted, fully half the length of the ample (inch or more long) purplish corolla: anthers very woolly. — *Orobanche multiflora*, Nutt. Pl. Gamb. 179. *Phelipæa Ludoviciana*, Torr. Bot. Mex. Bound. 110, in part. *P. erianthera*, Engelm. in Proc. Am. Acad. vii. 372. — Gravelly plains and pine woods, W. Texas, New Mexico, and S. Colorado, to Arizona. (Adjacent Mex.)

A. Ludoviciánum, Gray, l. c. Rather less pubescent: spikes more frequently compound: calyx less deeply and somewhat unequally 5-cleft: corolla about half smaller; upper lip sometimes almost entire: anthers (before dehiscence) glabrous or nearly so. — *Orobanche Ludoviciana*, Nutt. Gen. ii. 58. *Phelipæa Ludoviciana*, Walp. l. c.; Reuter in DC. l. c. — Illinois and Saskatchewan to Texas, thence west to Arizona and the south-eastern borders of California. (Adjacent Mex.)

* * * Flowers subsessile or short-pedicelled, thyrsoid-paniculate, small, otherwise nearly as in the preceding section: stems with a thickened tuber-like squamose base: anthers glabrous: corolla yellowish, half inch long.

A. tuberósum, Gray, l. c. Pruinose-puberulent, seldom a span high: short and dense spikes corymbose-globose at the summit of the thick stem: calyx-lobes lanceolate, longer than the tube. — *Phelipæa tuberosa*, Gray, Proc. Am. Acad. vii. 371. — Dry ridges, California, from Monterey to San Diego, and San Bernardino Co., Brewer, Palmer, Parry.

A. pinetórum, Gray, l. c. More pubescent: stem rather slender above the large tuberous base, a span to a foot high: flowers in a rather loose elongated panicle: calyx-lobes subulate from a broad base, not longer than the tube. — *Orobanche pinetorum*, Geyer in Hook. Kew Jour. Bot. iii. 297. — Oregon to British Columbia, on the roots of Fir-trees.

3. CONÓPHOLIS, Wallr. SQUAW-ROOT. (*Kōros*, cone, and *φολίς*, scale, the young plant, clothed with the imbricated dry scales and bracts, not unlike a slender Fir-cone.) — Single species.

C. Americana, Wallr. Glabrous, simple, 3 or 4 and in fruit becoming 6 to 10 inches long, as thick as the thumb, light chestnut-colored, and with yellowish flowers: scales at first rather fleshy, at length firm-chartaceous. — *Orobanch.* 78; Endl. Iconogr. t. 81. *Orobanche Americana*, L. f. Suppl. 88. — Oak woods, in clusters among decaying fallen leaves, New England to Michigan and Florida: fl. summer. (Mex.)

4. BOSCHNIÁKIA. C. A. Meyer. (In memory of *Boschniakia*, a Russian botanist.) — Short and thick, simple-stemmed from a tuberous caudex, brown, glabrous, scaly; the sessile flowers each subtended by a scaly bract nearly equaling the corolla; the whole forming a mostly dense cylindrical spike. W. N. American, E. Asian and Himalayan: fl. summer.

* Calyx-teeth short and broad: placenta 2: scales (acutish) and corolla-lobes somewhat ciliate.

B. glábra, C. A. Meyer. A span to a foot high: scales ovate: anterior calyx-tooth larger: lower lip of the ovoid ventricose corolla almost obsolete: filaments merely glandular at base. — Bong. Veg. Sitka, 158, where the genus was first described. *Orobanche*, &c., Gmel. Sibir. iii. 216, t. 46. *O. Rossica*, Cham. & Schlecht. in Linn. iii. 132. *O. (Bosch.) glabra*, Hook. Fl. ii. 92, t. 167. — Aleutian Islands and east to Slave Lake. (Japan, Siberia.) The reference in DC. Prodr. to E. United States and Mexico was an oversight.

B. Hoókeri, Walp. Smaller: scales oblong, rather sparse: spike short: lower lip of the oblong corolla fully half the length of the upper; its lobes ovate-oblong: filaments bearded at base. — Rep. iii. 479; Reuter in DC. l. c. 39. *Orobanche tuberosa*, Hook. Fl. ii. 92, t. 168. — N. W. Coast, *Menzies*: not since seen.

* * Calyx-teeth linear-subulate and longer than the tube: scales very broad and obtuse: placenta 4, equidistant.

B. strobilácea, Gray. A span high or less, stout and thick, brownish-red, flowering almost from the base: scales much imbricated, orbicular and round-obovate: lower lip of

the oblong (white and brownish-striped) corolla about as long as the upper; its lobes oblong, widely spreading: filaments densely bearded at base.—Pacif. R. Rep. iv. 118, & Bot. Calif. i. 585.—California; on dry steep hills, S. Yuba, *Bigelow*. Santa Lucia Mountains, parasitic on Manzanita-roots, *Brewer*. San Bernardino Co., *Lemmon*. (Mex.?)

5. *EPIPHÉGUS*, Nutt. (Written *Epifagus*.) BEECH-DROPS, CANCER-ROOT. (Composed of ἐπί, upon, and φηός, Beech, being parasitic on the roots of that tree.)—Single species.

E. Virginiana, Bart. Annual, slender, a foot or so high, with thickened base producing short fibrous matted roots, glabrous, dull purple or yellowish-brown, paniculately branched: scales and bracts minute and sparse: cleistogamous flowers a line and capsules 2 lines long: developed corolliferous flowers along the upper part of the branches 3 to 6 lines long, purplish and whitish.—Comp. Fl. Philad. ii. 50; Gray, Man. l. c.; Reuter in DC. l. c. 4. *E. Americanus*, Nutt. Gen. ii. 60; Endl. Iconogr. t. 80. *Orobanche Virginiana*, L. *Leptanthium Virginianum*, Raf. in Am. Month. Mag. 1819. *Myllanche*, Wallr. Orobanch. 75.—Beech woods, New Brunswick to Florida and Missouri: fl. autumn.

ORDER XCVIII. LENTIBULARIACEÆ.

Herbs, growing in water or wet soil, when terrestrial acaulescent, with scapes or scapiform peduncles simple and one-few-flowered, calcarate corolla always and calyx usually bilabiate, a single (anterior) pair of stamens, confluent one-celled anthers contiguous under the broad stigma, no hypogynous disk, and a free one-celled ovary with free central multiovulate placenta (either sessile or stipitate) which becomes a globular many-seeded capsule; the anatropous seeds with a close coat, no albumen, and filled by the apparently solid ellipsoidal or oblong embryo. Style short or none: stigma bilamellar, or the smaller anterior lip sometimes obsolete. Upper lip of the corolla commonly erect or concave, or the sides replicate, from entire to 2-lobed, interior in the bud; lower larger, spreading or reflexed, 3-lobed, with a palate projecting into the throat and a nectariferous spur beneath. Flowers always perfect. Capsule commonly bursting irregularly.—The following are the two principal genera. (For action of bladders of *Utricularia* and leaves of *Pinguicula*, see Darwin, Insectivorous Plants, p. 368–453.)

1. *UTRICULARIA*. Calyx 2-parted or deeply 2-lobed; lobes mostly entire, nearly equal. Upper lip of strongly bilabiate and more or less personate corolla erect. Filaments thick, strongly arcuate-incurved, the base and apex contiguous. Dissected foliage or stems of aquatic species bladder-bearing.
2. *PINGUICULA*. Calyx with upper lip deeply 3- and lower 2-cleft or parted. Corolla ringent or less personate, and the lobes all spreading. Filaments straighter: anthers nearly transverse. Terrestrial, with entire rosulate leaves next the ground.

1. *UTRICULÁRIA*, L. BLADDERWORT. (*Utriculus*, a little bladder.)—Cosmopolitan small herbs: terrestrial species with inconspicuous or fugacious radical leaves; aquatic with the dissected leaves, branches, and even roots, bearing little bladders, which are furnished with a valvular lid, and commonly tipped with a few bristles at orifice. Scapes one-flowered or racemously several-flowered, in summer.—*Lentibularia*, Vaill.

§ 1. Scape bearing an involucriform whorl of dissected leaves, which are buoyant by ample inflated-bladdery petioles filled with air: cauline leaves of the immersed branching stems capillary-dissected and bladder-bearing, in the manner of the following section: roots few or none.

U. infláta, Walt. Inflated petioles of the whorled leaves oblong or clavate, tapering to each end, the bases of the lower divisions also inflated; setaceous divisions pinnately multifid: scape 3-10-flowered, a span or so long: pedicels recurved after flowering: flowers rather large, yellow: spur conical-lanceolate, emarginate, appressed to and half the length of the lower lip: capsule apiculate with a short distinct style: seeds globular, squamose-echinate. — Car. 64; Ell. Sk. i. 20; A.DC. Prodr. viii. 4; Gray, Man. ed. 5, 318. *U. ceratophylla*, Michx. Fl. i. 12; LeConte in Ann. Lyc. N. Y. i. 73, t. 6, fig. 1. — Floating in still water, Maine to Texas along the coast.

§ 2. Scape leafless, emerged from submersed or floating leafy stems, which are free swimming and mostly rootless in deep water, or in some sparingly rooting where the water is shallow: leaves dissected into capillary or filiform divisions, some or many of them (as also stems) bearing small bladders: chiefly perennial, or continued by hybernacular tuber-like buds set free in autumn.

* Cleistogamous flowers along the submersed copiously bladder-bearing stems.

U. clandestína, Nutt. Leaves of the slender stems repeatedly forked: scapes slender, 3 to 5 inches high, 3-5-flowered: corolla yellow, 3 lines long; lips nearly equal in length, the lower broader, somewhat surpassing the approximate thick and obtuse spur: cleistogamous flowers scattered on the leafy stems; their short peduncle soon deflexed: seeds (from the clandestine blossoms) depressed-globular; the coat minutely reticulated. — Herb. Greene, & in Gray, Man. ed. 1 (1848), 287. *U. striata*, Tuckerm. in Am. Jour. Sci. xlv. 29, not of LeConte. *U. geminiscapa*, Benjamin in Linn. xx. 305? But that may be a form of *U. intermedia*. — Ponds, from New Brunswick and New England to New Jersey, near the coast.

* * No cleistogamous flowers.

+ Pedicels (few or several) recurved in fruit: corolla yellow.

U. vulgáris, L. Stems long and rather stout, densely leafy: leaves 2-3-pinnately divided, very bladdery: bladders about 2 lines long: scapes a foot or less long, 5-16-flowered: corolla pale yellow, 2 or 3 lines broad, ringent; upper lip reflexed; upper nearly entire, hardly longer than the prominent palate: spur conical, porrect toward the slightly 3-lobed lower lip, shorter than it, in the N. American plant (var. *Americana*) commonly narrower and less obtuse than in the European. — Lam. Ill. t. 14; Engl. Bot. t. 253; Fl. Dan. t. 138; Gray, Man. l. c. *U. macrorrhiza*, LeConte, l. c. — Slow streams, &c., Newfoundland and Saskatchewan to Texas, and west to California and Brit. Columbia. (N. Asia, Eu.)

U. mínor, L. Leaves scattered on the filiform stems, repeatedly dichotomous, small, setaceous: bladders barely a line long: scapes slender, 3 to 7 inches high, 2-8-flowered: corolla pale yellow, 2 or 3 lines broad, ringent; upper lip not longer than the depressed palate of the lower: spur very short and obtuse. — Fl. Dan. t. 128; Engl. Bot. t. 254; A.DC. l. c. *U. setacea*, Hook. Fl. ii. 118, ex char. — Shallow still waters, Canada and Saskatchewan to New Jersey, mountains of Utah and Nevada, northern Sierra Nevada, and Brit. Columbia. (Eu., Siberia.)

+ + Pedicels erect in fruit, few and slender: corolla yellow.

++ Spur of corolla thick and conical, shorter than the lower lip and approximate to it.

U. gibba, L. Branches delicate, root-like: leaves sparse, sparingly dissected, capillary, sparingly bladder-bearing: scape filiform, $1\frac{1}{2}$ to 3 inches high, 1-2-flowered: corolla 3 lines broad; the lips broad and rounded. — Spec. i. 18 (Gronov. Fl. Virg.); Pursh, Fl. i. 116. *U. pumila*, Walt. Car. 64? Benjamin in Linn. xx. 313. *U. fornicata*, LeConte, l. c. *U. mínor*, Torr. Fl. N. Y. ii. 21, not L. — Shallow water, Massachusetts to Alabama and Illinois. Apparently in a subalpine pond in Colorado, *Greene*.

U. bipartíta, Ell. Sk. i. 22, from St. John's, S. Carolina, said to have "spur scarcely half as long as the corolla, very obtuse," and "lower lip of the calyx generally 2-cleft, sometimes divided to its base" (an anomalous character), has not been identified.

++ ++ Spur of corolla narrower, equalling or little shorter than the lower lip.

= Scapes 2 to 4 inches high, 1-3-flowered: corolla less than half an inch broad.

U. biflóra, Lam. Floating or submersed stems filiform, small: dichotomously dissected leaves delicately capillary, usually copiously bladder-bearing: spur narrowly oblong,

obtuse, porrect or curved upward: seeds somewhat scale-shaped, imbricated, smooth. — Ill. i. 50; Poir. Diet. viii. 272; Vahl, Enum. i. 200; Ell. Sk. i. 23. *U. pumila*, Walt. l. c. ? a rather earlier name, but uncertain. *U. integra*, LeConte, l. c. ex Ell. *U. fibrosa*, Chapm. Fl. 283, not Walt. & Ell. — Ponds and shallow waters, S. Virginia ? and S. Illinois to Texas.

== Scapes 4 to 12 inches high, slender, few-several-flowered: corolla over half inch broad: leaves dichotomously dissected: bladders wholly or mostly borne along leafless portions of the slender stems.

U. fibrósa, Walt. Leaves somewhat scattered, small and capillary, sometimes bladder-bearing: scape 2-6-flowered: lips of the corolla nearly equal, broad and expanded; upper undulate, concave, plicate-striate in the middle; lower slightly 3-lobed, with projecting emarginate palate and reflexed sides; equalled by the nearly linear obtuse or emarginate spur: seeds minutely muricate. — Car. 64 (ex char.); Vahl, l. c. ? Ell. Sk. i. 20. *U. longirostris*, LeConte in Ell. l. c. 21. *U. longirostris* & *U. striata*, LeConte in Ann. Lyc. N. Y. l. c. *U. bipartita*, Chapm. Fl. 283. — Shallow ponds and pine-barren swamps, Long Island and New Jersey to Florida and Alabama.

U. intermédia, Hayne. Leaves crowded, 2-ranked, repeatedly dichotomous, rigid; the divisions filiform-linear, flat, with margins not rarely setaceous-serrulate: scape 1-4-flowered: lower lip of corolla very broad and with large palate, larger than the upper, somewhat exceeding the conical-subulate acute spur. — Schrad. Jour. i. 18, t. 5, & Fl. Germ. i. 55; Vahl, l. c.; Engl. Bot. t. 2489; Reichenb. Ic. Germ. t. 1824. *U. vulgaris, minor*, L.; Oeder, Fl. Dan. t. 1262. — Shallow water, Newfoundland to New Jersey and Ohio, and thence far northward. Also Plumas Co., in the Sierra Nevada, California, *Mrs. Austin*. (N. Eu., N. Asia.)

+ + + Pedicels erect in fruit, rather long: corolla violet-purple.

U. purpúrea, Walt. Leaves verticillate on the rather long and large free-floating stems, petioled, decompound; the divisions capillary, rather copiously bladder-bearing: scape a span or two long, 2-4-flowered: corolla over half inch broad; lower lip 3-lobed, its lateral lobes saccate and the central larger, about twice the length of the conoidal compressed spur: seeds globular, chaffy-muricate. — Car. 64 ? (doubtful, because the flowers are said to be small); Pursh, Fl. i. 15; LeConte, l. c.; A. DC. l. c. 5. *U. saccata*, Ell. Sk. i. 21, said to have been so named by LeConte. — Ponds, Maine and N. Penn. to Florida, mainly near the coast. (Cuba.)

§ 3. Scape leafless and solitary, the base rooting in the mud or bog, usually rising from or producing filiform and root-like creeping shoots, which bear slender subulate-gramineous (occasionally septate) simple leaves, or branches which take the place of leaves, to the lower part of which, as also to the colorless shoots, bladders are sparingly attached, usually fugacious or unnoticed, so that the flowering plant appears to be a leafless and naked scape only.

* Flower violet-purple, solitary and transverse on the summit of the scape: leaves of the rooting shoots sometimes furnished with a few capillary lobes.

U. resupináta, B. D. Greene. Scape filiform, a span high: corolla 4 or 5 lines long, deeply 2-parted; lips almost entire; upper narrowly spatulate; lower dilated and with a small palate: spur oblong-conical, very obtuse, ascending, shorter than and remote from the corolla, which appears as if resupinate: leaves an inch or so long, attenuate. — Hitchcock, Cat. Pl. Mass.; Bigel. Bost. ed. 3, 10; A. DC. Prodr. l. c. 11; Gray, Man. ed. 1, 286, ed. 5, 319. *U. Greenei*, Oakes in Hovey, Mag. Hort. 1841. — Sandy bogs and borders of ponds, Maine to Rhode Island near the coast, *B. D. Greene, Oakes, Olney*.

* * Flowers mostly yellow, solitary or several: spur descending: leaves entire, terete: these and the bladders seldom seen.

U. subuláta, L. Filiform radical shoots and leaves rather copious, but commonly evanescent: scape filiform, an inch to a span high, 1-9-flowered; the raceme becoming zigzag: pedicels slender: corolla 2 or 3 lines broad; lower lip plane or with margins recurved, equally 3-lobed, much larger than the ovate upper one, nearly equalled by the oblong acutish appressed spur. — Spec. i. 18 (Gronov. Virg., ex herb. Clayt.); Pursh, l. c.; A. DC. l. c. 16. *U. setacea*, Michx. Fl. i. 12; Vahl, l. c. — Wet places in pine barrens, New Jersey to Florida and Texas near the coast. (W. Ind. to Brazil.)

Var. cleistógama. An inch or two high, bearing one or two evidently cleistogamous purplish flowers, not larger than a pin's head: capsule becoming a line long. (Gray, Man. ed. 5, 320; Ell. Sk. i. 24.)—With the ordinary form. Pine barrens of New Jersey, *J. A. Paine*. Evidently also seen in Georgia by *Elliott*.

U. cornúta, Michx. Filiform radical shoots apparently none: leaves fasciculate, evanescent, rarely at all seen: scape strict, a span to a foot high, 1-10-flowered: pedicels very short, 2-bracteolate at base: corolla an inch long, including the long subulate acute spur; lower lip very large, the sides strongly recurved, and the central palate-like portion as if galeate, merely equalled by the obovate upper lip: seeds nearly smooth.—Fl. i. 12; Pursh, l. c.; A. DC. l. c. *U. personata*, LeConte, l. c.; Bertol. Misc. viii. 21.—Sphagnous or sandy swamps, Newfoundland to L. Superior and south to Florida and Texas. (Cuba, Brazil.)

2. PINGUÍCULA, Tourn. BUTTERWORT. (From *pinguis*, fat, in allusion to the greasy-viscid surface of the leaves.)—Terrestrial acaulescent herbs, of moist or wet ground (in northern hemisphere and the Andes); with fibrous roots, broad and entire leaves in a rosulate radical tuft, their upper surface with a coating of viscid glands, to which insects, &c., adhere, the margins slowly infolding under irritation; scapes naked, 1-flowered, circinate-coiled in vernation. Upper lip of the corolla 2- and lower 3-lobed or parted; the lobes sometimes incised; the base anteriorly saccate, and the bottom of the sac contracted into a nectariferous spur.

* Corolla distinctly bilabiate, purple, violet, or rarely whitish; upper lip decidedly smaller, 2-lobed or parted; lower 3-parted; lobes mostly quite entire: boreal species.

P. villósa, L. Small: leaves oval, nearly glabrous, half inch long or less: scape villous-pubescent, inch or two long: corolla (pale violet with yellowish-striped throat) 2 lines long, and with a slender spur of nearly the same length or half shorter.—Fl. Lapp. t. 12, fig. 2; Fl. Dan. t. 1021; E. Meyer, Labrad. 39; Reichenb. Iconogr. i. t. 82; Cham. in Linn. vi. 568. *P. acutifolia*, Michx. Fl. i. 11, the erect-rosulate oval and very acute leaves described are really the scales of a hybernaculal bud, and the plant (with mature fruit) had lost its leaves.—Labrador, Hudson's Bay, Northern islands and shores of the N. W. Coast. (Greenland, Arctic Eu., & Asia.)

P. alpína, L. Somewhat glabrous: leaves oblong, barely inch long: scape 3 or 4 inches high: corolla (whitish) 4 lines long, and with a conical obtuse divergent incurving spur of less than half the length of the lower lip.—Fl. Lapp. t. 12, fig. 3; Fl. Dan. t. 453; Reichenb. l. c. t. 81; Engl. Bot. t. 2747.—Labrador, *Steinhauer*. Given by LeConte to herb. Collins. Specimen not wholly satisfactory, but apparently of this species, not elsewhere detected in America. (Eu. to Siberia.)

P. vulgáris, L. Minutely puberulent or almost glabrous: leaves ovate or oval, an inch or two long, soft-fleshy: scape 1 to 4 inches high: corolla (violet) about half inch long, with campanulate or short-funnelform body abruptly contracted into a narrow linear-cylindraceous (acutish or obtuse) and mostly straight spur (of about 2 lines in length).—Oeder. Fl. Dan. t. 93; Engl. Bot. t. 70; Reichenb. l. c. t. 84; Hook. Fl. ii. 118; Herder in Radde, iv. 96. *P. grandiflora*, Hook. l. c. *P. macroceras*, Willd.; Roem. & Sch. Syst. Mant. i. 163; Cham. in Linn. vi. 568; A. DC. l. c. 30; a longer-spurred and commonly larger-flowered form (corolla from two-thirds to almost an inch long). *P. microceras*, Cham. l. c. (*P. macroceras*, Reichenb. l. c. t. 82, fig. 169, 170), a depauperate small-flowered and shorter-spurred form of high northern region.—Wet rocks, Labrador, Northern New England and New York, L. Superior, &c., to Alaskan coast and islands, and northward; the *macroceras* and *microceras* forms north-westward. (N. E. Asia to Europe and Greenland.)

* * Corolla light violet, varying occasionally to white, less bilabiate, the sinuses equal except between the two lobes of the upper lip; the three lower lobes usually emarginate or orbiculate; palate conical or cultriform, very protuberant, clothed with a dense yellow or sometimes white beard: spur abrupt and narrow from base of a short conical sac: upper lip of stigma small, narrowly triangular; lower semi-orbicular: fl. spring. (*P. cærulea*, Walt. Car. 63, covers one or both the following species, but the character is insufficient to secure the adoption of the name.)

P. púmila, Michx. Leaves half to full inch long, oval or ovate: scapes filiform, weak, 2 to 6 inches high: corolla a quarter to half inch long; spur acute, longer than the rather

narrow saccate base; lobes retuse or emarginate; palate puberulent-bearded, conical, salient. — Fl. i. 11; Pursh, Fl. i. 14; Ell. Sk. i. 19. *P. australis*, Nutt. in Jour. Acad. Philad. vii. 103, the spur by no means "very short." — Low pine-barrens, Carolina to Florida and Louisiana.

P. elatior, Michx. Leaves oblong or spatulate-obovate, 1 to 3 inches long: scapes 6 to 12 inches high: corolla an inch long or considerably smaller; spur obtuse, mostly shorter than the saccate base; lobes obovate; palate oblong, parallel with the throat, the short free apex more conspicuously bearded. — Fl. i. c.; Vahl, Enum. i. 191; Pursh, l. c.; Ell. l. c. — Wet soil, Carolina to Florida and Alabama in the low country.

* * * Corolla golden yellow, not bilabiate, except that the two upper lobes are commonly more united, all or most of the lobes incisely 2-4-cleft, equal: stigma of the preceding, or lips less unequal. — *Brandonia*, Reichenb.

P. lutea, Walt. Leaves from ovate to oblong-obovate, an inch or two long: scapes 5 to 12 inches high: corolla an inch or less long; the lobes longer than the short-campanulate tube with the saccate base, all or the lower and lateral usually 4-lobed or 2-cleft with the divisions obovate, or variously sinuate; spur subulate, as long as the sac and tube; palate oblong, very salient, densely bearded. — Car. 63; Michx. l. c.; Ker, Bot. Reg. t. 126; Ell. l. c.; A.DC. Prodr. viii. 32. *P. campanulata*, Lam. in Jour. Hist. Nat. 1792, 336, t. 18, fig. 1. — Low pine barrens, N. Carolina to Florida and Louisiana.

Var. edéntula, A.DC., l. c. (*P. edentula*, Hook. Exot. Bot. t. 16, cult. from Savannah), has lobes of corolla all simply and equally obovate, shorter than the tube. Possibly a hybrid of *P. lutea* and *P. pumila*.

ORDER XCIX. BIGNONIACEÆ.

Trees or shrubs, either erect or scandent (very rarely herbs), with mostly opposite leaves, and large and showy flowers, with more or less bilabiate corolla, tetradynamous or diandrous stamens, single style and bilabiate stigma, and numerous anatropous ovules of the preceding orders; distinguished from them by the large and flat usually winged and transverse exalbuminous seeds, indefinitely numerous, on parietal placenta, or usually on a partition which separates from the two valves of the capsule in dehiscence, although in the ovary and when the ovules are in many rows the placentation often appears to be central; the cotyledons broad and thin, plane, commonly emarginate or 2-lobed, and the short straight radicle included in the basal notch. Capsule either loculicidal or septicidal, often silique-like. Anthers 2-celled: suppressed stamens commonly represented by rudimentary filaments. Corolla bilabiate imbricated in the bud (in our genera, in a few others valvate). Calyx gamosepalous. Leaves compound, or in two of our genera simple; sometimes a pair of basal leaflets and sometimes an axillary pair of leaves imitate stipules. Chiefly a tropical and rather large order; but few North American.

* Leaves opposite, compound: perfect stamens 4: seeds transversely winged, hypogynous disk conspicuous: stems mostly scandent.

1. **BIGNONIA.** Calyx with undulate or barely 5-toothed margin. Corolla campanulate or cylindraceous-ampliate above the narrow and short proper tube, somewhat equally bilabiate-5-lobed. Anther-cells divergent, glabrous. Capsule linear, compressed parallel with the flat valves and partition, marginicidal and septifragal, a filiform margin usually separating all round both from the edges of the valves and the partition. Seeds attached in a single series on each side of both margins of the partition; the thin wing entire. Tendril-climbers.

2. **TECOMA.** Calyx distinctly 5-toothed. Corolla funnelform or somewhat campanulate above the short proper tube, somewhat bilabiate 5-lobed. Anther-cells divergent, glabrous or sparsely pilose. Capsule narrow, somewhat terete or turgid, loculicidal and septifragal; the valves contrary to the partition. Seeds imbricated in one or two or more series on each side of the margins of the partition; the wing hyaline. Rootlet-climbing or erect shrubs; flowers in terminal panicles or corymbs.

* * Leaves simple and entire: erect trees or shrubs: calyx closed in the bud, bilabiate or irregularly dividing or bursting in anthesis: corolla-lobes undulate-crested, hardly unequal: anthers glabrous; the cells narrow, divaricate: hypogynous disk obsolete: capsule long-linear, loculicidal, terete; valves contrary to the partition: seeds narrow, in 2 or more series on each side of partition; lateral wings dissected into copious long hairs.

3. **CATALPA**. Corolla ventricose-ampliate above, somewhat oblique, bilabiate-5-lobed. Antheriferous stamens 2, anterior, with filaments arcuate, and 3 rudimentary filaments (rarely 4 stamens antheriferous). Leaves mainly opposite and ovate or cordate.
4. **CHILOPSIS**. Corolla more funnelliform; the lobes erose. Antheriferous stamens 4; also a rudimentary filament. Leaves oftener alternate or irregularly scattered, linear.

1. **BIGNÓNIA**, Tourn. (Commemorates the *Abbé Bignon*.) — A large tropical-American genus, with the following more northern one: fl. spring.

B. capreolata, L. (CROSS-VINE.) Extensively climbing, glabrous: transverse section of older stems exhibiting a medullary cross: leaves of a single pair of ovate or oblong acuminate and subcordate entire leaflets and a compound tendril; accessory leaves or leaflets in some axils imitate foliaceous stipules: pedicels in fascicles of 2 to 5 on axillary spurs: calyx membranaceous: corolla 2 inches long, orange-red without, yellow within: capsule 6 inches long, 9 lines wide; valves 1-nerved. — Spec. ii. 624 (Catesb. Car. ii. t. 82); Sims, Bot. Mag. t. 864; Jacq. Schœnb. t. 363; Michx. Fl. ii. 25. *B. crucigera*, L. as to syn. Clayt. & Gronov. Virg.; Walt. Car. 169. — Woods, in low grounds, Virginia and S. Illinois to Florida and Louisiana.

2. **TÉCOMA**, Juss. TRUMPET-FLOWER, or TRUMPET-CREEPER. (Abridgment of the Mexican name, *Tecomaxochitl*.) — Genus (of late divided into several by monographers, but retained nearly intact by Benth. & Hook. Gen. ii. 1044, digitate species excluded) of several species, widely dispersed; ours imparipinnate and the leaflets serrate, ovate, and acuminate. They have been referred to different genera or subgenera on account mainly of the number of ranks of seeds. Fl. summer.

T. radicans, Juss. Climbing by aerial rootlets: leaflets 9 to 11: flowers corymbose: corolla tubular-funnelform, orange and scarlet, $2\frac{1}{2}$ or 3 inches long: stamens not exerted: capsule lanceolate, slightly stipitate; valves very convex, acutely narrowly margined: seeds several-ranked. — DC. Prodr. ix. 223; Nutt. Sylv. iii. t. 104; Bureau, Mon. Bign. t. 14. *Bignonia radicans*, L. (Catesb. Car. i. t. 65); Wangenheim, Amer. t. 26; Sims, Bot. Mag. t. 485; Sehk. Handb. t. 175. *Campsis radicans*, Seem. Jour. Bot. &c. — Moist soil, Penn. and Illinois to Florida and Texas: common in cultivation.

T. stans, Juss. Erect shrub: leaflets 5 to 11, narrower or lanceolate, more incisely serrate: flowers racemose or paniculate: calyx small: corolla more campanulate, yellow, inch and a half long: fifth stamen often with abortive anther: capsule linear, elongated, sessile; valves carinate-convex: seeds single ranked. — Hook. Bot. Mag. t. 3191; DC. l. c. 224. *Bignonia stans*, L. (Plum. Ic. Amer. t. 54); Jacq. Stirp. Amer. t. 176. *Stenobium stans*, Seem. Jour. Bot. i. 87; Bureau, l. c. t. 13. — S. Florida (introduced?) and S. Texas to Arizona. (W. Ind., Mex., &c.)

3. **CATÁLPA**, Scop., Walt. (Aboriginal name.) — There are a N. China and a Japanese species allied to our own, and a few somewhat anomalous West Indian species. Fl. summer; showy.

C. bignonioides, Walt. Low or large tree, with spreading branches: leaves pubescent, at least beneath, ample, cordate, acuminate, rarely somewhat angulate-lobed, long-petioled: panicle large and loose, compound: lips of the calyx obovate, mucronate: corolla inch long and broad, white or nearly so, dotted with purple and yellow in the throat: pendulous slender capsules a foot long. — Cav. 64; DC. l. c. 226; Bureau, Mon. Bign. t. 25. *C. cordifolia*, Jaume in Duham. Arb. t. 5; Ell. Sk. i. 24. *C. springefolia*, Sims,

Bot. Mag. t. 1094; Pursh, Fl. i. 10. *Bignonia Catalpa*, L. (excl. syn.); Catesb. Car. i. t. 49; Michx. f. Sylv. ii. 64. — River banks, S. Illinois to Georgia, W. Florida, and Louisiana. Cult. north to New England.

4. **CHILÓPSIS**, Don. (*Χεῖλος*, lip, and *ὄψις*, resemblance; name of no particular application.) — Single species.

C. saligna, Don. Shrub or low tree, 10 to 20 feet high, with hard wood, pubescent when young, soon glabrous: branches slender: leaves linear or linear-lanceolate, 4 to 6 inches long, of firm texture: lower leaves often opposite or verticillate: flowers in a short terminal raceme: corolla an inch or two long, white and purplish: capsule 6 to 10 inches long. — Edinb. Phil. Jour. ix. 261; G. Don, Syst. iii. 228; Gray, Bot. Calif. i. 587. *C. linearis*, DC. Prodr. ix. 227. *Bignonia linearis*, Cav. Ic. iii. 35, t. 269. — Water-courses in dry districts, S. Texas to S. California. (Mex.)

CRESCÉNTIA CUJÉTE, L., the Calabash tree of the West Indies, the type of an anomalous tribe of this order, with indehiscent cucurbitaceous-like fruit, has been introduced on the Keys of Florida, and in consequence has been figured by Nuttall, Sylv. iii. t. 103; but it has no claim to a place in our flora.

ORDER C. PEDALIACEÆ.

Herbs, with mucilaginous or watery juice, chiefly opposite simple leaves, and flowers as of the preceding order (to which it has more usually been annexed), except in the structure of the ovary and fruit. Ovary either one-celled with two parietal intruded placenta expanded into two broad lamellæ or united into a central columella, or variously 2–4-celled by the extension of the placenta and by spurious partitions from the wall. Fruit capsular, drupaceous, or nuculentaceous, few-many-seeded. Seeds wingless, mostly with a thick and close coat, filled by the large embryo; the cotyledons thickish. — A small extra-European and mainly African order, or suborder, of warm climates, represented in the United States by one sparingly naturalized, and one or two probably indigenous species.

1. **SESAMUM**. Calyx herbaceous, 5-parted, persistent. Corolla ventricose-campanulate or funnel-form; limb bilabiate 5-parted, spreading; upper lobes smaller. Stamens didynamous: anther-cells parallel. Stigmas linear. Fruit an oblong quadrangular and 4-sulcate capsule, septical at summit, spuriously 4-celled, a false partition from the dorsal suture of each of the two carpels reaching the columnar placenta at the centre. Seeds numerous in a single series in each half-cell.
2. **MARTYNIA**. Calyx 1–2-bracteolate, membranaceous, somewhat bladdery-campanulate, 5-cleft, sometimes splitting anteriorly to base, deciduous. Corolla ventricose-funnel-form or campanulate, somewhat oblique or decurved; the lobes of the bilabiate 5-parted limb broad, somewhat undulate, slightly unequal. Stamens 4, strongly didynamous, or sometimes only the anterior pair antheriferous: anthers tipped by a gland; the cells divaricate. Stigma bilamellar. Ovary one-celled, with two parietal placenta which meet in the axis and there diverge in broad lamellæ, bearing single or double rows of ovules. Fruit fleshy-drupaceous, tapering into an incurved beak: fleshy exocarp at maturity 2-valved and deciduous: endocarp fibrous-woody, scrobiculate, cristate at the sutures, 2-valved through the slender beak to the summit of the cells, indehiscent below; the cavity by the extension of the placenta to the walls 4-locellate, and with a small empty central cavity. Seeds rather numerous, oblong, large, with a thick and somewhat spongy tuberculate-rugose coat. Cotyledons obovate, fleshy: radicle very short.

1. **SÉSAMUM**, L. BENE, OIL-PLANT. (From the Arabic *semsen*.) — Chiefly African annuals; the following widely dispersed through cultivation.

S. INDICUM, L. Somewhat pubescent annual, 1 to 3 feet high, with mucilaginous juice and oily seeds: leaves ovate-oblong or lanceolate, petioled; lower often 3-lobed or divided: corolla white or tinged with rose, inch long: capsule velvety-pubescent. — Bot. Mag.

t. 1688; Endl. Iconogr. t. 70; DC. Prodr. ix. 249. *S. Indicum* & *S. orientale*, L., &c. — Sparingly naturalized in the Gulf Atlantic States. Seeds yield a useful oil. (Adv. from Old World.)

2. MARTÝNIA, L. UNICORN-PLANT. (*Prof. John Martyn*, of Cambridge.) — Diffuse and rank viscid-pubescent herbs (natives of America), of heavy odor; with ample rounded and subcordate petioled leaves, the lower usually opposite and upper alternate, and large flowers in short and loose terminal racemes: pedicels subtended by small bracts or none. Fl. summer. — Our species belong to § **PROBOSCIDEA**, having 4 perfect stamens and beak longer than the body of the fruit, and the calyx is more cleft anteriorly.

M. proboscidea, Glox. Coarse and heavy-scented annual: leaves cordate, roundish, often oblique, entire or obscurely undulate-lobed (4 to 12 inches in diameter): bractlets oblong-linear: corolla $1\frac{1}{2}$ or 2 inches long, dull white, spotted within with some yellowish or purplish, also varying to light yellow: endocarp crested on the posterior suture only. — Obs. 14, ex DC. Prodr. ix. 253; Sims, Bot. Mag. t. 1056; Pursh, Fl. ii. 428. *M. amma*, L. excl. syn. & hab. *M. Louisiana*, Mill. Diet. & Ic. t. 286. Banks of the Mississippi and lower tributaries to New Mexico. Also naturalized or cultivated about gardens farther north. (Mex., &c.)

M. fragrans, Lindl. Less stout: leaves from roundish to oblong-cordate, somewhat lobed and sinuate-dentate, 3 to 5 inches broad: corolla more campanulate, 1 or 2 inches long and wide, sweet-scented, from reddish- to violet-purple. — Bot. Reg. xxvi. misc., & xxvii. t. 6; Hook. Bot. Mag. t. 4292. *M. violacea*, Engelm. Pl. Wisl. 101; Torr. Bot. Mex. Bound. 110, partly. — South-western borders of Texas and southern part of New Mexico, *Wright, Bigelow*. (Northern Mex.)

M. althæefolia, Benth. Low and small: leaves seemingly all alternate, long-petioled, roundish-ovate and cordate, sinuately 3-7-lobed, 1 or 2 inches broad: bractlets linear-oblong or oval: corolla inch and a half or less long, from buff- to chrome yellow, or whitish, mottled or dotted with brown and orange: endocarp armed with teeth on both sutures. — Bot. Sulph. 38. *M. arenaria*, Engelm. Pl. Wisl. 101; Torr. Bot. Mex. Bound. 110. — S. W. Texas to S. Arizona, *Wright, Bigelow, Palmer*. (Lower California.)

ORDER CI. ACANTHACEÆ.

Chiefly herbs, with opposite simple leaves, no stipules, and didynamous or diandrous more or less bilabiate or irregular flowers with the general characters of *Scrophulariaceæ*, &c.; but corolla not rarely convolute in the bud; the anatropous ovules few and definite (from 2 to 8 or 10 in each of the two cells); fruit always capsular, 2-celled, elastically loculicidal scattering the seeds; seeds without albumen (except sparingly in the first tribe), either globose, or orbicular and compressed and the hilum marginal, wingless, in most supported on the upper face of curved processes from the placentæ (indurated and persistent funiculi?) called *retinacula*, the close coat not rarely developing mucilage and spiracles when wetted, in the manner of *Polemoniaceæ*. Cotyledons plane, orbicular with cordate base: radicle straight or accumbently incurved. Hypogynous disk conspicuous. Style filiform, undivided, with one or two small stigmas. Corolla from almost regular and 5-lobed (and then convolute in the bud) to deeply bilabiate (or in *Acanthus* with only a lower lip). Calyx persistent, of 5 or sometimes 4 sepals, commonly unequal and more or less imbricated, sometimes united. Inflorescence various: flowers usually conspicuously bracteate and often 2-bracteolate. Stems commonly quadrangular. Cystoliths abound in the foliage. — A large

and mainly tropical or subtropical order, one strongly marked tribe of which is represented in ornamental cultivation by *Thunbergia*, another sparingly so by the *Acanthus* of the Old World; the others have several North American representatives.

TRIBE I. NELSONIÆ. Corolla imbricated in the bud; upper lip exterior. Seeds small and globular, attached by a small ventral papilliform funicle, without retinacula, not mucilaginous when wetted: embryo in a thin layer of albumen! (In char. nearest to *Scrophulariaceæ*, but capsule and habit of *Acanthaceæ*.)

1. ELYTRARIA. Calyx 4-parted; lower division sometimes 2-toothed. Corolla with cylindraceous tube, funnelform throat, and 5-lobed or somewhat bilabiate limb. Stamens 2: filaments very short, inserted low in the throat: anther-cells equal and parallel. Stigma 2-lobed. Ovules 6 to 10 in each cell. Capsule oblong, thinner and contracted at base, acute at tip. Seeds globular. Bracts of the solitary or fasciculate-clustered spikes and the similar scales of the scape imbricated, glumaceous.

TRIBE II. RUELLIÆ. Corolla convolute (sinistrorsely) in the bud, either bilabiate or nearly regular. Seeds flat, attached by the edge to retinacula. (Stamens in ours didynamous, the long and the short filament on each side contiguous or united at base by a membrane; the anthers 2-celled, and the cells equal and parallel: style with linear or subulate stigmatose apex, the posterior lobe wanting or reduced to a minute tooth, or rarely 2 equal narrow stigmas.)

* Corolla deeply bilabiate: capsule terete and 2-celled to the very base.

2. HYGROPHILA. Calyx deeply and almost equally 5-cleft or parted. Corolla narrow; lips erect at base and above (at least the lower) spreading, 2- and 3-lobed. Anthers oblong, mucinous. Capsule oblong-linear, several-seeded. Flowers sessile in the axils.

* * Corolla not obviously or only moderately bilabiate, the 5 lobes broad and roundish, spreading: capsule with the base more or less contracted into a solid short stipe.

3. CALOPHANES. Calyx deeply 5-cleft or parted; lobes elongated setaceous-acuminate or aristiform. Corolla funnelform, with ample limb, either somewhat manifestly bilabiate, or with 5 equal broad and spreading lobes, the two posterior a little higher united. Anthers mucronate, or at least mucronulate, or sometimes aristate at base. Ovules a single pair in each cell. Capsule oblong-linear, 2-4-seeded.

4. RUELLIA. Calyx deeply 5-cleft or parted; lobes mostly linear or lanceolate. Corolla with funnelform or campanulate throat on a narrow and sometimes elongated tube; the 5 ovate or rounded lobes nearly similar and spreading, or the posterior rather more united. Anthers mucinous, oblong-sagittate. Ovules 3 to 10 in each cell. Capsule oblong-linear or clavate, several- (6-20-) seeded.

TRIBE III. JUSTICIÆ. Corolla imbricated in the bud; the posterior lobes or lip interior. Seeds and capsule of the preceding tribe; in the last two genera the placentiferous half-portions separating below from the valve after dehiscence.

* Stamens 4, in the throat of the corolla: filaments short: anthers one-celled, ovate-lanceolate or oblong, mucinous at base, their tips sometimes lightly cohering by a minute beard: corolla with 5 plane obovate lobes, the two posterior usually united a little higher: stigma naked, truncate or obscurely funnelform: ovules 2 in each cell: calyx 5-sepalous or 5-parted into narrow nearly equal divisions.

5. STENANDRIUM. Lobes of the salverform corolla all equally spreading. Low herbs.

6. BERGINIA. Posterior lobes of the corolla nearly erect, forming an upper lip, the 3 others larger and widely spreading. Anterior pair of filaments bearded on the inner side: anthers ovate-lanceolate. Seeds (mostly 2) rugose. Fruticlose.

* * Stamens 2 and no rudiments: anthers 2-celled: ovules 2 in each cell; capsule usually more or less obcompressed, and with a conspicuous stipe-like solid base.

+ Placenta not separating from the valves of the capsule.

++ Anther-cells equal, parallel and contiguous, mucinous: limb of corolla somewhat equally 4-parted: shrubby plants: bracts and bractlets small and narrow or minute: calyx small, 5-parted or 5-cleft; the divisions narrow: stigma obscurely capitate or emarginate: filaments filiform, inserted in the throat.

7. CARLOWRIGHTIA. Corolla with narrow tube shorter than the lobes; throat not dilated; limb 4-parted down to the tube; lobes entire, oblong, nearly similar, widely

spreading and plane, or the posterior (interior in the bud) at first concave-infolded and less spreading. Stamens nearly equalling the corolla-lobes. Capsule ovate, acuminate, obcompressd, on a slender clavate stipe. Seeds very flat, minutely scabrous.

8. **ANISACANTHUS**. Corolla with elongated tube gradually somewhat wider at the throat; the 4 lobes similar, lanceolate, entire, erectish recurving; the posterior (or upper lip) rather more deeply separated. Stamens and style equalling or exceeding the corolla-lobes. Capsule ovate on the long clavate stipe. Seeds smooth or rugulose.

++ ++ Anther-cells unequal or unequally inserted, one lower than the other or oblique;

= The lower calcarate or mucronate at base: corolla manifestly bilabiate; upper lip erect and more or less concave, merely emarginate or 2-lobed at apex, not surpassed by the stamens; these inserted in or near the throat: calyx 5-parted (sometimes 4-parted), small.

9. **SIPHONOGLOSSA**. Corolla with long-linear or filiform tube and short limb; lower lip broad and spreading, 3-cleft. Anther-cells contiguous and parallel, but one higher.

10. **BELOPERONE**. Corolla deeply bilabiate, but with tube much longer than limb; throat narrow; lower lip 3-lobed at apex, erect-spreading. Anther-cells somewhat unequal and oblique, on a more or less dilated connective. Seeds globular or thickened!

11. **JUSTICIA**. Corolla with short tube, and rather ampliate throat seldom longer than the limb; lower lip spreading, 3-lobed. Anther-cells oblique and disjointed. Seeds, as far as known, flat.

= = Anthers muticous, or both cells rarely mucronulate at base: calyx deeply 5-parted into narrow or subulate divisions, the fifth commonly smaller: stamens not surpassing the corolla.

12. **DIANTHERA**. Corolla bilabiate; upper lip erect and concave or fornicate, entire or 2-toothed; lower spreading and 3-lobed, with a rugose or venose-reticulated convex base or palate. Anther-cells ovate or oblong, not parallel, moderately or conspicuously disjointed on a dilated connective. Seeds glabrous, smooth, or echinulate-scabrous. Bractlets small.

13. **GATESIA**. Corolla with slender tube, somewhat ampliate throat, and almost equally 4-lobed spreading limb; lobes nearly similar, plane, ovate. Anther-cells oblong, contiguous and similar, but one a little lower and oblique. Stigma capitellate. Seeds glabrous, minutely rugulose. Spikes short and dense: bracts and bractlets membranaceous-foliateous, 1-nerved and pinnately veined or triplinerved.

+ + Placentæ, by rupture of half-partition from the base upward, at length separating and diverging or incurving: anther-cells muticous, or rarely one or both mucronulate at base: calyx small, dry, or somewhat glumaceous, 4-5-parted; the divisions subulate or linear-lanceolate, equal, or the innermost (posterior) smaller: corolla with narrow tube: filaments filiform.

14. **TETRAMERIUM**. Flowers solitary (rarely 2 or 3) covered by a large and herbaceous primary bract, and subtended by two small and narrow bractlets. Corolla with an almost equally 4-parted limb, or somewhat bilabiate; the 3-parted and widely spreading lower lip rather more separated from the less spreading or rather erect and slightly concave entire and obovate or oblong upper lip. Anther-cells equal and parallel or nearly so, either contiguous or separated by a slightly dilated connective. Seeds flat, muriculate or papillose. Spikes strobilaceous, quadrifarious.

15. **DICLIPTERA**. Flowers not covered by primary bracts (of main axis), but involucrate (either singly or in a fascicle) by 2 valvately opposed and nearly equal or 4 less dilated and unequal herbaceous bractlets. Corolla deeply bilabiate; upper lip erect, concave or plane, entire or emarginate; lower spreading, entire or 3-lobed at apex. Anthers with a narrow connective. Seeds either smooth or muriculate. Inflorescence various, not strobilaceous-spicate.

1. **ELYTRÁRIA**, Michx. (*Ελυτρον*, a case or cover, the scape or peduncle and spike covered with imbricated bracts.) — Low perennial herbs (chiefly tropical American); with leaves crowded at base of a naked scape or at summit of a short naked stem, tapering to the base, thinnish; flowers small, solitary and sessile under the bracts; these and the scales of the scapes rigid-chartaceous or glumaceous, alternate! — Michx. Fl. i. 8 (1803); Vahl, Enum. i. 106 (1804), excl. spec.

E. virgáta, Michx. Acaulescent: leaves from oblong to elongated spatulate, obtuse (2 to 6 inches long), with usually undulate margins: scape a foot or less high, bearing a short

spike or a cluster of spikes: bracts ovate, cuspidate-acuminate: corolla white (3 or 4 lines long): seeds nearly smooth and even.—Fl. i. 9, t. 1; Vahl, l. c.; not "*E. Vahlia*," as says Nees in DC. Prodr. xi. 63. *Anonymos Carolinensis*, Walt. Car. 69. *Tabiflora Carolinensis*, Gmel. Syst. *E. cupressina*, Nees, l. c. 65, if *N. Amer.*?—Low grounds, S. Carolina to Florida: fl. summer.

E. tridentata, Vahl, l. c. Acaulescent or with proliferous low stems: leaves lanceolate or oblong, 2 or 3 inches long, clustered, as are the hardly longer peduncles or scapes, either at the root or at the summit of naked stems: spikes slender: bracts ovate, mostly scarious-margined; the upper commonly tricuspidate or aristate: corolla purple.—Griseb. Fl. W. Ind. 451; Torr. Bot. Mex. Bound. 122. *E. ramosa*, *frondosa*, *fasciculata*, &c., HBK.; Nees, l. c.—Arizona and New Mexico, along the Mexican border. (Mex. to W. Ind. & S. Brazil.)

2. HYGRÓPHILA, R. Br. (From *ὑγρός*, moist, and *φιλία*, affection; plants which affect wet places.)—A large tropical genus, of which a single species reaches the southernmost Atlantic States.

H. lacustris, Nees. Nearly glabrous: stem simple, 2 or 3 feet high from a creeping base: leaves lanceolate, sessile, entire (about 4 inches long), scabrous-ciliolate: flowers small, white: calyx-lobes and bracts subulate-lanceolate: anthers of the shorter stamens smaller.—DC. Prodr. xi. 86. *Ruellia lacustris*, Schlecht. in Linn. v. 96. *R. justicieflora*, Hook. Comp. Bot. Mag. i. 170.—Swamps, Texas and Louisiana, *Drummond*, *Riddell*, *Lindheimer*, &c. W. Florida, *Saurman*. (Mex.)

3. CALÓPHANES, Don. (*Κάλος*, beautiful, and *φαίρω*, to appear.)—Low perennials, branched from the base, pubescent or hirsute, usually with proportionally large or showy axillary flowers, either solitary or usually clustered and nearly sessile; the corolla blue or purplish, rarely white; its tube not longer than the calyx. Seeds as in *Ruellia*, or the hairs nearly destitute of rings or spiral fibres. Fl. summer.

* Eastern-Atlantic species: calyx deeply 5-parted: stems from slender creeping base or rootstocks: flowers solitary or few in the axils.

C. humistrata, Nees. Glabrous or almost so throughout, no hirsute hairs: stems weak, erect or decumbent from the creeping base: leaves thinnish, oblong-obovate or the uppermost oblong, narrowed at base into a petiole (6 to 18 lines long): corolla white, barely half inch long, seldom longer than the obovate or oblong foliaceous bractlets; the tube very short: sepals setaceous-aristiform from an oblong-lanceolate base, little shorter than the corolla: anther-cells oblong, barely mucronulate.—DC. Prodr. xi. 108. *Ruellia humistrata*, Michx. Fl. ii. 23. *Dipteracanthus (Calophanes) riparius*, Chapm. Fl. 303, a luxuriant form.—Low grounds, S. Georgia and Florida.

C. oblongifolia, Don. Pubescent or soft-hirsute, sometimes glabrate: stems usually erect and simple, a span to a foot high: leaves from narrowly oblong to oval, very obtuse, sessile (an inch or less long): corolla blue, sometimes purple-dotted or mottled, seldom an inch long, twice the length of the narrowly oblong bractlets; the tube shorter than the ample throat: sepals distinct almost to the very base, filiform-setaceous, hirsute, hardly half the length of the corolla: anther-cells oblong-linear, aristulate.—Brit. Fl. Gard. ser. 2, t. 181; Nees, l. c. (*Ruellia biflora*, L. Spec. ii. 635, may be this, but it rests on a mere mention by Dillenius, without character.) *Ruellia oblongifolia*, Michx. Fl. ii. 23; Pursh, Fl. ii. 420. *Dipteracanthus biflorus*, Nees in Linn. xvi. 294. *D. oblongifolius*, Chapm. l. c.—Sandy pine barrens, S. Virginia to Florida. An almost glabrous large form in Florida.

Var. angusta. A reduced form, a span or so high, nearly glabrous, very leafy: leaves and flowers only half inch long, most of the former oblong-linear.—*Dipteracanthus linearis*, Chapm. l. c.—S. Florida; Key West and Biscayan Bay, *Blodgett*, *Palmer*.

* * Texano-Arizonian species: calyx 5-cleft.

C. lineáris. Hirsute with somewhat rigid and short hairs, or glabrate, not cinereous: stems erect and strict (a span to a foot high), or branched and diffuse: leaves from linear-oblongeolate to oblong-spatulate (9 to 20 lines long), rather rigid: flowers usually foliose-glomerate: bracts and bractlets similar to and equalling the subtending leaves and about

equalling the corolla: calyx-lobes subulate-setaceous, more or less hispid-ciliate, hardly more than twice the length of the narrow tube: corolla purple? (10 lines long); the tube not longer than the abruptly ampliate throat: anther-cells linear-oblong, aristulate. — *Dipteracanthus* (*Calophanes*) *linearis*, Torr. & Gray in Pl. Lindh. i. 50. *C. orata*, Benth. Pl. Hartw. 89, as to Texan sp.; Nees, l. c.; surely not *Ruellia orata*, Cav. *C. oblongifolia*, var. *Texensis*, Nees, l. c.; Torr. Bot. Mex. Bound. 122. — Dry ground, Texas (*Berlandier, Drummond, Wright, &c.*) to the border of New Mexico. (Adjacent Mex.)

C. decumbens. Cinereous-puberulent throughout, not at all hirsute, nor scabrous: stems mostly spreading on the ground: leaves spatulate, or the lowest obovate and the uppermost oblanceolate, with attenuate base, but hardly petioled (6 to 14 lines long): flowers few in the foliose-bracteolate clusters: setaceous-subulate calyx-lobes hardly twice the length of the tube: corolla purple (8 or 10 lines long); its tube double the length of the throat, nearly equalling the calyx-lobes: anther-cells oblong, mucronate. — *Calophanes oblongifolia*, Torr. Bot. Mex. Bound. 123, not Don. — Dry soil, western borders of Texas (*Wright, &c.*) to S. Arizona, *Thurber, Wright, Rothrock, &c.* (Adjacent Mex.)

4. RUÉLLIA, Plum. (*I. Ruel*, or *de la Ruelle*, of France, early herbalist.) — Large genus, chiefly American and tropical, perennials; with mostly entire and broad leaves, and rather large flowers (in summer), usually violet or lilac-purple, solitary or commonly clustered in the axils or in evolute cymes; in several species the earlier or later blossoms cleistogamous. Seeds in many clothed with fine appressed hairs, which when wetted diverge and elongate, either marked with fixed spiral bands or developing spiracles. — Benth. & Hook. Gen. ii. 1077. — Our species all rank under *Ruellia* proper (*Cryptiacanthus* and *Dipteracanthus*, Nees in DC.), with straight tube and almost or quite regular limb to the corolla, and included stamens. Both stigmas equally developed occasionally in *R. strepens* and *R. ciliosa*. Five stamens have been found in the latter.

* Flowers in open pedunculate cymes from upper axils and forming a terminal panicle: bracts and bractlets small, linear or subulate: capsule 8-12-seeded, narrow: hairs of the seed developing long spiracles when wetted.

R. tuberósa, L. Glabrescent or minutely pubescent, a foot or two high, with somewhat tuberos-thickened roots: leaves (2 or 3 inches long) with undulate or obscurely repandentate margins, ovate-oblong or elliptical, and with base cuneate-contracted or decurrent into a rather long petiole: primary and secondary peduncles of the loose cyme slender: calyx-lobes subulate-filiform (half inch or more long), much exceeding the bractlets, hardly equalling the slender tube of the (inch and a half long blue or sometimes white) corolla, which is about as long as the funnell-form-campanulate throat: capsule narrowly subclavate, 7 to 9 lines long, the stipitiform solid base mostly short but manifest. — Spec. ii. 635; Griseb. Fl. W. Ind. 452, but hardly of Desc. Ant. ii. t. 113. *R. clandestina*, L. l. c. (Dill. Elth. 328, t. 148.) *R. humilis*, etc., Plum. Nov. Gen. Amer. 12, t. 2. *Cryptiacanthus Barbudensis*, Nees in DC. l. c. 197. *Dipteracanthus nudiflorus*, Engelm. & Gray, Pl. Lindh. i. 21. — River-bottoms, Texas. (W. Ind., Mex., S. Am.)

Var. occidentális. Rather large and tall: inflorescence and calyx conspicuously viscid-pubescent; the latter usually shorter than the tube of the ($1\frac{1}{2}$ to fully 2 inch) corolla: leaves from glabrate to velvety-pubescent, mostly ovate and with more abrupt or even subcordate base, sometimes 6 or 7 inches long. — W. & S. Texas, *Berlandier, Wright, S. Arizona, Rothrock*. "California" (or probably Arizona), *Coulter*. The two latter glabrate forms. (Mex.)

* * Flowers solitary or 3 and cymulose on an axillary peduncle as long as the leaf: bracts foliaceous: seeds and capsule of the succeeding: stems branching.

R. pedunculáta, Torr. Slightly puberulent, 2 feet high, with spreading branches: leaves ovate-oblong, acute, short-petioled ($1\frac{1}{2}$ to 3 inches long): peduncles spreading, slender, 1 or 2 inches long, bearing a pair of bracts similar to the leaves (half inch or more long) and equalling the calyx and capsule of the single flower, or shorter than the similarly 2-bracteolate pedicels when they are developed: calyx-lobes subulate-filiform, pubescent, about the length of the narrow tube of the corolla: throat of the latter dilated-funnel-

form: capsule puberulent. (Torr. in herb., unpublished.) — Dry woods, in W. Louisiana, *J. Hale*. Arkansas, *Bigelow*, *Mrs. Harris*. Corolla about an inch and a half long.

* * * Flowers subsessile and commonly glomerate in the axils, when short-peduncled with foliaceous primary bracts or bractlets: stamens of almost equal length: capsule at most 8-seeded: short hispid hairs of the seed spreading when wet, containing a fixed spiral fibre or band, but no uncoiling spiracles.

+ Suffrutescent: leaves rigid: corolla white: capsule oblong, with hardly any stipe-like base.

R. Párryi. A span high, much branched from the lignescens base: leaves obovate-oblong, or the upper oblong-lanceolate, tapering into a distinct petiole, hispid-ciliate, otherwise glabrate, an inch or less long (the older have cystoliths): flowers mostly solitary in the axils, on a peduncle shorter than the petiole or subsessile: bractlets oblong, surpassing the slender-subulate often unequal calyx-lobes: tube of the corolla (inch long) slender, dilated at the summit into a small narrowly funnelform throat, which is shorter than the lobes. — *Dipteracanthus suffruticosus*, Torr. Bot. Mex. Bound. 122 (but there is a *R. suffruticosa*, Roxb.). — South-western borders of Texas: at Presidio del Norte, *Parry*, in flower. Valley of the Pecos, in fruit, *Wright*.

+ + Herbaceous: stems mostly simple: corolla usually blue or violet, except in *R. tubiflora*: capsule more broadly clavate and obcompressed.

+ + Calyx-lobes filiform-attenuate, longer than the capsule: cleistogamous flowers seldom seen.

R. noctiflora. Puberulent, or very young parts soft-villous, a foot or less high: leaves narrowly oblong (1 to 3 inches long), mostly with tapering base, but sessile: bracts and bractlets of the solitary or few flowers linear-lanceolate: calyx generally soft-puberulent; its lobes somewhat linear-filiform and hardly widened at base (sometimes 18 lines long), barely half the length of the elongated (fully 2 inch) tube of the white corolla, the throat of which is funnelform. — *R. tubiflora*, LeConte in Ann. Lyc. N. Y. i. 142, not HBK. *Dipteracanthus noctiflorus*, Nees in DC. l. c., partly; Chapm. Fl. 304. — Low pine-barrens, Lower Georgia, *LeConte*. W. Florida, *Rugel*, *Chapman*, &c. S. Mississippi, *Ingalls*. Night-blooming?

R. ciliósa, Pursh. Usually hirsute with long spreading hairs, especially the (about inch long) filiform attenuate calyx-lobes: leaves oblong or the lower oval (an inch or two long), almost sessile: tube of the blue corolla commonly twice the length of the calyx and of the limb with the obconical throat, the whole not rarely 2 inches long. — Fl. i. 420; Gray, Man. ed. 5, 339. *Dipteracanthus ciliósus*, Nees in Linn. xvi. 294, & Prodr. l. c., with var. *hybridus*, mainly. — Dry ground, Michigan and Illinois to Florida and Louisiana: in various forms.

Var. longiflora. Pubescence sometimes cinereous, with or without long hirsute hairs: stems sometimes flowering when 2 or 3 inches high, sometimes tall and slender: leaves narrowly oblong or the lower obovate-spatulate, usually small: slender tube of corolla 1 or 2 inches long. — *R. humilis*, Nutt. in Trans. Am. Phil. Soc. n. ser. v. 182. *Justicia*, with char. & no name, Torr. in Ann. Lyc. N. Y. ii. 235. *Dipteracanthus Drummondii*, Torr. & Gray in Pl. Lindh. i. 50. *D. noctiflorus*, Nees, in DC. l. c., as to Texan pl. and var. *humilis*, also *D. ciliósus*, var. *hybridus*, in part. — Louisiana, Arkansas, and Texas.

Var. híbrida. Either hirsute or cinereous-pubescent, sometimes almost velvety-pubescent: leaves from ovate to oblong, mostly with distinct petioles: tube of the corolla shorter than the throat and limb, sometimes shorter than the linear-setaceous calyx-lobes, which often want the hirsute hairs. — *R. híbrida*, Pursh, Fl. ii. 420; LeConte in Ann. Lyc. l. c. *R. strepens*, L. as to Dill. Elth. t. 249, at least in part. *R. hirsuta*, Ell. Sk. ii. 109. *Dipteracanthus ciliósus*, var. *hybridus*, in part, & *D. Mitchillianus*, Nees, l. c. *D. strepens*, var. *Dillenii*, Nees, l. c. — S. Carolina to Florida. Verges to the two following species.

Var. ambigua. Sparingly hirsute-pubescent or glabrate: leaves ovate-oblong, usually short-petioled, larger: tube of corolla little exceeding the hardly hirsute calyx. — *Dipterocarpus ciliósus*, var. *parviflorus*, Nees, l. c. — Virginia and Kentucky to Alabama. As if a hybrid between *R. ciliósa* and *R. strepens*, with aspect of the latter, but the calyx of the former.

R. Drummondiana. Cinereous-puberulent, tall: leaves ovate, 3 to 6 inches long, petioled: filiform-setaceous and canescent calyx-lobes (commonly an inch or more long) more or less shorter than the tube of the (inch and a half long) corolla. — *Dipteracanthus Drummondianus*, Nees in DC. l. c. *D. Lindheimerianus*, Scheele in Linn. xxi. 764, 1848. — Texas, *Drummond*, *Lindheimer*.

++ ++ Calyx-lobes lanceolate or linear, hardly surpassing the capsule: cleistogamous flowers common.

R. strépens, L. Green and almost glabrous or pubescent, 1 to 4 feet high: leaves oblong-ovate or oblong, 2 to 5 inches long, mostly contracted at base into a short petiole: calyx sparingly soft-hirsute or ciliate: well-developed corolla $1\frac{1}{2}$ or 2 inches long, with tube about the length of the campanulate-funnelform throat and limb. — Spec. ii. 634 (partly) & Mant. 422; Schk. Handb. t. 177; Pursh, l. c. *Dipteracanthus strepens*, Nees, l. c., mainly. — Dry soil, Penn. to Wisconsin, Florida, and Texas.

Var. cleistántha. Leaves commonly narrower and oblong: flowers for most of the season cleistogamous. — *Dipteracanthus (Meiophanes) micranthus*, Engelm. & Gray, Pl. Lindh. i. 49. *D. strepens*, var. *strictus*, Nees, l. c., mainly. *Hygrophila illinoensis*, Wood in Bull. Torrey Club, v. 41. — Common with the ordinary form.

5. STENÁNDRIUM, Nees. (Composed of *στέρος*, narrow, and *ἀνδρία*, manhood, here taken for anthers.) — Low and small perennials, all American, commonly with leaves all at base of scapiform flowering stems; the flowers spicate; corolla rose-colored or purple.

S. dulce, Nees. Hirsute-pubescent or glabrate: leaves all radical, oval or oblong, thickish, 9 to 16 lines long, either narrowed or abruptly contracted into a rather long naked petiole: scape equalling or shorter than the leaves, capitately few-flowered: bracts lanceolate, longer than the calyx, usually hirsute-ciliate (either nerveless or 3-nerved): tube of the corolla narrow, rather longer than the calyx, the limb half inch or more in diameter: capsule clavate-oblong, somewhat terete. — DC. Prodr. xi. 282, with *S. trinerve*. *Ruellia dulcis*, Cav. Ic. vi. 62, t. 585, fig. 2. (Mex. to S. Chili.)

Var. Floridánium. Glabrous, only the upper bracts and bractlets lightly hirsute-ciliate. — Indian River, E. Florida, *Palmer*.

S. barbátum, Torr. & Gray. Very hirsute with long and shaggy white hairs, many-stemmed from the root; a span or less high: leaves crowded, oblanceolate, attenuate at base into an indistinct petiole, above passing into the lanceolate and crowded foliaceous bracts of the rather many-flowered spike, which nearly equal the corolla: tube of the latter hardly longer than the calyx; limb over half inch in diameter: capsule ovate, obcompressed, not attenuate at base: seeds hispid. — Pacif. R. Rep. ii. 168, t. 4, & Bot. Mex. Bound. 122. — Hillsides, western borders of Texas and adjacent parts of New Mexico, *Wright*, *Gen. Pope*, &c.

6. BERGÍNIA, Harvey. (In honor of *Mr. Bergin*, of Dublin.) — Benth. & Hook. Gen. ii. 1096. A single species.

B. virgáta, Harvey. Low and branching, apparently suffruticose, minutely cinereous-puberulent: branches slender: leaves linear-oblong, nearly sessile (half inch long); the upper smaller and passing into obscurely 3-nerved bracts of the loose and interrupted spike: calyx rather longer than the bracts, 2-bracteolate: corolla probably white, less than half inch long; its lower lobe bearded at and below the base. — Gray, Bot. Calif. i. 588. — “California,” *Coulter*. Probably Arizona: not since found.

7. CARLOWRÍGHTIA, Gray. (*Charles Wright*, the discoverer of one species, the earliest explorer of the district it inhabits, a most assiduous and successful collector and investigator of the botany of several parts of the world.) — Much branched undershrubs, minutely cinereous-puberulent or glabrate; with slender branchlets, small and narrow entire leaves, and rather small loosely spicate or paniculate-racemose flowers: corolla purple. — Gray, Proc. Am. Acad. xiii. 364.

C. linearifólia, Gray, l. c. A foot high, ericoid-leafy: leaves filiform-linear, 4 to 8 lines long; uppermost passing into similar bracts and bractlets of the somewhat paniculate inflorescence: calyx deeply 5-parted; the divisions similar to and equalled by the bractlets:

lobes of the purple and almost rotate corolla oblong, $2\frac{1}{2}$ lines long, twice the length of the tube: filaments hirsute-puberulent: anthers sagittate, the cells at base very obtuse or retuse: stipe as long as the body of the capsule. — *Shaueria linearifolia*, Torr. Bot. Mex. Bound. 123: referred by Benth. & Hook. Gen. ii. 1114, to *Dianthera*, but it cannot properly be included in that genus. — Western Texas; on hills between the Limpio Pass and the Rio Grande, *Wright*. Burro Mountains and Great Cañon of the Rio Grande, *Bigelow*, *Parry*.

- C. Arizónica**, Gray, l. c. Apparently low, diffuse: leaves oblong or lanceolate, 2 or 3 lines long: flowers sparsely spicate on filiform branchlets: bracts subulate, shorter than the calyx: bractlets minute or none: calyx deeply 5-cleft; the lobes subulate: lobes of the bright purple corolla 4 lines long, thrice the length of the narrow tube, narrowly oblong, or the posterior broader above and with a yellow spot on the face, contracted below: filaments glabrous: anthers oblong: stipe shorter than the body of the capsule. — Arizona, on rocks near Camp Grant, *Palmer*, 1867.

8. ANISACÁNTHUS, Nees. (*ἄνισος*, unequal, and *ἄκανθος*, the Acanthus.) — Suffrutescent or shrubby plants (of Mexico and its borders); with mostly lanceolate and entire petioled leaves, and usually loosely spicate or scattered red (an inch or more long) flowers: branches apt to be pubescent in alternate lines. — Benth. & Hook. Gen. ii. 1117.

- A. púmilus**, Nees. Low shrub, nearly glabrous: leaves lanceolate or linear-lanceolate (about 18 lines long); the larger short-petioled: calyx pubescent or tomentulose, 5-parted; the subulate or linear lobes about equalling the stipe of the capsule, which is not longer than the body: corolla red or reddish. — DC. Prodr. xi. 445. *Drejera puberula*, Torr. Bot. Mex. Bound. 121. — S. Arizona, *Wright*, *Wheeler*. Probably not distinct from *A. virgularis*, Nees, the *Justicia coccinea*, Cav. and *J. virgularis*, Salisb. (Mex.)

- A. Thúrberi**. Shrubby, 2 to 4 feet high: young parts minutely hirsute: leaves oblong or lanceolate (an inch or less long), thickish, subsessile: flowers more pedicellate, in short leafy clusters at the axils: calyx-lobes long-attenuate, equalling the pointed capsule, twice the length of its stipe: corolla red, more funnelform; its lobes little shorter than the tube. — *Drejera Thurberi*, Torr. Bot. Mex. Bound. 124. — S. New Mexico and Arizona, *Thurber*, *Capt. Smith*, *Palmer*.

- A. Wrightii**. Suffrutescent, 2 to 4 feet high, puberulent or the foliage glabrous, paniculately branched: leaves oblong- or ovate-lanceolate, acute or acuminate (an inch or two long): spikes loosely paniculate, naked: lobes of the deeply 5-cleft calyx oblong-lanceolate, obtuse, very much (commonly thrice) shorter than the stipe of the pointed capsule (stipe 3 to 5 and capsule 3 or 4 lines long): corolla purplish-red, inch and a half long, with lobes considerably shorter than tube. — *Drejera Wrightii*, Torr. l. c. — S. and W. Texas, between the Guadalupe and the Rio Grande, *Wright*, &c.

A. GRÉGGII, *Drejera Greggii*, Torr. l. c., of northern part of Mexico, has leaves as the last species, but more pubescent and veiny, longer and slender corolla, with linear lobes longer than the tube, tomentose calyx 5-cleft only to the middle, and the single capsule seen is obovate and obtuse or retuse, on a stipe of thrice its length and double the length of the calyx.

9. SIPHONOGLOSSA, Oersted. (*Σίφων*, tube, and *γλῶσσα*, tongue.) — Herbaceous or barely suffrutescent, chiefly Mexican.

- S. Pilosélla**, Torr. Low, branching from a suffrutescent base, hirsute with scattered spreading hairs: leaves ovate or oval, subsessile (5 to 15 lines long): flowers mostly solitary in the axils: sepals 5, subulate: corolla pale blue or purple, with tube 8 or 9 and limb 3 or 4 lines long: lower anther-cell conspicuously mucronate-calcarate at base; upper less so at apex: seeds cordate-orbicular, rugulose. — Bot. Mex. Bound. 134. *Adhatoda dipteracantha*, Nees in DC. l. c. 396. *Monechma Pilosella*, Nees, l. c. 412. — Dry ground, Texas and S. New Mexico. (Adjacent Mex.)

- S. longiflóra**. Glabrous, or the slender stems cinereous-puberulent, barely a foot high: leaves lanceolate, glabrous, short-petioled, an inch or two long: flowers clustered in upper

axils: corolla (white or yellowish-white) with tube inch and a half long: lower anther-cell mucronate-appendaged at base. — *Adhatoda?* *longiflora*, Torr. Bot. Mex. Bound. 125. — S. Arizona, *Schott*, *Rothrock*.

10. **BELOPÉRONE**, Nees. (*Βέλος*, an arrow or dart, and *περόνη*, something pointed.) — Shrubby plants; with red flowers, all but the following tropical American.

B. Califórnica, Benth. Low shrub, with spreading often leafless branches, tomentose or cinereous-puberulent: leaves ovate, oval, or subcordate, petioled: racemes terminating the branches, short, several-many-flowered: bracts and bractlets small, deciduous: calyx deeply 5-parted; lobes subulate-lanceolate: corolla dull scarlet, an inch long; both the lips oblong and truncate; lower 3-lobed at apex: anther-cells oval; lower mucronate at base: capsule obtuse, with broad and long stipe-like base obcompressed: seeds turgid, glabrous, coarsely rugose. — Bot. Sulph. 38; Gray, Bot. Calif. i. 588. *Jacobinia Californica*, Nees in DC. l. c. 729. *Sericographis Californica*, Gray in Bot. Mex. Bound. 125. — Desert region along the southern borders of California, and Lower California.

11. **JUSTÍCIA**, Houston, L. (*James Justice*, a Scotch cultivator and amateur.) — A large and widely distributed genus, chiefly tropical, represented here by a single anomalous and little known plant.

J. Wrightii. A span or less high and much branched from a suffrutescent base, cinereous-puberulent: leaves rigid, 3 or 4 lines long, sessile; lowest obovate; upper linear-lanceolate, mucronate-acute: flowers solitary and sessile in the upper axils; bractlets similar to the subtending leaf: corolla purplish, 4 lines long, somewhat campanulate; upper lip with a broad emargination and two short narrow lobes; lower larger with oval-obovate lobes: anther-cells oblong; the lower abruptly short-calcarate; the upper smaller and mucronate at base (fruit not seen: ovules 4). — Calcareous hills along the San Felipe, W. Texas, *Wright* (no. 445 of 1st coll.).

12. **DIANTHÉRA**, L. (*Δίς*, double, and *ἀνθηρά*, blooming, used for author.) — Chiefly perennial herbs, mostly American and of warm regions, various in inflorescence and habit: fl. summer. — *Rhytiglossa*, Nees in DC. Prodr. xi. 335.

§ 1. **EUDIANTHÉRA**. Flowers capitate or spicate on a long and naked axillary peduncle: bracts and bractlets subulate or linear: tube of the (purple or violet) corolla shorter or not longer than the limb: glabrous perennials.

D. crassifolia, Chapm. Stem barely a foot high, simple or sparingly branched: leaves few in distant pairs, fleshy, linear, or the lowest spatulate-lanceolate and short, and the upper filiform and elongated (4 to 6 inches), about the length of the 2-6-flowered peduncles: corolla an inch long, bright purple: capsule (with the long stipe) of the same length. — Fl. 304. — Apalachicola, Florida, in wet pine barrens, *Chapman*.

D. Americána, L. Stem 1 to 3 feet high, sulcate-angled: leaves narrowly lanceolate, 3 or 4 inches long, tapering at base, subsessile: peduncles mostly exceeding the leaves, capitate several-flowered: corolla pale violet or whitish, less than half inch long; base of lower lip rugose. — Spec. i. 27; Gray, Man. ed. i. 293. *D. ensiformis*, Walt. Car. 63. *Justicia linearifolia*, Lam. Ill. i. 41. *J. pedunculosa*, Michx. Fl. i. 7. *J. Americana*, Vahl, Enum. i. 140. *Rhytiglossa pedunculosa*, Nees in DC. l. c. 339. — In water, Canada to South Carolina, Arkansas, and Texas.

D. humilis, Engelm. & Gray. Stems a span to a foot high from a creeping base or rootstock, mostly slender: leaves from oblong or obovate-oblong to linear-lanceolate, sessile or slightly petioled, 1 to 3 inches long: flowers at length scattered in slender spikes on a peduncle shorter than the leaf: bract and bractlets much shorter than the 5 equal subulate-linear calyx-lobes: corolla violet or pale purple, 4 or 5 lines long: anther-cells more or less mucronate at base. — Pl. Lindh. i. 22. *D. ovata*, Walt. Car. 63; Chapm. Fl. 304. (with var. *lanceolata* & *angusta*), a misleading name, as the leaves are never so broad

as ovate. *Justicia humilis*, Michx. Fl. i. 8; Pursh, Fl. i. 13; Vahl, Enum. i. 43. *Rhytiglossa humilis*, Nees, l. c. 340. *R. obtusifolia*, Nees, l. c. 338, as to N. Am. plant? — Muddy borders of streams, S. Carolina, near the coast, to Texas. Narrowest leaved forms much resemble the tropical *D. pectoralis*, which has smaller flowers and fifth sepal small.

D. parviflora, *Drejera parviflora*, Buckley in Proc. Acad. Philad. Dec. 1861, is like the preceding, so far as an imperfect specimen shows: but leaves shorter (an inch or so long), lanceolate from a broader and rounded sessile base, the younger with a few hairs, and the inflorescence puberulent, with also some short-stipitate glands. — W. Texas, Buckley.

§ 2. Anomalous species, cinereous-pubescent: flowers small, in the axils of ordinary leaves and in slender spikes terminating the branches. (*D. Sagraana*, Griseb. with somewhat similar habit, is *Justicia Sagraana*, the lower anther-cell calcarate.)

D. parvifolia. Much branched from a somewhat woody root or base, a span or more high, erect or diffuse: leaves ovate, 3 to 8 lines long, petioled; upper axils floriferous: flowering branches mostly extended into slender sparsely-flowered spikes: bracts with bractlets and sepals subulate, small: corolla white or purple, 4 lines long; the lips nearly equal and about the length of the rather broad tube: anther-cells separated by a narrow connective, somewhat oblique and one a little lower. — *Shaueria parvifolia*, Torr. Bot. Mex. Bound. 122. — Dry soil, W. Texas to New Mexico, Wright, Schott, Lindheimer, &c. Referred to this genus on the authority of Benth. & Hook. Gen. ii. 1114.

13. GATÉSIA, Gray. (In memory of *Dr. Hezekiah Gates*, who almost half a century ago made and distributed a collection of Alabama plants, upon one of which, viz. *Petalostemon corymbosus*, mistaken for a Composita, Bertoloni founded his genus *Gatesia*.) — Single species: fl. summer. — Proc. Am. Acad. xiii. 365.

G. læte-virens, Gray, l. c. Perennial herb a foot or two high, puberulent or almost glabrous: stem when dry with a contracted ring above each node, as if articulated: leaves bright green, membranaceous, ovate-lanceolate or oval and acuminate at both ends ($2\frac{1}{2}$ to 5 inches long), petioled: flowers in oblong and somewhat strobilaceous usually short-peduncled spikes, both terminal and axillary: bracts oval or obovate with narrowed base, mucronate, hirsute-ciliate (half inch long): bractlets similar but smaller, about half the length of the clavate-oblong firm-coriaceous capsule: calyx somewhat glumaceous, deeply 5-parted; lobes setaceous-subulate, sparingly hirsute-ciliate, the innermost smaller: corolla white or flesh-color, almost salverform (about half inch and the lobes 2 lines long): stipe-like base shorter than the body of the 4-seeded capsule. — *Justicia læte-virens*, Buckley in Am. Jour. Sci. xlv. 176 (1843). *Rhytiglossa viridiflora* (meant for *viridifolia*), Nees in DC. Prodr. xi. 346. *Dicliptera Halei*, Riddell, Cat. Fl. Ludov. in N. Orl. Med. Jour. 1852; Chapm. Fl. 305. — Shady damp ground, Northern Alabama, Buckley, Cabell, Beaumont. Lookout Mountain, Tennessee, A. H. Curtiss. W. Louisiana, Hale. Eastern Texas, Wright. "Flowers opening in the night: corolla dropping early next day," *Dr. Cabell*. More allied to *Tetramerium* than to *Dianthera*, having only the capsule of the latter, and the bractlets of *Dicliptera*.

14. TETRAMÉRIUM, Nees. (*Τετραμερής*, quadripartite, limb of corolla 4-parted.) — Low perennial herbs, or barely suffrutescent at base (of and near Mexico); with oblong or ovate and petioled leaves, dense spike terminating stem and branches, its 4-ranked bracts imbricated and little exceeded by the (white or purplish) corollas. — Bot. Sulph. 147, & DC. Prodr. xi. 467. (*Henrya*, Nees, referred here in Benth. & Hook. Gen. ii. 1121, is distinguished by its small primary bract, or ordinary leaf in place of it, and conspicuous herbaceous bractlets, as of *Dicliptera*, which are usually vaginate and connate.)

T. hispidum, Nees, l. c. Hirsute-pubescent, and the ovate or oblong strongly 3-5-nerved spinulose-pointed bracts hispid: leaves oblong, 1 or 2 inches long: calyx 4-parted: lobes of the corolla shorter than its tube: seeds muriculate. — *T. nervosum*, var., Torr. Bot. Mex. Bound. 125. — S. Arizona to the borders of Texas. (Mex.)

T. platystégium, Torr. l. c. Scabrous-puberulent, not at all hirsute: leaves oblong-lanceolate: bracts subcordate, mucronate-acuminate (half or two-thirds inch long), lightly 3-5-plinerved and veiny: bractlets minute and subulate: calyx 5-parted: tube of purple corolla longer than the narrowly oblong lobes: seeds muriculate-scabrous. — S. borders of Texas, near Ringgold Barracks on the Rio Grande, *Schott*.

15. **DICLÍPTERA**, Juss. (*Δικλῖς*, two-valved, and *πτερόν*, wing: applies to the involucre of the typical species, but was explained to relate to the bipartition and separation of the two parts of each valve of the capsule after dehiscence.) — Chiefly herbs, dispersed over the warmer regions of the world. Fl. summer. Corolla often seemingly resupinate as relates to primary axis, on account of the cymose inflorescence or the evolution of more than one flower in the involucre. Leaves petiolate. In the disruption of the valves of the capsule, the sides are usually carried away with the placentæ, leaving only a stalk-like base.

§ 1. **EUDICLÍPTERA**. Bractlets of the flat involucre a single pair and broad, opposite: internal bractlets small and thin like the sepals: anther-cells oval, disjoined, one nearly over the other.

D. resupinata, Juss. A span to a foot or two high from an annual or perennial root, nearly glabrous: stem 6-angled: leaves from ovate to lanceolate or oblong: involucre on naked simple or commonly trifid peduncles, 1-3-flowered, rotund- or deltoid-subcordate, rarely round-obovate, very flat, a third to half inch long and nearly as wide: lobes of the purple corolla obovate. — Ann. Mus. ix. 268; Nees in DC. Prodr. xi. 474; Torr. Bot. Mex. Bound. 124. *Justicia sexangularis*, Cav. Ic. iii. 2, t. 203. *J. resupinata*, Vahl, Enum. i. 114. *Dicliptera thlaspioides*, Nees, l. c. ? S. Arizona (and California ? *Coulter*), *Thurber*, *Schott*, *Wright*, &c. (Mex.)

D. brachiáta, Spreng. A foot or two high, from almost glabrous to pilose-pubescent: stem 6-angled, rather slender, with numerous spreading branches: leaves oblong-ovate, mostly acuminate, membranaceous (2 to 4 inches long), slender-petioled: involucre clustered in the axils and more or less paniculate, short-peduncled and subsessile, somewhat convex, or at length ventricose, its valves narrowed at base, 3 to 5 lines long, from broadly obovate with rounded summit to spatulate-oblong, often unequal, frequently mucronate or mucronulate: lobes of the purple or flesh-colored corolla elongated-oblong, half inch or less long, about the length of the slender curved tube. — Syst. i. 86; Nees, l. c.; Chapm. Fl. 305. *D. resupinata*, Nutt. in Trans. Am. Phil. Soc. n. ser. v. 183, not Vahl. *D. glandulosa*, Scheele in Linn. xxi. 765, a villous-pubescent form. — Shady and moist ground, N. Carolina to Florida and Texas.

Var. attenuáta, a form with the involucreal valves narrower, spatulate or oblong, and cuspidate-acuminate; and attenuate-acuminate leaves on long (sometimes 2 inch) petioles. — E. Texas, *Wright*. Also Arkansas, *Nuttall*: therefore his *D. resupinata*, in part; but not according to his character "bracteis bivalvibus subcordatis."

§ 2. **DACTYLOSTÉGUM**. Bractlets 2 and narrow, and at base supplemented by and sometimes partially conereted with a smaller and alternate pair, being the outer and larger of the internal bractlets: anthers oblong-sagittate, the cells usually parallel and equal: flowers loosely secund-spicate or paniculate: primary bracts small and subulate. — *Dactylostegium*, Nees in Fl. Bras., Oersted. § *Dactylostegia*, Nees in DC. Prodr.

D. assúrgens, Juss. l. c. Glabrous or puberulent: stem 1 to 3 feet high, with virgate branches: leaves ovate, acuminate, or the smaller upper ones oblong and obtuse: involucre chiefly sessile and rather sparse in the slender simple or paniculate spikes: principal bractlets of the involucre linear-spatulate, 4 or 5 lines long, 1-nerved, mucronate, nearly twice the length of the slender-subulate interior ones: corolla much exserted, an inch long, red or crimson, arcuate; the nearly entire lanceolate-oblong lips shorter than the upwardly ampliate tube. — Nees in DC. l. c. 489; Chapm. Fl. 305. *Justicia assurgens*, L. (P. Browne, Jam. 110, t. 2, fig. 1.) — Eastern S. Florida. (W. Ind., Centr. Am.)

ORDER CII. SELAGINACEÆ.

Shrubs or herbs, of various habit, confined to the southern hemisphere, except two anomalous northern genera of dubious association, in character most like *Verbenaceæ*, but the solitary ovules anatropous and suspended, and the radicle of the terete straight embryo superior.

1. GYMNÁNDRA, Pall. (*Γυμνός*, naked, *άνήρ*, man; stamens somewhat protruding.) — Calyx spathaceous, cleft anteriorly, entire or 2-3-toothed posteriorly. Corolla tubular, amplified at the throat; limb 2-labiate; upper lip entire, erose-2-3-crenulate, or 2-cleft; lower usually longer, 2-3-cleft. Stamens 2, inserted in the throat of the corolla, not surpassing its lobes: anthers versatile, confluent 1-celled. Ovary 2-celled, 2-ovulate: style filiform and elongated: stigma subcapitate or 2-lobed. Fruit dry or slightly drupaceous, small, included in the calyx and marcescent corolla, separating into two akene-like nutlets, or one of them often abortive. Seed suspended: embryo a little shorter than the fleshy albumen. — Perennial and subcaulescent glabrous herbs; with the aspect of *Synthyris* in *Scrophulariaceæ* (p. 285); rootstock somewhat creeping: leaves alternate; the radical obovate or oblong and petioled; those of the scapiform and simple flowering stem sessile: flowers in a dense terminal spike, each solitary and sessile in the axil of a bract: corolla bluish. A few montane and arctic Asiatic species, two of them reaching N. America. — Pall. It. iii. 710; Choisy in DC. Prodr. xii. 24; Benth. & Hook. Gen. ii. 1130.

G. Gmelini, Cham. & Schl. Somewhat robust, a span to a foot high: radical leaves ovate or oblong, mostly obtuse at both ends, repand-crenate (2 to 4 inches long): cauline smaller, passing into bracts of the dense and thick oblong spike: stamens much shorter than the upper lip of the corolla, exceeding the style. — Linn. ii. 561; Hook. Fl. ii. 102. *G. borealis*, var., Pall. l. c. *G. ovata & reniformis*, Willd. *Lagotis glauca*, Gärtn. in Nov. Comm. Petrop. xiv. 533, t. 18, fig. 2. (*Bartsia gymnandra*, Pursh, Fl. ii. 430, referred here as to plant of Columbia River, is probably *Synthyris rubra*.) — Unalaska, Popoff Islands, &c., recently coll. by Harrington and Elliott. (Kamts., &c.)

G. Stelleri, Cham. & Schl. l. c. Slender and smaller: radical leaves oblong, acute, more attenuate at base, unequally and obtusely serrate: stamens about equalling the upper lip of the corolla, shorter than the style. — Hook. l. c. *G. minor, dentata, & gracilis*, Willd. — Kotzebue Sound, *Lay & Collie*. Arctic coast, *Richardson*. Perhaps Island of St. Lawrence, *Chamisso*. St. Paul's Island, *Elliott*. (Arctic Asia.)

ORDER CIII. VERBENACEÆ.

Herbs or shrubs (in tropical regions some are trees), with chiefly opposite or verticillate leaves, no stipules, bilabiate or almost regular corolla, with lobes imbricated in the bud, mostly didynamous stamens, single style with one or two stigmas, an undivided mostly 2-carpellary but more or less completely 2-4-celled (rarely 8-locellate) ovary, a pair of ovules to each carpel (one to each *locellus* or half-carpel); the fruit either drupaceous and 2-4-pyrenous, or dry and separating at maturity into as many nutlets; embryo straight, and in true *Verbenaceæ* with the radicle inferior. *Phryma*, appended to this order for lack of other affinity, is a notable exception. Albumen in our genera scanty or none. Inflorescence various. Foliage sometimes aromatic.

TRIBE I. PHRYMEÆ. Ovary one-celled, and with a single erect or ascending orthotropous ovule. Seed without albumen. Radicle superior: cotyledons broad, convolute round their axis. Inflorescence centripetal.

1. **PHRYMA**. Calyx cylindraceous, bilabiate; upper lip of 3 setaceous-subulate teeth; lower of 2 short subulate teeth. Corolla with cylindrical tube equalling the upper lip of the calyx, and a bilabiate limb: upper lip almost erect, emarginate; lower much larger, spreading, 3-lobed. Stamens didynamous, included: anthers 2-celled, opening longitudinally. Style slender: stigma 2-cleft. Fruit a dry akene in the bottom of the calyx. Calyx abruptly reflexed on the axis of the spike in fruit, strongly ribbed, and closed by the narrowing of the orifice: the long slender teeth hooked at the tip.

TRIBE II. VERBENEÆ. Ovary, or at least the fruit, with 2 to 8 cells or nutlets: ovules anatropous or nearly so, erect. Radicle accordingly inferior. Inflorescence centripetal and simple; the flowers in the spike commonly alternate: bractlets none. Leaves simple, sometimes divided, but not compound. Stamens in our genera included and distinctly didynamous.

* Flowers spicate or capitate.

+ Calyx ampliate-globular and closed over the fruit.

2. **PRIVA**. Flowers slender-spicate. Calyx at first cylindraceous, with 5 ribs produced into short teeth, membranaceous and enlarging with and closely investing the dry indurated fruit, which splits into a pair of 2-locellate or by abortion 1-locellate nutlets. Corolla salverform, 5-lobed, obscurely bilabiate.

+ + Calyx narrow, tubular, plicately 5-angled, 5-toothed, mostly enclosing the dry fruit: corolla salverform; limb somewhat equally or unequally 5-lobed: akene-like nutlets 1-celled, 1-seeded.

3. **STACHYTARPHETA**. Perfect stamens 2 (the anterior pair) and with divaricate vertical anther-cells: posterior reduced to sterile filaments. Stigma terminal, orbicular, subcapitate. Fruit separating into 2 oblong-linear nutlets.

4. **BOUCHEA**. Perfect stamens 4: anthers ovate, the cells parallel. Stigma 2-lobed, one lobe abortive, the other subclavate-stigmatose. Fruit separating into 2 nutlets. Seed linear.

5. **VERBENA**. Perfect stamens 4: anthers ovate; the cells nearly parallel. Stigma mostly 2-lobed; anterior lobe larger; posterior smooth and sterile. Fruit separating into 4 nutlets.

+ + + Calyx small and short: anthers short, the cells parallel: cells of the ovary and nutlets of the fruit 2, one-seeded: style mostly short: stigma thickish, mostly oblique.

6. **LIPPIA**. Calyx 2-4-cleft or toothed, ovoid, oblong-campanulate or compressed and bicarinate, enclosing the dry fruit, which separates into 2 nutlets. Limb of corolla oblique or bilabiate, 4-lobed.

7. **LANTANA**. Calyx very small and membranaceous, truncate or sinuate-toothed. Limb of the corolla not bilabiate, obscurely irregular, 4-5-parted; the broad lobes obtuse or retuse; tube slender. Fruit drupaceous, merely girt at base by the calyx, fleshy or juicy; its nutlets bony, mostly roughened.

* * Flowers in open racemes, minutely bracteate: calyx tubular-campanulate, with truncate minutely 5-toothed border: corolla salverform; the 5-parted limb somewhat oblique or unequal: anther-cells parallel: ovules amphitropous: drupe juicy, containing 2 to 4 bilocellate 2-seeded bony nutlets: subtropical and tropical shrubs or trees.

8. **CITHAREXYLUM**. Calyx in fruit girding the base of the drupe. Stigmas 2. Nutlets 2. Sterile fifth stamen present, rarely antheriferous.

9. **DURANTA**. Calyx in fruit ampliate and enclosing the drupe. Corolla commonly curved. Stigma unequally 4-lobed. Nutlets 4: seeds therefore 8.

TRIBE III. VITICEÆ. Ovary, embryo, &c, of the preceding tribe. Ovules laterally affixed, amphitropous. Inflorescence centrifugal, cymose.

10. **CALLICARPA**. Flowers 4-merous (rarely 5-merous in calyx and corolla), nearly regular. Calyx short, sinuately toothed. Corolla with short or campanulate tube. Stamens 4, equal, exserted: anthers short; cells parallel. Style elongated: stigma capitate or 2-lobed. Baccate drupe small, the base subtended by the calyx, containing 4 small 1-seeded nutlets or by abortion fewer. Cymes axillary.

TRIBE IV. AVICENNIEÆ. Ovary imperfectly 4-celled, with a central 4-winged columella bearing 4 pendulous amphitropous ovules, these and the solitary seed des-

titute of any coats. Fruit fleshy-capsular. Seed consisting solely of a large embryo, which begins germination at or before dehiscence; radicle villous, inferior: cotyledons large, amygdaloid, conduplicate longitudinally: plumule conspicuous. Flowers glomerate (inflorescence centrifugal); the capituliform clusters variously disposed.

11. **AVICENNIA**. Calyx of 5 imbricated concave sepals. Corolla with short campanulate tube, and slightly irregular 4-parted spreading limb. Stamens 4, somewhat unequal and exserted. Style short or none. Stigmas 2. Fruit compressed, 2-valved.

1. **PHRYMA**, L. **LOPSEED**. (An unexplained name, substituted by Linnæus for *Leptostachya*, Mitch. in Act. Phys.-Med. Nat. Cur. viii. 212, 1748.) — Single species.

P. Leptostachya, L. Perennial herb, 2 to 4 feet high, slender, somewhat pubescent: leaves ovate, acuminate, coarsely serrate; lower ones long-petioled: flowers small and inconspicuous, sessile in slender and filiform at length much elongated terminal spikes, purplish, each in the axil of a setaceous bract and subtended by a pair of minute bractlets, at length strictly reflexed; the fructiferous calyx, detaching at maturity, apt to adhere to fleece and clothing by the hooked tips of the awn-like teeth in the manner of a bur. — Gærtn. Fr. t. 75; Lam. Ill. t. 516; Schauer in DC. Prodr. xi. 520. — Moist and open woods, Canada to Florida and Missouri: fl. summer. (Japan to Nepal.)

2. **PRIVA**, Adans. (Name of unknown derivation.) — Homely perennial herbs of warm climates; with petioled coarsely serrate leaves, and terminal spikes of small dull flowers, in summer.

P. echinata, Juss. Somewhat pubescent: leaves ovate, somewhat cordate: flowers alternate in the slender spike: fruiting calyx hirsute with small hooked hairs: fruit ovate, 4-angled, splitting into 2 nutlets, each 2-seeded, spiny-toothed on the back. — Jacq. Obs. t. 24; Sloane, Jam. t. 110; Chapm. Fl. 206. — S. Florida. (Trop. Amer.)

3. **STACHYTARPHETA**, Vahl. (Name formed of *στάχυς*, spike, and *ταρφή*, dense, written *Stachytarpha* by Link and some succeeding authors, that it might better accord with the etymology.) — Tropical herbs or undershrubs, chiefly American; with mostly serrate and sometimes alternate leaves, and dense terminal spikes; the flowers, or at least the fruiting calyx, often half immersed in longitudinal excavations of the stout rhachis, subtended each by a small and usually paleaceous bract.

S. Jamaicensis, Vahl. Annual, but suffrutescent, glabrate: leaves oval or oblong, coarsely serrate, tapering into the petiole: spike as thick as a goose-quill, 6 to 10 inches long: bracts appressed, striate, aristulate-acuminate: flowers sunk in deep excavations of the thickening rhachis: calyx becoming compressed and 2-cleft: corolla blue, its border 4 lines broad. — Enum. i. 206 (Sloane, Jam. t. 107; Desc. Ant. vi. t. 692); Chapm. Fl. 308. *Verbena Jamaicensis*, L. — S. Florida. (W. Ind. to Guiana.)

4. **BOUCHÉA**, Cham. (*Charles* and *Peter Bouché*, Berlin gardeners.) — Between the preceding and following genera, American, African, and Indian: flowers not immersed in the slender rhachis of the spike; in summer.

§ 1. Leaves petioled and serrate (as in the genus generally): flowers small.

B. Ehrenbergii, Cham. Annual, a span to 2 feet high, barely puberulent, brachiatly branched: leaves ovate or oval: spikes short: flowers crowded: corolla little exserted, bluish, 3 lines long: tip of fruit exserted from the shortish tube of calyx. — Linn. vii. 253; Schauer in DC. Prodr. xi. 558; Torr. in Bot. Mex. Bound. 126. *Verbena prismatica*, Jacq. Ic. Rar. t. 203. — S. Arizona, *Thurber*, *Wright*. (Mex. & W. Ind. to Venezuela.)

§ 2. Leaves sessile or nearly so and entire: spikes lax: tube of (purple or white) corolla exserted, and limb 6 to 9 lines broad: fruit somewhat shorter than the narrow cylindrical calyx-tube. Peculiar species.

B. spatuláta, Torr. Suffrutescent, puberulent: branches terete, very leafy: leaves thickish, obovate, entire, obtuse, mucronate (9 lines long); upper ones passing into similar foliaceous bracts; uppermost lanceolate, about equalling the calyx. — Bot. Mex. Bound. 126. — S. W. Texas, cañon of the Rio Grande, near Mount Carmel, *Parry*.

B. linifolia, Gray. Fastigiately and alternately branched from a perennial or suffrutescent base, a foot or two high, glabrous and smooth: branches rigid, striate-angled and sulcate, very leafy: leaves linear-lanceolate, entire, acute at both ends, 1-nerved; uppermost passing into bracts of the loose spike: upper bracts subulate, much shorter than the slightly pedicellate striate calyx: throat of corolla funnelliform. — Am. Jour. Sci. ser. 2, xvi. 98; Torr. l. c. — Dry bed or banks of the San Pedro and Rio Grande, S. W. Texas, *Wright, Schott*.

3. **VERBÉNA**, Tourn. **VERVAIN**. (Roman name of a sacred herb, of Celtic derivation.) — A large genus of herbs (or a few S. American species suffruticose), chiefly American, some mere weeds, some ornamental; fl. summer. Spontaneous hybrids abound, not here to be described; many are noted by Engelmán in Am. Jour. Sci. xlv. (1843) 99.

§ 1. Flowers small or comparatively so, in narrow spikes: anthers unappendaged.

* Spikes filiform, with the flowers or at least the fruits scattered, naked, and the inconspicuous bracts shorter than the calyx.

+ Leaves 1-2-pinnately cleft or incised, sessile or nearly so.

V. officinális, L. Annual, slender: stem glabrous or nearly so: leaves minutely strigulose-pubescent, chiefly once or twice pinnatifid or 3-5-cleft; lower obovate, sometimes only incised, narrowed below into a tapering base; uppermost lanceolate: spikes very slender, solitary or panicled: bracts shorter than calyx: lobes of the small purplish corolla usually less than a line long. — Fl. Dan. t. 628; Lam. Ill. t. 17. *V. officinális* & *V. spuria*, L. Spec. i. 18. — Road-sides and old fields, New Jersey to Texas, Arizona, and S. California. (Nat. from Eu., &c.)

V. xútha, Lehm. Stouter and taller (2 or 3 feet high, from a perennial root?), hirsute-pubescent: leaves more or less canescent, incisely pinnatifid or lacinate, or some of the lower 3-parted; lobes coarsely toothed: flowers more crowded in the strict spikes, larger: bracts equalling the calyx: lobes of the purple or blue corolla commonly a line and a half long. — Ind. Sem. Hamb. 1834, & Linn. x. Literb. 115. *V. strigosa*, Hook. & Arn. Comp. Bot. Mag. i. 176, not Cham. *V. Lucwana*, Walp. Rep. iv. 23; Schauer in DC. Prodr. xi. 547. *V. cerulea*, Vatke in App. Ind. Sem. hort. Berol. 1876, 1. *V. sororia*, Don, Prodr. Fl. Nepal. 104, & Brit. Fl. Gard. t. 202, is perhaps the same species. — Louisiana and Texas, southern borders of California. (Mex.)

+ + Leaves merely serrate, or sometimes sparingly incised: root perennial.

V. urticæfólia, L. From minutely hirsute-pubescent to almost glabrous, 3 to 5 feet high: leaves thin, petioled, ovate to oblong-lanceolate, acuminate or acute, evenly or doubly serrate: spikes slender-filiform, panicled, more or less sparsely flowered: bracts ovate, acuminate, shorter than the short calyx: corolla a line or two, and lobes only half a line long, white, sometimes bluish or purplish. — Waste or open grounds, Canada to Texas, &c. (Trop. Am.)

V. polystáchya, HBK. Less tall, more scabrous, sometimes hirsute or hispid, paniculately branched: leaves from oblong to broadly lanceolate (1 or 2 inches long), sessile by a narrowed base or short-petioled, obtuse or acute, incisely serrate, occasionally somewhat lobed: spikes thicker and denser than in the preceding. — Gray, Bot. Calif. i. 608. *V. polystachya*, *biserrata*, & *veronicæfólia*? HBK. Nov. Gen. & Spec. ii. 274, &c. *V. Caroliniensis*, Dill. Elth. ii. 407, t. 301, fig. 388: therefore *V. Carolina*, L. Spec. ed. 2, ii. 29, but not in Carolina. *V. Caroliniana*, Spreng. Syst. ii. 748; Hook. & Arn. Bot. Beech. 156; Schauer in DC. l. c. 546. California and Arizona: rare. (Mex.)

V. Caroliniána, Michx. Cinereous-puberulent and scabrous-pubescent: stems mostly simple, ascending, from 6 inches to 2 feet high, including the commonly solitary long and virgate spike: leaves oblong and the lowest obovate, obtuse, sessile, finely and often doubly serrate: flowers in the upper part of the spike crowded: bracts subulate, equalling the calyx: corolla flesh-color; the lower lobe a line long, the others shorter. — Fl. ii. 13; Ell. Sk. ii. 99. *Phryma Carolinensis*, Walt. Car. 166. *Verbena Caroliniana*, Ray, and as to this at least *V. Carolina*, L., but seemingly not *V. Carolinensis*, Dill. Elth. *V. carnea*, Med. ex Schauer in DC. l. c. 545. — Pine barrens, N. Carolina to Florida.

* * Spikes thicker or densely-flowered; the fruits crowded, mostly overlapping each other or imbricated: bracts inconspicuous, not exceeding the flowers: root perennial.

+ Pubescence short, sparse and hirsute or scabrous: spikes dense, strict, naked at base or more or less peduncled: stem erect.

V. angustifolia, Michx. l. c. Stem and spikes often simple, a foot or two high: leaves linear or lanceolate, coarsely rugose-veiny, serrate, tapering into nearly sessile base: corolla purple or lilac (3 lines long). — *V. rugosa*, Willd. Enum. 633. *V. simplex*, Lehm. Pugill. i. 37. — Dry or sandy ground, Massachusetts (Amherst) to Wisconsin and Florida.

V. hastata, L. Tall, 3 to 6 feet high: leaves oblong-lanceolate, gradually acuminate, coarsely or incisely serrate, petioled, some of the lower commonly hastate-3-lobed at base: spikes numerous in a panicle: corolla blue. — *V. paniculata*, Lam.; Bot. Mag. t. 1102; name applied to the form which wants the 3-lobed leaves; the better but the later name for the species. — Canada and Saskatchewan to Florida, New Mexico, and (according to Torrey in Wilkes Exped. Bot.) California: chiefly waste grounds and road-sides. — Var. *pinnatifida*, Schauer (*V. pinnatifida*, Lam.), is a probable hybrid, of occasional occurrence.

+ + Pubescence softer and denser, commonly cinereous or canescent: spikes mostly sessile or leafy-bracted at base.

V. stricta, Vent. Erect, rather stout, a foot or two high: leaves cinereous with dense soft-hirsute-villous pubescence, thickish, rugose-veiny, ovate or oblong, nearly sessile, very sharply and densely mostly doubly serrate, rarely incised: spikes comparatively thick, dense both in flower and fruit, canescent: bracts subulate-setaceous, equalling the calyx: corolla blue (4 or 5 lines long): nutlets linear. — Hort. Cels, t. 53. *V. rigens*, Michx. Fl. ii. 14. *V. cuneifolia*, Raf. in Med. Rep. N. Y. xi. 260? — Barrens and prairies, Ohio to Dakota, Texas, and New Mexico, where a hybrid occurs between it and *V. bracteosa*. *V. lanceolata*, Beck in Ann. Jour. Sci. xiv. 118, may be one of the hybrids between *V. stricta* and *V. angustifolia* which occur at St. Louis.

V. prostrata, R. Br. Diffusely spreading, at length much branched, from soft-villous to hirsute: leaves obovate or oblong, with cuneate base tapering into a margined petiole, veiny, acutely incised and serrate, often 3-5-cleft: spikes solitary or somewhat clustered, elongated, hirsute or villous, dense when in flower: bracts subulate, shorter than the calyx: corolla violet or blue, 2 lines long: nutlets oblong. — Ait. Kew. ed. 2, iv. 41; Schauer, l. c.; Gray, Bot. Calif. i. 609. *V. lasiostachys*, Link; Hook. & Arn. Bot. Beech. 156. — Plains and open grounds, throughout W. California. Very variable.

* * Spikes (either thickish or slender) sessile and bracteose, i. e. the rigid and somewhat foliaceous bracts, or some of them, surpassing the flowers: root annual or becoming lignescens-perennial.

V. bracteosa, Michx. Much branched from the base, diffuse or decumbent, hirsute: leaves cuneate-oblong or cuneate-obovate, narrowed mostly into a short margined petiole, pinnately incised or 3-cleft, and coarsely dentate: spikes terminating the branches, thick: lowest bracts often pinnatifid or incised; the others lanceolate, acuminate, entire, rigid, sparsely hispid, all exceeding the flowers: corolla purplish or blue, very small: nutlets with a broad and strongly convex or 2-faceted granulate-scabrous commissure. — Fl. ii. 14; Hook. Bot. Mag. t. 2910. *V. squarrosa*, Roth, Catal. Bot. iii. 3. *V. canescens*? Chapm. Fl. 307, not HBK. — Prairies and open waste grounds, Wisconsin to W. Florida, and west to Oregon, California, and Arizona.

Var. *brevibracteata*, a peculiar form, with dense spikes, most of the bracts little longer than the flowers, and the uppermost barely equalling them, in fruit all ascending or appressed. — W. Texas to Arizona. (Adjacent Mex.)

V. canescens, HBK. Much branched from the base, ascending or erect, canescent-hirsute: leaves oblong-lanceolate and cuneate-obovate, contracted into a margined base, rigid, sharply toothed, incised, or some of them pinnatifid: spikes solitary, filiform, mostly loosely-flowered: bracts subulate, the lower almost filiform and more or less ex-

ceeding the flowers, the uppermost ovate-lanceolate and only equalling them: corolla bluish (about 2 lines long): nutlets with a narrower almost smooth commissure. — HBK. Nov. Gen. & Spec. ii. 274, t. 136. *V. gracilis*, Desf. Cat. ed. 3, 303. *V. remota*, Benth. Hartw. 21. *V. Roemeriana*, Scheele in Linn. xxi. 755? — Dry open grounds, W. Texas to S. California. (Mex.)

Var. Neo-Mexicana. Stems rather strict and slender: leaves bipinnately cleft or almost parted: bracts not longer than the calyx. — *V. officinalis*, var. *hirsuta*, Torr. Bot. Mex. Bound. 28. — Borders of thickets near the Coppermines, New Mexico, Wright, Bigelow. Appears as if a hybrid between *V. canescens* and *V. officinalis*. S. Arizona, similar in foliage but with long bracts, *Rothrock*.

§ 2. Flowers more showy, at first depressed-capitate, becoming spicate in fruit: anthers of the longer stamens appendaged by a gland on the connective: tube of corolla at the upper part lined with reflexed bristly hairs, especially the anterior side: anther-cells slightly oblique or unequal. — *Glandularia*, Gmelin, Nutt. *Billardiera*, Mœnch. *Shuttleworthia*, Meissner. *Uvarovia*, Bunge.

* Gland of the anthers small and short, sometimes inconspicuous, on the middle of the back: mainly fibrous-rooted perennials; but seedlings flowering as annuals: nutlets reticulate-rugulose, mostly scabrous on the commissure. Species difficult to distinguish, apparently passing into each other.

V. ciliata, Benth. Low or depressed, hirsute-pubescent or hispid, 3 to 10 inches high, diffusely spreading from an apparently annual root; the branches not creeping nor rooting at base: leaves once or twice 3-cleft or parted and variously incisedly lobed, 6 to 12 lines long, with cuneate base contracted into a margined petiole; lobes from linear to oblong: spikes short-peduncled or sessile, dense, at most oblong: fructiferous calyx oblong, 2½ or 3 lines long, with short subulate teeth: limb of the purple or bluish corolla 2 to 4 lines broad: gland of the anthers usually very small. — Pl. Hartw. 21; Schauer in DC. Prodr. xi. 553; Gray, Bot. Calif. i. 608. — Dry plains, W. Texas to Arizona and the southern border of California. (Mex.)

V. bipinnatifida, Nutt. A span to a foot high, hispid-hirsute, perennial, rooting from subterranean branches: leaves (1½ to 4 inches long), bipinnately parted, or 3-parted into more or less bipinnatifid divisions; the lobes commonly linear or rather broader: spikes in age elongated. bracts setaceous-attenuate, mostly surpassing the calyx: teeth of the latter slender, subulate-setaceous from a broader base, unequal: limb of the bluish-purple or lilac corolla 4 or 5 lines broad; lobes obovate: nutlets at maturity usually retrorsely muriculate-scabrous or hispidulous on the commissure. — Jour. Acad. Philad. ii. 123; Torr. in Ann. Lye. N. Y. ii. 233; Schauer in DC. l. c. 553. *Glandularia bipinnatifida*, Nutt. in Trans. Am. Phil. Soc. n. ser. v. 184. — Plains and prairies, Arkansas and Texas to the base of the Rocky Mountains in Colorado, &c. Cult. as "*V. montana*."

V. Aubletia, L. A foot or less high, branching and ascending from a creeping or rooting base, perennial (as rightly said by Jacquin), slender, soft-pubescent, hirsute, or glabrate: leaves (1 or 2 inches long) ovate or ovate-oblong in outline, with truncate or broadly cuneate base tapering into a margined petiole, incisedly lobed and toothed, often more deeply 3-cleft: spikes pedunculate, elongated in fruit: bracts subulate or linear-attenuate, shorter than or equalling the similar slender and unequal teeth of the narrow calyx: limb of the reddish-purple or lilac (rarely white) corolla half or two-thirds inch broad: commissure of the nutlets minutely white-dotted or nearly smooth. — Jacq. Vind. ii. 82, t. 176; L. f. Suppl. 86; Bot. Mag. t. 308; Michx. Fl. ii. 13; Bot. Reg. t. 294, t. 1925 (var. *Drummondii*); Schauer in DC. l. c. 554. *V. Obletia*, Retz. *V. longiflora*, Lam. *Buchnera Canadensis*, L. Mant. 88. *Glandularia Carolinensis*, Gmel. *Billardiera explanata*, Mœnch. *V. Lamberti*, Sims, Bot. Mag. t. 2200; Schauer, l. c.; form with narrower and more incised leaves. *V. Lamberti*, var. *rosea*, Don, Brit. Fl. Gard. ser. 2, t. 363, with large and light-colored corolla (three-fourths inch wide, fragrant). — Open woods and prairies, Florida to Illinois, Arkansas, and New Mexico. (Mex.) Cult., variously mixed.

* * Gland of the anthers oval, as high and almost as large as one of the cells: stem erect from an annual root.

V. Wrightii. Hispidulous-pubescent: stem simple below, 2 feet high: leaves pinnately 3-7-parted or deeply cleft, contracted at base into a margined petiole; lobes mostly lan-

ceolate, acute: fructiferous pedunculate spikes dense, oblong: fructiferous calyx with teeth very much shorter than the oblong tube: corolla light purple: nutlets, &c., of *V. Aubletia*. — Near Frontera, on the borders of Texas, and adjacent New Mexico, and Chihuahua, Wright (no. 1504).

V. VENÓSA, Gillies & Hook., of S. America, one of the species cultivated for ornament, has escaped into prairies in the vicinity of Houston, Texas.

6. *LÍPPIA*, L. (*Dr. A. Lippi*, killed in Abyssinia early in the 18th century.) — Herbs or shrubs (American, mainly southern, a few African, &c., and one or two widely dispersed species); with spikes or heads of small flowers, in summer. Leaves often verticillate.

§ 1. *ALÓYSIA*, Schauer, Benth. & Hook. Flowers in slender and naked spikes, with small and narrow bracts: calyx about equally 4-cleft, herbaceous, often densely hirsute, the tube not compressed: nutlets thin-walled: shrubs, with foliage commonly sweet-aromatic. — *Aloysia*, Ortega. (*L. citriodora*, of Uruguay, with smooth calyx, &c., is the *Lemon Verbena* shrub, of cultivation.)

L. lycioides, Steud. Shrub 4 to 10 feet high, with long and slender branches, sometimes spinescent, minutely puberulent: leaves (3 to 12 lines long) lanceolate-oblong, obtuse, 1-nerved, scabrous above, pale beneath, veinless, small and entire on flowering branches, larger and incised or few-toothed on strong sterile shoots: spikes axillary, racemose-panicled, filiform: flowers white or tinged violet (fragrance of vanilla). — Schauer in Fl. Bras. ix. t. 36 & DC. Prodr. xi. 574. *Verbena ligustrina*, Lag. Nov. Gen. & Spec. 18. — Texas to Arizona and "California," Coulter. (Mex., Uruguay, &c.)

L. Wrightii, Gray. Shrub 2 to 4 feet high, with many spreading slender branches, minutely canescent-tomentose: leaves (4 to 8 lines long) orbicular-ovate, crenate, rugose, abruptly short-petioled: spikes short-peduncled, densely flowered: calyx-teeth triangular: corolla white, glabrous within: "odor of Sage." — Am. Jour. Sci. ser. 2, xvi. 98; Torr. in Bot. Mex. Bound. 126. — S. W. Texas to Arizona, Thurber, Wright, Palmer, &c. (Adjacent Mex., where var. *macrostachya*, Torr. l. c., approaches *L. scorodonioides*, HBK., of S. Am.)

§ 2. *ZAPÁNIA*, Schauer, Benth. & Hook. Flowers capitate or in short and dense spikes, subtended and imbricated by broad bracts.

* Bracts decussately 4-ranked, complicate-carinate, persistent: flowers very small.

L. gravéolens, HBK. Shrubby, 2 to 4 feet high, cinereous with close pubescence: leaves ovate-oblong or oval, crenate-reticulate-rugose, hirsute-pubescent above, canescent beneath, petioled: umbellate peduncles 3 to 6 in each axil, shorter than the leaves: bracts thin, ovate, acute, silky, shorter than the yellowish-white salverform corolla. — Nov. Gen. & Spec. ii. 266; Schauer, l. c. *L. Berlandieri*, Torr. l. c., not Schauer. — Texas, along and near the Rio Grande. (Mex., &c.)

* * Bracts several-ranked, concave or flattish: calyx thin, more or less compressed fore and aft and the sides carinate. — *Zapania*, Schauer.

— More or less shrubby, erect: heads on short axillary peduncles.

L. gemináta, HBK. l. c. Pubescent leaves ovate or oblong, closely serrate, triplinerved, pinnately veined, and with rugose-reticulated veinlets, minutely strigose above, canescently tomentose-pubescent beneath, petioled: peduncles mostly solitary in the axils, hardly longer than the petiole: head globular, at length cylindraceous: bracts broadly ovate, abruptly cuspidate-acuminate, villous-canescant, a little shorter than the purple or violet corolla. (Foliage with odor of citron.) — *Verbena lantanoides*, L. — S. Texas on the Rio Grande. (Mex. to Uruguay.)

* * Herbaceous, procumbent or creeping: pubescence of fine and close hairs fixed by their middle and both ends acute: peduncles chiefly axillary and slender: bracts closely imbricated: calyx strongly flattened fore and aft, with carinate margins, and cleft into 2 lateral more or less conduplicate lobes: limb of corolla manifestly bilabiate; the smaller upper one retuse or emarginate: pericarp crustaceous or corky, not readily separating into the two nutlets.

L. cuneifolia, Steud. Diffusely branched from a lignescent perennial base, procumbent (not creeping), minutely canescent throughout: leaves rigid, cuneate-linear, sessile, incisely

2-6-toothed above the middle, nearly veinless, the midrib prominent: peduncles mostly shorter than the leaves: heads at length cylindraceous, almost half inch thick: bracts rigid, broadly cuneate, abruptly acuminate from the truncate or retuse dilated summit: calyx deeply 2-cleft; the lobes oblong and emarginate, shorter than the tube of the (white?) corolla: fruit oblong-oval. — Torr. in Marcy, Rep. 293, t. 17. *Zapania cuneifolia*, Torr. in Ann. Lyc. N. Y. ii. 234. — Plains, Nebraska to New Mexico and Arizona.

L. nodiflora, Michx. Creeping extensively, some branches ascending, "annual" or probably perennial, cinereous or greenish: leaves cuneate-spatulate or oblanceolate, sessile or nearly so, obscurely veiny or almost veinless, the long tapering base entire, sharply serrate from above the middle to the apex: peduncles filiform (1 to 4 inches long), much exceeding the leaves: heads cylindraceous in age, quarter inch thick: bracts mucronate or pointless: lobes of the calyx linear-lanceolate: corolla rose-purple or nearly white, short: fruit globose or didymous. — Fl. ii. 15. *Zapania nodiflora*, Lam. Ill. t. 17. *Verbena nodiflora*, L.; Sibth. Fl. Græc. t. 553. — Low grounds, Georgia to Texas and southward: also California. (Cosmopolite in torrid zone.)

L. lanceolata, Michx. l. c. Like the preceding, and perhaps passes into it, but greener, minutely and sparsely strigulose: leaves thinner, mostly broader (name therefore inapt), varying from obovate and lanceolate-spatulate to ovate, narrowed at base mostly into a petiole, above sharply serrate, pinnately straight-veined; veins ending in the sinuses: corolla bluish-white. — Gray, Man. ed. 5, 341. *L. reptans*, HBK. l. c.? *Zapania lanceolata*, Beck in Am. Jour. Sci. xiv. 284. — River banks, E. Penn. to Illinois and Missouri, south to Florida and Texas. (Mex.)

7. LANTÁNA, L. (An old name of a *Viburnum*, transferred by Linnæus, in view of some resemblance to this genus, which should have retained Plumier's name of *Camara*). — Shrubs or undershrubby plants of warm regions; with mostly rugose and somewhat glandular-odorous pinnately veined petioled leaves (not rarely in threes), and axillary pedunculate heads of rather showy small flowers; in summer. Several species common in gardens, two or three indigenous to our southern borders.

§ 1. **Drupe** thin-fleshed or somewhat dry, at least with nutlets contiguous and usually cohering more or less into a 2-celled putamen: stems never prickly. (Transition to *Lippia*.)

L. involucrata, L. Canescent, much branched: leaves obovate-oval or ovate, rounded at the apex, crenate, rugulose and veiny, scabrous above, soft-tomentose beneath, cuneate at base, rather slender-petioled: peduncles equalling or exceeding the leaf: head hemispherical or at length globose, not elongating: bracts silky, ovate, or the outermost sometimes oblong, these as long as the (white or lilac) flowers, and forming an involucre. — S. Florida (*L. involucrata*, var. *Floridana*, Chapm.; a form with long peduncles and white flowers). S. borders of Texas (*L. odorata*, var. *Berlandieri*, Torr. Mex. Bound. and *L. parvifolia*, Raf.?): a form with less obtuse leaves and white flowers. *L. odorata*, L. Syst., seems not distinct. (Trop. Am.)

L. canescens, HBK. Cinereous-canescient throughout with fine and soft strigose pubescence: branches slender: leaves oblong-lanceolate or ovate-lanceolate and gradually acuminate, with cuneate base, somewhat appressed-serrate, lineate-veined and minutely rugose, about the length of the slender peduncles: heads ovoid, small, in age short-oblong: bracts ovate and ovate-lanceolate, acuminate, lax; the exterior larger, spreading and involucrate: corolla small, white. — Nov. Gen. & Spec. ii. 259. *Lippia pallescens*, Benth. Hartw. 245. As yet collected only on the Coahuila (Mexican) side of the Rio Grande, *Berlandier*, Bigelow. (Trop. Am.)

L. macrópoda, Torr. Cinereous with minute strigulose pubescence: stems slender, 1 to 3 feet high, herbaceous almost or quite to the base: leaves ovate or oblong-ovate, acute, coarsely and sharply serrate, obtuse or somewhat cuneate at base, petioled, usually scabrous above and slightly canescent beneath, not at all rugose-reticulated, the primary veins conspicuous and running straight to the sinuses: peduncles twice or thrice the length

of the leaf (2 to 5 inches long): heads globular, at length oblong: bracts ovate, cuspidate-acuminate, nearly equalling the white or purple corolla; the outermost gradually larger but hardly forming an involucre. — Bot. Mex. Bound. 127. — S. W. borders of Texas (Wright, &c.), and adjacent parts of Mexico, Gregg, Palmer.

§ 2. Drupe juicy; the 2 nutlets separated, at least at base. Stems sometimes prickly or hispid, but this very variable.

L. Cámara, L. Scabrous and more or less hirsute, 1 to 4 feet high: prickles on the stem short and hooked: leaves ovate or ovate-oblong, often subcordate, crenate-serrate, very scabrous above, scabrous-hirsute or softer-pubescent beneath (about 2 inches long): peduncles rigid, about the length of the leaf: head flat-topped in anthesis; the rhachis not elongating: bracts lanceolate, strigose-hirsute, about half the length of the yellow at length orange or even flame-colored corolla. — Plum. Ic. t. 71; Dill. Elth. t. 56. *L. horrida*, var. *parviflora*, Schauer in DC. l. c.; Torr. l. c. — S. Georgia and Florida, S. Texas and southward. (Trop. Am.)

8. CITHARÉXYLUM, L. (Name composed of *κθάρα*, guitar or lyre, and *ξύλον*, wood, a translation into Greek of the colonial-English Fiddle-wood; but this name, unfortunately for the etymology, is an English corruption of the earlier French-colonial name, *bois fidèle*, meaning a wood trustworthy for strength.) — Tropical American shrubs or trees; with somewhat coriaceous leaves, and small flowers on a filiform rhachis; each subtended by a minute bract.

C. villósum, Jacq. Soft-pubescent or glabrate: leaves oblong-obovate or oblong, entire or occasionally few-toothed above the middle, veiny and with finely reticulated veinlets, shining and barely scabrous above, pale and sometimes soft-canescens beneath, biglandular at the narrowed base, tapering into the petiole: racemes declining, loose, but spike-like: flowers very short-pedicelled: corolla white, glabrous externally. — Coll. i. 72, & Ic. Rar. t. 118; Chapm. Fl. 309. — Key West, S. Florida; perhaps S. Texas. (W. Ind., Mex.)

9. DURÁNTA, L. (*Castor Durantes*, wrote upon W. Indian plants in the 16th century.) — W. Indian and S. American shrubs, often armed with axillary spines; one has reached our borders.

D. Plumiéri, Jacq. Minutely pubescent or glabrate: branches 4-angled: leaves obovate, oblong, or ovate, mostly entire, contracted at base into a short petiole: racemes panicked, loose: lower bracts often leafy: calyx-teeth subulate from a broad base: corolla lilac: drupe yellow; the enclosing persistent calyx also yellowish, closed into a straight or contorted beak. — Jacq. Stirp. t. 176, fig. 76, & Ic. Rar. t. 502; Bot. Reg. t. 244; Chapm. l. c. *D. spinosa* & *D. incrimis*, L.; the branches sometimes spiny, sometimes unarmed. *D. Ellisia*, Jacq. Amer. t. 176, f. 77, & Hort. Schœnb. iii. t. 99; Bot. Mag. t. 1759. *Ellisia acuta*, L. — Key West, S. Florida, Blodgett. (Trop. Am.)

10. CALLICÁRPA, L. (*Κάλλος*, beauty, and *καρπός*, fruit: the berry-like drupes ornamental.) — A rather large E. Asiatic and American genus, chiefly of the warmer regions, one in the Atlantic States; fl. late summer. Pubescence stellate-branched or scurfy.

C. Americána, L. (FRENCH MULBERRY.) Shrub low, with scurfy-stellate down and glandular-dotted: leaves ovate-oblong, acuminate, obtusely serrate, greenish above, whitish or rusty beneath, acute or cuneate at base: cymes shorter than the petiole, many-flowered: corolla bluish, hardly 2 lines long: fruit violet-colored. — Catesb. Car. t. 47; Lam. Ill. t. 69. *Spondylococcus*, Mitchell, Nov. Gen. *Burchardia Americana*, Duham. Arb. ed. 1, i. t. 44. — Rich or moist grounds, Virginia to Texas. (W. Ind.)

11. AVICÉNNIA, L. WHITE MANGROVE. (Dedicated to *Avicenna*, the Latinized name of *Ibúsina*, most illustrious of Arabian physicians; died in

1037.) — Maritime evergreen trees, of tropical regions, spreading from creeping shoots; their opposite entire and mostly canescent coriaceous leaves connected at base by an interpetiolar line, giving the branchlets the appearance of being articulated: peduncles axillary and terminal, commonly cymosely trichotomous: flowers small, white or whitish, in late summer.

A. nitida, Jacq. Leaves oblong or lanceolate-elliptical, glabrate and at length sometimes shining above: peduncles ternate or trichotomous: lobes of corolla minutely sericeous or tomentulose both sides: style as long as stamens. — Jacq. Amer. t. 112, fig. 1; Schauer in DC. Prodr. xi. 699; Griseb. Fl. W. Ind. 502. *A. tomentosa*, Meyer, Essequib.; Nutt. Sylv. iii. 79, t. 105, exerted style shown. *A. oblongifolia*, "Nutt.?" Chapm. Fl. 310: name not mentioned by Nuttall in Sylv. l. c. — Keys and coasts of S. Florida, and mouth of the Mississippi. (W. Ind. to Brazil.)

A. TOMENTOSA, Jacq. l. c. fig. 2, with hardly any style, and corolla-lobes glabrous above, is in the Prodronus and in Chapman's Flora attributed to "Florida, Nuttall." But Nuttall's species figured under this name in the Sylva is clearly the *A. nitida*, and that is probably our only species.

ORDER CIV. LABIATÆ.

Herbs or low shrubs, with aromatic herbage (usually dotted with small immersed glands replete with volatile oil), with square stems, opposite simple leaves and no stipules; the perfect flowers with irregular more or less bilabiate corolla, didynamous or diandrous; filiform style mostly 2-cleft and 2-stigmatose at apex, and around its base the divisions of a 4-parted (sometimes only 4-lobed) ovary, which are uniovulate and ripen into akene-like nutlets, in the bottom of a gamosepalous calyx. Ovule and seed mostly amphitropous or anatropous, and erect. Embryo straight except in the *Scutellarineæ*, with plane or plano-convex cotyledons and inferior radicle: albumen usually none or hardly any. Lobes of the corolla imbricated in the bud, the posterior or the upper lip exterior and the middle lobe of the lower lip innermost. Stamens borne on the tube of the corolla, distinct or rarely monadelphous; the fifth (posterior) stamen, and in diandrous flowers the adjacent pair also, not rarely represented by sterile filaments or rudiments: rarely the 4 fertile stamens equal. Hypogynous disk generally present, sometimes as (one to four) gland-like lobes. Pistil as in all the related orders dimerous, each carpel deeply 2-parted or 2-lobed. Inflorescence thyrsoidal; the general evolution of the clusters in the axils of leaves or primary bracts (these occasionally reduced to single flowers) centripetal; that of the clusters (cymes or glomerules) centrifugal. The pair of sessile clusters, one to each axil, having the appearance of a whorl (*verticil*) form what has been termed a *verticillaster*. Bracts or bractlets various. Leaves occasionally verticillate. Seed transverse and the radicle incurved in *Scutellarineæ*. (The *Ajugoideæ* connect with the tribe *Viticeæ* of the preceding order, and therefore are placed foremost. A larger proportion of our *Labiataæ* are Old World naturalized plants than of any other order.) — Benth. Lab. & in DC. Prodr. xii. 26; Benth. & Hook. Gen. ii. 1160.

I. Nutlets rugose-reticulated, with introrsely very oblique or even ventral and comparatively large areola (scar of the attachment): ovary merely 4-lobed or not deeply 4-parted. (Seeds in the tribe here represented, as in most of the order, exalbuminous.)

TRIBE I. AJUGOIDEÆ. Stamens ascending, mostly exserted from the upper side of the corolla, 4 in all our genera. Nutlets obovoid, dry. Ovule and seed more or less amphitropous: calyx 5-10-nerved.

* Limb of the corolla merely or hardly oblique, of 5 somewhat equal and similar lobes, therefore obscurely if at all bilabiate.

1. **TETRACLEA.** Calyx deeply 5-cleft, regular; the lanceolate lobes twice the length of the short turbinate tube. Corolla nearly salverform in anthesis, with narrow tube surpassing the calyx; limb globular and erect (not oblique) in the bud; lobes oval or oblong-obovate, similar and equally spreading, the three lower obscurely more united at base. Filaments filiform, involute in bud, exserted: anthers cordate-oblong; cells permanently parallel and distinct. Ovary barely 4-lobed. Ovule and seed descending-amphitropous, i. e. attached above its middle, rostellate at the micropyle. Areola of the nutlet very large and ventral.
2. **TRICHOSTEMA.** Calyx barely 5-cleft, either oblique or almost regular. Corolla with narrow tube and more or less oblique limb; the somewhat similar lobes oblong, more or less declined. Filaments spirally coiled in the oblique unopened limb, curved in anthesis, capillary, very long-exserted, didynamous, sometimes monadelphous at base: anther-cells divaricate or divergent, at length often confluent. Ovary deeply 4-lobed. Amphitropous ovule and seed ascending, being attached below the middle.
3. **ISANTHUS.** Calyx nearly equally 5-cleft, campanulate; lobes lanceolate. Corolla short; tube included in the calyx; throat somewhat campanulate; limb almost regularly 5-parted; lobes obovate, not declined. Stamens slightly incurved-ascending, not longer than the corolla, didynamous: anther-cells at length divergent. Ovary deeply 5-lobed. Ovule and seed nearly anatropous and erect. Areola of nutlet introrsely basal.
- * * Limb of corolla irregular, seemingly unilabiate; the upper lip being either split down or very short: stamens exserted from the cleft.
4. **TEUCRIUM.** Corolla deeply cleft between the two small lobes of the upper lip, which are united one on each side with the lateral lobes of the declined lower lip; middle lobe much larger. Anthers confluent one-celled. Nutlets with a broad introrse areola.
5. **AJUGA.** Corolla with very short and as if truncate upper lip; the large and spreading lower lip with middle lobe emarginate or 2-cleft. Anther-cells less confluent.

II. Nutlets smooth or granulate; areola basal, small: ovary deeply 4-parted.

TRIBE II. OCIMOIDEÆ. Stamens declined toward or resting on the lower lip of the corolla, didynamous, all fertile. Corolla declined; lower lip apparently formed of the anterior lobe only, which is unlike the other somewhat equal four lobes.

6. **OCIMUM.** Calyx deflexed after flowering; its posterior tooth broad, orbicular or obovate, and with decurrent often wing-like margins; the 4 others narrower. Corolla with short tube, and flat or concave declined lower lobe. Disk enlarging into glands.
7. **HYPTIS.** Calyx mostly equally 5-toothed. Corolla with the lower lobe saccate, abruptly deflexed at the contracted and callous base. Disk entire or with a gland on the anterior side. Nutlets ovoid or oblong.

TRIBE III. SATUREINEÆ. Stamens not declined; the posterior pair shorter or wanting: anthers (in ours) 2-celled; the cells distinct or more or less confluent, short. Corolla less strongly bilabiate and the lobes flatter than in succeeding tribes; upper lip not galeate or concave, except in *Acanthomintha*.

* Corolla with lower lobe larger and pendent, fimbriate or lacerate-toothed, very unlike the 4 shorter and nearly equal lobes, which in appearance form the upper lip: stamens straight and long, divergent: anther-cells divaricate and contiguous, or at length somewhat confluent: flowers in terminal racemes.

8. **COLLINSONIA.** Calyx short, small in flower, enlarging and declined in fruit, about 10-nerved, mostly somewhat hirsute in the throat, bilabiate; the broader and at length flattish upper lip 3-toothed; the lower 2-parted. Corolla elongated, somewhat funnel-form, with a bearded ring inside at the insertion of the stamens. Stamens 2 or 4, much exserted, spirally coiled in the bud.
- * * Corolla about equally 4-lobed, small and short, hardly irregular, but the upper lobe often broader than the others and emarginate: stamens erect, straight and distant: anther-cells parallel, destitute of any thickish connective: flowers capitate-glomerate, and the clusters sometimes confluent-spiked.
9. **MENTHA.** Stamens 4, similar and nearly equal. Calyx campanulate or short-tubular, and 5-toothed. Upper lobe of corolla sometimes emarginate.

10. **LYCOPUS**. Stamens only 2 with anthers; the upper pair sterile rudiments or else wanting. Calyx campanulate, 4-5-toothed, naked in the throat. Upper lobe of corolla entire. Nutlets 3-sided, truncate at top, narrow at base, thickened-margined.

* * * Corolla more or less evidently bilabiate; the upper lip erect, entire or emarginate, or in *Monardella* 2-cleft; the lower spreading and 3-cleft, destitute of bearded ring within, except in *Pollomitha*. Calyx striate-nerved or costate, not much changed after flowering.

+ Stamens distant and straight, often divergent, never convergent nor curved.

++ Antheriferous stamens only 2; with or without abortive rudiments of the upper pair.

11. **CUNILA**. Calyx ovate-tubular, equally 5-toothed, very villous in the throat, 10-13-nerved. Upper lip of corolla emarginate; the lower somewhat equally 3-cleft. Stamens long-exserted. Nutlets smooth.

++ ++ Antheriferous stamens 4, didynamous: calyx 15-nerved.

12. **HYSSOPUS**. Calyx tubular, equally 5-toothed, naked in the throat. Tube of corolla short: upper lip emarginate; the lower 3-cleft, its middle lobe larger and 2-cleft. Stamens exserted, divergent: anther-cells linear, divaricate.

++ ++ ++ Antheriferous stamens 4, didynamous: calyx 10-13-(in *Monardella* 15-)nerved,

= Naked in the throat: flowers capitate-verticillastrate, or sometimes sparser.

13. **PYCNANTHEMUM**. Calyx ovate-oblong or tubular; the 5 teeth equal, or the 3 upper more or less united. Corolla short, with entire or barely emarginate upper lip, and 3-cleft lower one; the lobes all short, ovate, obtuse. Stamens little unequal: anther-cells parallel.

14. **MONARDELLA**. Calyx tubular, narrow; the 5 teeth equal or nearly so. Corolla glabrous within; the 2-cleft upper lip and lobes of the 3-parted lower one all linear or narrowly oblong, plane. Stamens strongly or moderately unequal, exserted: anther-cells often divergent or divaricate. Flowers densely capitate-verticillastrate in the manner of *Monarda*.

= = Calyx villous or hirsute-bearded in the throat: corolla short.

15. **ORIGANUM**. Calyx ovate-campanulate, in our (introduced) species equally 5-toothed. Stamens exserted. Flowers spicate- or capitate-verticillastrate, imbricated with broad colored bracts.

16. **THYMUS**. Calyx ovate, declined in fruit, villous in the throat, distinctly bilabiate; upper lip 3-toothed, spreading; lower 2-cleft, its divisions subulate and ciliate. Flowers scattered or crowded, the bracts inconspicuous.

+ + Stamens ascending (at least the lower part) or arcuate, often more or less converging and sometimes ascending parallel under the erect upper lip of the corolla: connective of the anther commonly more or less thickened, sometimes separating the oblique or divaricate cells.

++ Calyx only about 10-nerved, naked in the throat, not declined nor gibbous: fertile stamens 4.

17. **SATUREIA**. Calyx campanulate or short. Tube of the corolla short, or not exceeding the bracts.

++ ++ Calyx 12-15-nerved: upper lip of the corolla plane or slightly concave and straight, as in the tribe generally.

= Style beardless: anthers mucous.

a. Stamens 4, all antheriferous.

18. **MICROMERIA**. Calyx oblong or tubular, terete, not gibbous nor declined, about equally 5-toothed. Corolla short, its straight tube usually shorter or hardly longer than the calyx. Stamens arcuate, shorter than the corolla.

19. **CALAMINTHA**. Calyx oblong or tubular, often gibbous, bilabiate; the upper lip 3-toothed or 3-cleft, the lower 2-parted. Corolla with a straight tube mostly exceeding the calyx, and a commonly enlarging throat. Stamens ascending parallel under or beyond the upper lip, or conniving in pairs.

20. **MELISSA**. Calyx oblong-campanulate, bilabiate as in the preceding, but the broad upper lip becoming flatter. Corolla rather short; its tube at base declined, then ascending, included in the calyx. Otherwise like *Calamintha*. Leaves ovate, serrate, veiny.

21. **CONRADINA**. Calyx, &c., of *Calamintha*. Corolla with a narrow and straight tube rather shorter than the calyx, abruptly bent backwards at the throat, deeply bilabiate, ringent; the upper lip somewhat concave and incurved, emarginate or retuse; the lower dependent, contracted at the base, deeply 3-lobed; the lateral lobes roundish, the dilated

middle one emarginate-2-lobed. Stamens arcuate-ascending under the upper lip, parallel : cells of the anther at length separated on a transversely dilated connective, their base bearing a small tuft of delicate villous hairs. Leaves linear, with entire revolute margins, one-ribbed.

- b. Stamens 2 antheriferous, ascending parallel under the upper lip ; the posterior pair either wanting or rudimentary, or with imperfect (rarely perfect and polliniferous) anthers : calyx tubular or tubular-campanulate, more or less villous-bearded in the throat.
22. **POLIOMINTHA**. Calyx cylindraceous or cylindrical, terete and regular, 13-15-striate, bearded in the throat, equally 5-toothed or nearly so. Corolla mostly with a hairy ring within the throat or tube ; upper lip erect, emarginate ; lower 3-cleft and spreading, the broader middle lobe emarginate. Posterior filaments mere subulate rudiments. Fruticulose and canescent.
23. **HEDEOMA**. Calyx from tubular to oblong, usually gibbous, more or less bilabiate or unequally 5-toothed (the two lower teeth different and longer), mostly 13-striate, hairy or villous-bearded in the throat, which is commonly contracted in fruit. Tube of corolla naked : upper lip erect, entire or 2-lobed ; lower 3-cleft, spreading. Posterior stamens either none, or sterile, or in the original species sometimes antheriferous ! Low herbs.
- = = Style bearded or villous, sometimes sparingly so : antheriferous stamens 4 or sometimes 2.

24. **POGOGYNE**. Calyx very deeply and unequally 5-cleft, at least the two longer (lower) lobes much longer than the campanulate or turbinate 15-nerved tube ; throat naked. Corolla straight, tubular-funnelform, with short lips ; the erect entire upper lip and the spreading lobes of the lower one oval and somewhat similar. Stamens ascending and above somewhat approximate in pairs : anther-cells parallel and mucicous : posterior filaments much shorter and sometimes sterile. Style more or less hirsute-bearded above. Flowers verticillastrate-glomerate and spicate : bracts and calyx strongly ciliate.

25. **CERANTHERA**. Calyx tubulose-campanulate, 13-nerved, nearly terete, villous in the throat, bilabiate ; lips short ; the upper recurved-spreading and entire or slightly 3-toothed ; the lower scarcely longer and 2-cleft. Corolla with a straight narrow tube barely exceeding the calyx, an abruptly much-dilated short throat, and rather short and spreading lips ; the upper one nearly entire, the lower 3-cleft. Fertile stamens 4 : filaments capillary, somewhat ascending, exerted, and above diverging : cells of the anther divaricate on a broad connective, aristate or pointed ! Style long-exserted, pubescent. Leaves linear, entire.

++ ++ ++ Calyx 13-nerved : upper lip of corolla concave and more or less incurved or fornicate, after the manner of the succeeding tribes.

26. **ACANTHOMINTHA**. Calyx tubular-campanulate, 13-nerved, naked in the throat, bilabiate ; upper lip 3-toothed ; lower 2-cleft ; teeth all acerose-spinulose from a broader base ; the anterior shorter. Corolla with tube exceeding the calyx, naked within ; upper lip entire, oblong ; lower broad and spreading, 3-lobed ; lobes short and rounded, middle one deeply and the lateral slightly emarginate. Stamens 4, inserted high in the ampliate throat : anterior pair fertile, ascending under the upper lip, bearing 2-celled anthers, the cells divaricate and somewhat confluent : posterior pair much shorter, with filiform filaments, and small imperfect or abortive anthers. Style 2-lobed at apex ; lobes or stigmas subulate, the posterior shorter. Nutlets smooth.

* * * * Corolla obscurely bilabiate : a hairy ring at base of the tube within : calyx irregularly about 10-nerved, reticulate-veiny, enlarging and commonly inflated after flowering.

27. **SPHACELE**. Calyx campanulate, deeply and nearly equally 5-toothed, membranaceous at least in fruit, naked within. Corolla with a broad tube, and 5 broad or roundish and plane rather erect lobes, the lower one longest. Stamens 4, distant, somewhat ascending : filaments naked : anthers somewhat approximate, the cells diverging. Leaves veiny.

TRIBE IV. MONARDEÆ. Antheriferous stamens only 2 (the posterior pair rudimentary or wanting), straight or commonly parallel-ascending ; the anther with narrow usually oblong-linear cells, which are either widely separated on the upper and lower ends of a linear or filiform commonly filament-like connective (which is usually longer than the filament itself and articulated with it), or the lower cell wanting or difformed, or the two cells confluent into one linear cell. Corolla bilabiate.

* Anther dimidiate on the elongated filament-like connective, which is articulated with the filament, a fertile anther-cell at the ascending end, and sometimes one at the lower. Calyx bilabiate ; its lower lip 2-cleft.

28. **SALVIA.** Corolla with upper lip erect (entire, emarginate, or rarely 2-lobed above), straight or falcate, usually concave; the lower spreading, its middle lobe often emarginate. Stamens inserted in the throat of the corolla: connective commonly linear or filiform, transverse on the short (sometimes very short) and mostly horizontal filament, its descending or porrect portion continued beyond the articulation and either more or less dilated and naked, or bearing an abortive rudiment of the second anther-cell, or sometimes one which is polliferous but unlike the upper one. Nutlets commonly developing mucilage and long spiracles when wetted.
29. **AUDIBERTIA.** Corolla with upper lip spreading, 2-lobed or emarginate; lower spreading and 3-lobed, the middle lobe broad and emarginate. Filaments slender, exerted, seemingly simple and bearing a linear one-celled anther, or with an articulation, showing that the portion above the joint answers to a filiform connective, the lower end of which sometimes obliquely projects into a subulate point, but never bears even a trace of an anther-cell. Otherwise as *Salvia*, but the calyx (always naked in the throat) more deeply cleft in front, or oblique, or as it were spathaceous. Nutlets smooth, unchanged when wetted.
- * * Anther with both cells fertile and similar, contiguous and divaricate, more or less connate or confluent at their junction, so as to become or to imitate a single linear cell, on a very small and inconspicuous dorsal connective: corolla with slender tube, and lips of somewhat equal length; the upper erect, linear or oblong, entire or barely emarginate; the lower spreading, 3-lobed, its middle lobe retuse or emarginate: stamens inserted in the throat of the corolla, ascending, usually more or less projecting from the upper lip; calyx tubular, 13–15-nerved: inflorescence verticillastrate-capitate, dense, many-flowered, multi-bracteate: outer bracts and bractlets broad; inner from lanceolate to setaceous.
30. **MONARDA.** Calyx elongated-tubular, mostly 15-nerved, regular or nearly so, almost equally 5-toothed, more or less villous-bearded or hirsute at the orifice. Corolla narrow or dilated at the throat; middle lobe of lower lip larger or longer than the lateral.
31. **BLEPHILIA.** Calyx shorter, naked in the throat, bilabiate; upper lip 3- and the shorter lower one 2-toothed; teeth aristiform or subulate. Corolla dilated at the throat; lower lip broader; its linear-oblong middle narrower than the roundish lateral lobes.

TRIBE V. **NEPETEÆ.** Stamens 4, both pairs fertile; the *posterior* (inner or upper) pair surpassing the anterior. Corolla distinctly bilabiate. Calyx usually 15-nerved; the upper teeth or lip commonly larger or longer.

* Anthers separated or distant (not approximate in pairs); their cells parallel or nearly so.

32. **LOPHANTHUS.** Stamens divergent or distant, exerted; the upper pair usually declined; the lower or shorter pair ascending. Calyx tubular-campanulate, more or less oblique, 5-toothed. Corolla with tube not exceeding the calyx; upper lip nearly erect, 2-lobed at the apex; lower spreading, its broad middle lobe crenate.
33. **CEDRONELLA.** Stamens parallel, ascending. Calyx campanulate or short-tubular, 5-toothed, the throat little oblique. Corolla with short lips; the flattish erect upper one 2-lobed; middle lobe of lower lip largest, commonly crenulate-erose and more or less 2-lobed.
- * * Anthers more or less approximate in pairs; their cells divaricate or divergent: filaments ascending, not exerted.
34. **NEPETA.** Calyx more or less oblique at the throat, equally (or somewhat unequally) 5-toothed. Corolla with tube narrow at base; throat dilated; upper lip somewhat concave, emarginate or 2-lobed; lower spreading, with middle lobe large.
35. **DRACOCEPHALUM.** Calyx equal at the throat, 5-toothed; the upper tooth (at least in ours) very much larger than the others, sometimes the 3 upper partly united. Corolla, &c., of *Nepeta*.

TRIBE VI. **SCUTELLARINÆ**, Visiani. Stamens 4, ascending and parallel; both pairs fertile; the anterior (lower or outer) pair longer and with anthers mostly one-celled by abortion (the other cell rudimentary or wanting); those of the posterior pair 2-celled. Corolla bilabiate; but with the small lateral lobes more connected with the galeate upper lip; lower lip therefore of a single lobe. Calyx bilabiate, closed in fruit; the lips entire. Upper fork of the style very short or none. Ovule campylotropous or amphitropous. Nutlets depressed or globular, rough-granulate or tuberculate: seed transverse. Embryo curved; the short radicle incumbent on one of the cotyledons! Herbage bitterish, little or not at all aromatic.

36. **SCUTELLARIA.** Calyx in anthesis campanulate, gibbous, with a crest-like or casque-shaped projection (answering to the upper sepal) on the back, closed after the corolla falls, not inflated, at maturity of the fruit splitting to the base; upper part not rarely falling away; the lower persistent. Corolla with long exerted tube, naked within; its anterior lobe or lower lip with the sides recurved. Anthers ciliate-pilose. Nutlets very rarely wing-margined.
37. **SALIZARIA.** Calyx globular or at first oblong, barely repand-bilabiate, not appendaged or gibbous on the back, much enlarged after anthesis, becoming vesicular-inflated and reticulated. Nutlets depressed, tuberculate-roughened, marginless. Corolla, &c., of *Scutellaria*.

TRIBE VII. STACHYDEÆ, Benth. (Lab., with part of *Scutellarineæ*.) Stamens 4; both pairs fertile, parallel and ascending under the concave and commonly galeate upper lip of the bilabiate corolla (or in *Marrubium* included in the throat); the anterior (lower or outer) pair longer (except in a *Phlomis*): anthers 2-celled or confluent somewhat 1-celled. Calyx 5-10-nerved, or veiny. Bitter-aromatic or with hardly aromatic herbage.

* Calyx reticulate-veiny, membranaceous or chartaceous, more or less inflated, deeply bilabiate; the lips flattened and closed in fruit; upper lip plane and broad: corolla with inflated throat from a more or less exerted tube.

38. **BRUNELLA.** Calyx oblong, somewhat 10-nerved; upper lip truncate, 3-toothed, its teeth very broad and short; lower 2-cleft, its teeth lanceolate. Corolla with assurgent tube, ringent lips, and slightly contracted orifice; upper lip galeate, entire; lower 3-lobed; its middle lobe dependent, rounded, concave, denticulate. Filaments, at least of the upper pair, 2-toothed at the apex, one tooth naked, the other bearing the 2-celled anther, the cells of which are divaricate. Nutlets smooth and glabrous. Inflorescence verticillate-capitate or spicate.
39. **BRAZORIA.** Calyx short-campanulate, indistinctly nerved, mostly declined in fruit; both lips broad; the upper 3-lobed and somewhat recurved; the lower 2-lobed and surracted in fruit. Corolla with inflated throat, broad and barely concave upper lip, and spreading 3-lobed lower one; its lobes short and roundish. Filaments simple: anthers with somewhat divergent cells. Nutlets smooth, glabrous or pubescent. Inflorescence racemose-spicate.

* * Calyx more or less membranaceous and inflated or enlarged after flowering, obscurely nerved, but somewhat veiny, 3-5-lobed, not bilabiate, open: corolla showy; throat inflated; upper lip more or less concave, not galeate: filaments more or less villous.

40. **PHYSOSTEGIA.** Calyx nearly regular, and equally 5-toothed; the tube campanulate or oblong, hardly nerved or veined, moderately turgid in fruit. Corolla gradually inflated upward; lips short; the upper erect, rounded, entire; lower somewhat spreading, 3-parted, its roundish middle lobe emarginate. Anthers uniform; the cells nearly parallel, denticulate or slightly spinulose along the edges of the valves. Style almost equally 2-cleft at apex. Nutlets triquetrous, smooth and even. Flowers simply opposite in the spikes, one under each bract.
41. **MACBRIDEA.** Calyx tubular-campanulate or funnelform, 3-lobed; upper lobe narrower, oblong, entire, obtuse; the two others broad (each of two combined sepals) and 2-lobed or entire. Corolla much inflated above, rather deeply bilabiate; upper lip roundish and fornicate, entire or nearly so; lower spreading, with 3 roundish lobes, middle one larger. Anthers unconnected, hairy on the face; cells divergent. Style equally 2-toothed at apex. Nutlets oblong, nervose. Inflorescence terminal and capitate, 2 or 3 flowers under each bract.
42. **SYNANDRA.** Calyx campanulate, inflated, membranaceous, deeply 4-cleft; the lobes lanceolate-subulate, somewhat equal; the 2 lower slightly smaller, the fifth or uppermost wanting. Corolla with narrow tube, inflated above into a very ventricose throat; upper lip somewhat fornicate, entire; lower widely spreading, 3-lobed, the middle lobe emarginate. Filaments very villous above: anthers nearly glabrous; the cells divergent, the contiguous ones of the upper stamens sterile and connate! Upper fork of the style very short. Nutlets smooth, ovate-compressed, with lateral angles almost winged. Inflorescence simply and loosely leafy-spicate.

* * * Calyx of firmer texture, distinctly 5-10-nerved or striate, 5-10-toothed.

+ Stamens included in the short tube of the corolla, the upper lip of which is merely concave.

43. **MARRUBIUM.** Calyx tubular-cylindrical, strongly ribbed, and with 5 or 10 subulate or spinulose teeth. Tube of corolla included in the calyx; lips short; the upper

erect and narrow, 2-lobed; lower spreading, 3-cleft. Anther-cells more or less confluent. Nutlets ovoid, smooth, obtuse. Leaves rugose.

+ + Stamens ascending under the galeate upper lip of the corolla.

++ Introduced and naturalized from the Old World: stamens not deflexed after anthesis.

44. **BALLOTA**. Calyx funnelform-dilated at the throat or border, 10-nerved, 5-toothed in ours. Corolla nearly as in *Stachys*. Filaments not appendaged.

45. **PHLOMIS**. Calyx tubular, 5-10-nerved, 5-toothed in ours. Upper lip of the corolla strongly galeate; the lower spreading, 3-cleft. Upper pair of stamens (in our species rather longer) furnished with a subulate or hooked appendage at base!

46. **LEONOTIS**. Calyx tubular, 10-nerved, at length incurved above, oblique at the orifice, and with 5 or more unequal spinulose-tipped teeth, the upper one largest. Corolla slender; the upper lip erect or incurved and elongated, entire; lower short and spreading, 3-cleft, its middle lobe not larger. Filaments not appendaged at base: anthers approximate in pairs. Upper fork of the style very short. Flowers densely capitate-verticillastrate.

47. **LEONURUS**. Calyx turbinate, 5-nerved, with nearly equal truncate orifice, and 5 rigid and at length spreading subulate-spinescent teeth. Corolla short; upper lip oblong, entire. Filaments not appendaged: anther-cells parallel or sometimes divergent; valves naked. Nutlets smooth, truncate at apex. Leaves cleft or incised, veiny, all longer than the capitate-verticillastrate flowers.

48. **LAMIUM**. Calyx tubular- or turbinate-campanulate, somewhat 5-nerved, commonly oblique at the orifice; the 5 teeth subulate but not spinescent. Corolla dilated at the throat; upper lip ovate or oblong, fornicate, narrowed at base; lower lip spreading, its lateral lobes truncate down to the throat, or sometimes oblong, and with or without a tooth-like appendage; middle one broad, emarginate, contracted and as it were stipitate at base. Filaments not appendaged: anthers approximate in pairs; their cells oblong, divaricate, sometimes hairy; valves not ciliate. Nutlets truncate at the apex. Leaves mostly cordate.

49. **GALEOPSIS**. Resembles *Lamium* in habit and *Stachys* generally in flowers. But anthers transversely 2-valved; the inner valve of each cell hirsute-ciliate, the outer and larger one naked.

++ ++ Indigenous (chiefly): stamens all or the lower pair sometimes deflexed to the sides of the throat or contorted after anthesis.

50. **STACHYS**. Calyx tubular-campanulate or turbinate, 5-10-nerved, equally 5-toothed, sometimes the upper teeth larger and more or less united. Corolla with cylindrical or cylindraceous tube, not dilated at the throat; upper lip erect, more or less fornicate or concave, sometimes rather thrown back, entire or emarginate; lower spreading, 3-lobed, its middle lobe larger. Filaments naked: anthers approximate in pairs; the cells either parallel or divergent. Nutlets obtuse at the apex, not truncate.

1. **TETRACLÉA**, Gray. (From *τετρά*, four, and *κλείω*, to close, referring to the four distinct or closed nutlets of the fruit: first described as a Verbenaceous genus.) — Single species.

T. Coulteri, Gray. Herb a foot or more high from a perennial root or suffrutescent base, minutely puberulent: leaves petioled, ovate, nearly entire: flowers 2 or 3 on the short axillary peduncles, short-pedicelled, cream-colored, in summer. — *Am. Jour. Sci.* ser. 2, xvi. 98; *Torr. Bot. Mex. Bound.* 134, t. 41; *Benth. & Hook. Gen.* ii. 1220. — Rocky hills, S. W. Texas to Arizona. (Adjacent Mex.)

2. **TRICHOSTÉMA**, Gronov. (**TRICHOSTEMMA** of some.) **BLUE-CURLS**. (From *θρίξ*, hair, and *στίμμη*, for stamen, referring to the capillary filaments.) — Herbs or suffrutescent plants, sweet-aromatic or strong-scented, mostly low; with entire leaves, and commonly blue or violet corolla and stamens: fl. summer: all belonging to the U. S.

§ 1. Calyx very oblique and bilabiate; its 3 upper divisions twice or thrice the length of the lower two and united to above the middle: tube of the corolla shorter than the limb: flowers loose, 1 to 3 on slender bibracteate peduncles, or scattered on paniculate branches; the alar ones, becoming lateral and second or

decurved, appear as if resupinate, and have the two short teeth of the calyx uppermost: cismontane, low and paniculately branched annuals. — § *Streptopodium*, Benth.

T. dichotomum, L. Viscid with rather minute pubescence: leaves oblong or lanceolate-oblong, obtuse, short-petioled: corolla blue or pink, sometimes white: stamens half inch long. — Spec. ii. 598; Bart. Fl. Am. Sept. iii. 93. *T. pilosum*, Roth. — Sandy fields, E. Massachusetts to Kentucky, Texas, and Florida.

T. lineáre, Nutt. Puberulent: leaves linear, sometimes nearly glabrous: stems more slender: corolla rather larger: otherwise similar. — *T. dichotomum*, Roth. *T. brachiatum*, Lam., not L. *T. linearifolium*, Bertoloni, Misc. xiii. t. 2. — Connecticut to Alabama and Louisiana, near the coast, in sandy ground.

§ 2. Calyx campanulate, regular, almost equally 5-cleft (as in *Isanthus*): far western species. — § *Orthopodium*, Benth.

* Tube of corolla not exceeding the calyx.

+ Peduncles (in the manner of the preceding) loosely 1-5-flowered and much longer than the leaves.

T. Arizónicum, Gray. Puberulent, a foot or less high from a ligneous perennial root: leaves ovate or oval, half inch long, short-petioled: pedicels as long as the calyx: bracts minute: calyx-lobes ovate or oblong, sometimes irregularly united: lobes of the blue or whitish corolla 3 to 5 lines long, oblong-spatulate, very much longer than the tube, much shorter than the filaments. — Proc. Am. Acad. viii. 371. *T. dichotomum*, Torr. Bot. Mex. Bound. 134, not L. — S. Arizona, *Wright, Rothrock*.

+ + Peduncles and pedicels short; the inflorescence shorter than the leaves, which are similar to the summit of the stem, and are narrowed at base into short petioles: corolla small and inconspicuous: branching annuals.

T. micránthum. A span high, cinereous-pubescent: leaves lanceolate, not costate-veiny: peduncles about the length of the 3-7-flowered cymule: calyx-lobes little longer than the tube, nearly equalling the (only line long) corolla: stamens moderately exerted. — San Bernardino Co., California, in Bear Valley, *Parry & Lemmon*.

T. oblongum, Benth. A span to a foot high, soft-villous: leaves oblong or oval with narrowed base, membranaceous, costate-veined: glomerate cymules many-flowered, subsessile, villous: calyx-lobes narrow, much longer than the tube, nearly equalling the (3 line) corolla: filaments 4 or 5 lines long. — Lab. 659; Gray, Bot. Calif. i. 606. — Oregon and California to Mariposa Co.

* * Tube of the corolla slender and exerted, longer than the limb: nutlets sometimes tuberculate.

+ Annuals, a span to two feet high, leafy to the summit: leaves nervose-costate: cymes several-many-flowered, when fully developed the pedicels becoming secund-racemose in age: calyx-lobes ovate or triangular-lanceolate: tube of blue corolla about 3 and limb 2 lines long: stamens half an inch longer.

T. láxum, Gray. Diffusely branched, minutely soft-pubescent, rather sparsely leafy: leaves lanceolate and oblong-lanceolate, acuminate-obtusish (2 or 3 inches long), rather slender-petioled: cymes pedunculate, loose. — Proc. Am. Acad. vii. 387, & Bot. Calif. i. c. — California, from Sonoma Co. northward.

T. lanceolátum, Benth. l. c. More strict and simple, with ascending branches from the base: leaves crowded, sessile, lanceolate or the upper almost ovate-lanceolate, gradually tapering from near the broad base to a very acute tip, strongly 3-5-nervose (an inch or more long): cymes subsessile or short-peduncled, dense, mostly undivided: calyx villous: corolla somewhat pubescent. — California, throughout the whole western part of the State, and north to Oregon.

+ + Shrubby, taller: cymes in a naked terminal thyrsus: leaves Rosemary-like.

T. lanátum, Benth. l. c. Very leafy: leaves thickish, narrowly linear and with revolute margins, 1-nerved, glabrate and shining above, canescent-tomentulose beneath, sessile, many fascicled in the axils; uppermost reduced to bracts: thyrsus racemiform, interrupted; cymules short-peduncled or subsessile; whole inflorescence with calyx and even corolla clothed with dense violet or purple wool: corolla half inch long and filaments an inch or more longer. — Torr. Bot. Mex. Bound. 134, t. 40; Gray, Bot. Calif. i. 607. — Rocky places, California, from Santa Barbara southward.

3. **ISÁNTHUS**, Michx. (From ἴσος, equal, and ἄρθος, flower: calyx and corolla nearly regular.) — Single species.

I. cæruleus, Michx. Low and erect annual, somewhat viscid-pubescent, pungently aromatic, copiously branched: leaves oblong-lanceolate or broader, acute at both ends, somewhat petioled: peduncles axillary, 1-3-flowered: corolla blue, 2 or 3 lines long, little exceeding the calyx. — Fl. ii. 3, t. 30. *Trichostema brachiatum*, L. l. c. (Dill. Elth. t. 285.) — Dry or sterile ground, common from Canada to Georgia, Kentucky, and Texas: fl. all summer.

4. **TEÚCRIUM**, L. GERMANDER. (*Teucer*, first king of Troy.) — Less aromatic herbs or undershrubs, mainly of the Old World: fl. summer.

* Erect perennial herbs: leaves undivided: flowers in naked terminal spikes or racemes, short-pedicelled, 1 to 3 to each bract: calyx campanulate, moderately 5-lobed; two lower teeth triangular-subulate; three upper ovate: nutlets globular and with a roundish scar.

T. Canadense, L. Soft-pubescent to canescent-tomentose, 1 to 3 feet high: leaves oblong-ovate to oblong-lanceolate, sharply serrate, short-petioled: spike at length 6 to 12 inches long: flowers short-pedicelled: corolla purple, rose, or sometimes cream-color, half inch long: calyx canescent, sometimes distinctly short-pubescent; the 3 upper lobes very obtuse. — Spec. ii. 564. *T. Virginicum*, L. l. c. (pl. Gronov. Virg.); Schk. Handb. t. 155. — Low grounds, Canada to Texas. (Mex.)

Var. angustatum. Leaves lanceolate, very acutely serrate (2 inches long, 3 to 6 lines wide): pubescence all minute. — Camp Grant, Arizona, *Palmer*.

T. occidentale. Loosely pubescent, more branched, a foot or two high: leaves smaller (1 or 2 inches long), ovate-oblong to broadly lanceolate: corolla 4 or 5 lines long: calyx villous with viscid hairs; upper lobes acute or the middle one acuminate. — Nebraska, (*Hayden*, &c.) to New Mexico (*Fendler*, *Wright*), Arizona (*Palmer*), and on the Sacramento, California (*T. Canadense*, Torr. in Bot. Wilkes), collected there only by the Wilkes Expedition. (*T. inflatum*, Swartz, has a globular fructiferous calyx, with upper lobes obtuse, nutlets angulate ventrally, &c.)

* * Low and diffuse herbs: leaves multifid or incised, having solitary pedicellate flowers in their axils: the uppermost more or less reduced or bract-like: calyx almost 5-parted into subulate-lanceolate equal lobes.

T. Cubense, L. Glabrous or nearly so, branched from the annual root, about a foot high: leaves cuneate; the lower obovate-cuneate or rhomboidal and short-petioled, crenately incised, sometimes 3-5-cleft to the middle; upper sessile, palmately 3-cleft or 3-5-toothed, exceeding the flowers: corolla (pale blue or white, 3 or 4 lines long) hardly exceeding the calyx: nutlets suberosus-thickened, obscurely few-ribbed lengthwise and punctate-impressed between the ribs. — Mant. 80; Jacq. Stirp. t. 183, f. 74, & Obs. t. 30. *T. levigatum*, Vahl, Symb. i. 40. — Texas to S. E. California. (W. Ind., Mex. to Buenos-Ayres.)

T. laciniatum, Torr. Glabrous or hirsute-pubescent, much branched from a lignescent perennial root, a span or so high: leaves pinnately 3-7-parted into narrow linear entire or 2-3-lobed or toothed divisions, rather rigid; the floral much crowded, 3-parted; upper equalling the flowers: corolla (pale blue or lilac, 6 to 10 lines long) with spatulate lower lobe much surpassing the calyx: nutlets not obviously costate. — Ann. Lyc. N. Y. ii. 231; Benth. in DC. Prodr. xii. 578. *T. Cubense*, in part, Torr. Bot. Mex. Bound. 135. — Plains of Colorado to W. Texas and Arizona. (Adjacent Mex.)

5. **ÁJUGA**, L. (Formed of α privative, and ζυγόρ, a yoke, from the seeming absence of a yoke-fellow to the lower lip of the corolla.) — Low herbs of the Old World (Europe to Japan and Australia), one scantily naturalized in a few stations: fl. summer.

A. reptans, L. Perennial, a span or so high, with copious creeping stolons: leaves obovate or spatulate, sometimes repand-sinuate; cauline sessile; lowest and radical with long tapering base; floral approximate, subtending several sessile blue flowers. — Fields, Montreal, Canada, *Maclean*. Saco, Maine, *Goodale*. (Eu., N. Asia.)

6. **ÓCIMUM**, Tourn. (*OCYUM* of some authors.) **BASIL.** (*Ῥαψιον*, the ancient Greek name.) — Sweet-aromatic herbs or suffrutescent plants, of warm regions, largely African and Brazilian.

O. BASILICUM, L., of the Old World, the Sweet Basil, is one of the sweet herbs of the gardens.

O. micránthum, Willd. Glabrate or nearly glabrous low annual: leaves long-petioled, ovate, more or less serrate: flowers in terminal racemes, about 3 to each early deciduous small bract: calyx with large and roundish upper tooth, in fruit the decurrent wing extending down to the short pedicel: corolla white, 2 lines long: filaments separate, naked, toothless. — Enum. 630. *O. Campechianum*, Chapm. Fl., not Mill. — S. Florida, Key West. (W. Ind., S. Am.)

7. **HÝPTIS**, Jacq. (*Ῥυτις*, resupinate, or turned back, referring to the lower lobe of the corolla.) — A large genus in South America, a few species within our borders. Fl. summer.

* Herbs, minutely pubescent or smoothish, not canescent or white-woolly: flowers capitate or spicate: leaves slender-petioled.

H. radiáta, Willd. Stems tall, mostly simple from a perennial root: leaves ovate-lanceolate, toothed, and with entire long-tapering base: axillary peduncles usually shorter than the leaf, bearing a many-flowered soft-puberulent capitate glomerule which is mostly shorter than its involucre of several lanceolate obtuse whitish bracts: calyx campanulate: its teeth lanceolate-subulate and rigid: corolla white, purple-dotted. — Spec. iii. 84; Poit. Ann. Mus. vii. t. 27. *Clinopodium rugosum*, L. — Low ground, from North Carolina towards the coast to Texas.

H. spicigera, Lam. Stem stout, from an annual root, rough-muriculate on the angles: leaves ovate-lanceolate, unequally serrate: flowers in small and sessile glomerules aggregated in dense and narrow spikes (1 to 3 inches long): bracts linear and subulate, equalling the calyx; teeth of the latter subulate, strict, rigid, equalling the small white corolla. — Dict. iii. 185; Desc. Ant. viii. t. 581; Chapm. in Bot. Gazette, iii. 10. — S. Florida, Garber. Perhaps an introduced weed. (W. Ind. to Brazil, Afr., E. Ind.)

H. spicáta, Poit. Stem tall from an annual root, branching, rough-angled: leaves ovate, acuminate, unequally serrate: flowers in small capitate glomerules, which are short-peduncled or sessile, and form interrupted and often paniculate terminal racemes or spikes: calyx cylindrical, with base somewhat inflated in fruit, then much exceeding the bracts; teeth subulate-setaceous, short, strict. — S. Florida. Ann. Mus. Par. vii. 474, t. 28, fig. 2; Benth. in DC. Prodr. xii. 121. — (Mex., S. Am.)

H. POLYSTÁCHYA, HBK., allied to this, is said in Bot. Beechey, 156, but doubtfully, to have been collected in California.

* * Shrubby, at least the calyx and short pedicels white-woolly with many-branched implexed hairs: bracts inconspicuous.

H. Emóryi, Torr. Shrub 5 feet high, lavender-scented, furfuraceous-canescant: leaves ovate, crenate (inch or less long), rather slender-petioled: flowers on pedicels about the length of the lanate-furfuraceous calyx, in axillary short-peduncled cymes, and in denser somewhat paniculate clusters at the end of the branchlets: corolla violet, only 2 lines long. — Bot. Ives Colorad. Exped. 20; Gray, Bot. Calif. i. 591. *H. lanata*, Torr. Bot. Mex. Bound. 129, excl. syn. — Arid region, S. E. California and Arizona. (Adjacent Mex.)

H. ALBIDA, HBK. of Mexico, not yet found within our borders (although a form of *H. Emoryi* has been mistaken for it), has more oblong leaves, and sessile glomerules crowded in terminal naked spikes.

H. LANIFLÓRA, Benth. Bot. Sulph. t. 20, a remarkable species, with rotund and angulate-dentate glabrous leaves on slender petioles, open cymes on filiform peduncles, and very densely long-woolly calyx (the wool dendritic-branched), is known only from Cape San Lucas, in Lower California.

H. TEPHRÓDES, Gray, Proc. Am. Acad. v. 164, from the same place, collected by Xantus, is minutely canescent, except the furfuraceous calyx, and has sessile lanceolate leaves, and paniculate inflorescence.

8. COLLINSÓNIA, L. HORSE-BALM, CITRONELLA. (*Peter Collinson* of London, who corresponded with Linneus and John Bartram, and received from the latter the original species.) — Odorous and large-leaved perennials (of Atlantic North America); with thickened roots or rootstocks, ovate and serrate veiny leaves, mostly on long petioles, and simple or panicled naked terminal racemes of yellow or whitish flowers; mostly only a single naked pedicel to each small bract.

* Fertile stamens 2; upper pair rudimentary or obsolete: calyx-teeth all subulate-acute: flowers in late summer or autumn, on slender pedicels, solitary from the axil of each small subulate bract.

C. scabriúscula, Ait. Glabrate or minutely pubescent, 1 to 3 feet high from a tuberous stock, commonly leafless below: leaves small for the genus (2 or 3 inches long), broadly ovate, often rather scabrous above: corolla 3 or 4 lines long, yellowish or purple-spotted. — Ait. Kew. ed. 1, i. 47 (1789); Benth. Lab. & in DC. Prodr. xii. 253. *C. præcox*, Walt. Car. 65? (1788), but not early flowering. *C. tuberosa*, Michx. Fl. i. 17. *C. scabra*, Pers. Syn. i. 29; Pursh, Fl. i. 20; Ell. Sk. i. 35. *C. ovalis*, Pursh, l. c., from the char.? — Open woods, S. Carolina to Florida and E. Arkansas.

C. Canadénsis, L. (HORSE-WEED, STONE-ROOT, &c.) Glabrous, or the inflorescence glandular-puberulent, 2 to 4 feet high, leafy: leaves ample (4 to 9 inches long), from broadly ovate to oblong, rarely subcordate: racemes amply paniculate: calyx in flower a line, in fruit 4 or 5 lines long: corolla lemon yellow, lemon-scented, 5 or 6 lines long. — Hort. Cliff. t. 5, & Spec. i. 28; Torr. Fl. N. Y. t. 75. *C. decussata*, Mœnch, Meth. 379. *C. ovalis*, Pursh, l. c. & herb., ex Benth. — Rich woods, Canada to Wisconsin and south to Florida, chiefly in the upper country.

Var. punctáta. Inflorescence more puberulent and glandular: leaves minutely tomentose-pubescent beneath and more obviously punctate. — *C. serotina*, Walt. Car. 65. *C. punctata*, Ell. Sk. i. 36. — Rich soil, Carolina and Georgia, towards the coast.

* * Fertile stamens 4, usually 2 ascending and 2 descending: corolla rather broader, about half inch long, viscid-pubescent: flowers earlier.

C. verticilláta, Baldw. Stem a foot high, leafless and glabrous below, at summit bearing two approximate pairs or a seeming whorl of thin and large (3 to 7 inch) ovate coarsely serrate and glabrous leaves: peduncle mostly simple and slender, viscid-pubescent, supporting a single raceme: bracts minute: lower pedicels often in pairs or threes: calyx-teeth all attenuate-subulate: corolla yellow or purplish, Ell. Sk. i. 37; Benth. Lab. & in DC. l. c.; Chapm. Fl. 316. — Rich woods, western part of S. Carolina and Georgia to Tennessee and Mississippi: fl. May.

C. anisáta, Sims. (CITRONELLA, FRENCH TEA.) Copiously viscid-pubescent, or the foliage glabrate, sweet-scented: stem 2 or 3 feet high, leafy: leaves ovate, rarely subcordate, obtusely serrate, veiny, somewhat rugose, 3 to 8 inches long: racemes paniculate: bracts ovate, conspicuous, mostly subtending single short pedicels: upper lip of calyx with very broad and ovate mostly obtuse teeth; those of the lower lanceolate: corolla yellowish or cream-color. — Bot. Mag. t. 1213; Pursh, Fl. i. 21; Ell. Sk. i. 37. — S. Carolina to Alabama and Florida, chiefly in the middle country: fl. summer.

9. MÉNTHA, Tourn. MINT. (*Mínthē*, the ancient Greek name.) — Odorous perennial herbs, mostly spreading by slender creeping rootstocks: calyx naked at the throat in our species. Flowers small, whitish or purplish, glomerate (in summer), not rarely gynodioecious, i. e. some individuals produce female flowers with impotent stamens instead of perfect ones.

* Introduced from the Old World, to which most of the species belong. Many hybrids.

← Inflorescence terminal.

++ Densely capitate glomerules all much crowded in leafless narrow spikes: leaves either sessile or very short petioled.

M. SYLVÉSTRIS, L. (HORSE MINT of Eu.) Finely pubescent or canescent: leaves from ovate-oblong to oblong-lanceolate, acute, sharply serrate, often glabrous above: spikes rather slender, canescently pubescent or cinereous. — Spec. ed. 2, ii. 804; Engl. Bot. ed.

Syme, t. 1022. — Road-sides, &c., Pennsylvania, *Porter*. Also a seeming hybrid between it and *M. viridis*. (Nat. from Eu.)

Var. ALOPECUROIDES, Baker. Intermediate between the above and the next species: leaves larger, more nearly sessile, broadly oval and obtuse, often subcordate, coarsely and sharply serrate, more veiny, but not rugose: spikes usually thicker; bracts broader. — Baker in *Seem. Jour. Bot.* iii. 238; Hook. f. *Fl. Brit. Isl.* 279. *M. alopecuroides*, Hull, ex Smith; *Engl. Bot. ed. Syme*, t. 1021. *M. rotundifolia*, Sole, *Menth. Brit.* t. 4, not L. — Penn. and New Jersey, *Porter, Parker, Leggett*. (Nat. from Eu.)

M. ROTUNDIFOLIA, L. Tomentose-canescens: stem strict: leaves from broadly elliptical to roundish-subcordate, sessile, rugose, rather finely serrate: spikes slender, not canescens. — *Reichenb. Ic. Germ.* t. 1282; *Engl. Bot. ed. Syme*, t. 1020. *M. sylvestris*, Sole, l. c. t. 3, not L. — Atlantic States, at a few stations, Maine to Texas: rare. (Nat. from Eu.)

M. VIRIDIS, L. (SPEARMINT.) Glabrous or nearly so: leaves oblong-lanceolate or oblong, sparsely and sharply serrate: bracts linear-lanceolate and subulate, conspicuous. — Wet ground, in cultivated districts. (Nat. from Eu.)

++ ++ Less capitate glomerules in interrupted leafless spikes, or some in the axils of upper leaves: flowers distinctly pedicellate: leaves distinctly petioled: stems less erect.

M. PIPERITA, L. (PEPPERMINT.) Glabrous, or in one variety somewhat hairy, very pungent-tasted: leaves ovate-oblong to oblong-lanceolate, acute, sharply serrate: spikes narrow, of numerous glomerules. — Along brooks, escaped from cult. (Nat. from Eu.)

M. AQUATICA, L. Soft-pubescent or glabrate, the stem with reflexed hairs: leaves ovate, roundish, or subcordate: spikes oblong and interrupted or capitate, thick: calyx and usually the pedicels hairy. — *M. citrata*, Ehrh.; *Engl. Bot. ed. Syme*, t. 1029 (BERGAMOT MINT), a more glabrous and sweet-odorous variety. — Wet places, New England to Pennsylvania, &c.; rare. (Nat. from Eu.)

Var. CRISPA, Benth. A glabrous or glabrate form, with lacerate-dentate and crisped leaves. — *M. crispa*, L.; *Engl. Bot. ed. Syme*, t. 1028. — Wet ditches, New Jersey, &c. (Nat. from Eu.)

+ + Inflorescence axillary, in dense verticillate glomerules, on stems leafy to the top: leaves more or less petioled, ovate or oblong-ovate, pubescent or glabrate.

M. ARVÉNSIS, L. Leaves obtusely serrate: calyx-teeth deltoid, acute or obtuse, about one-third the length of the campanulate tube: otherwise same as forms of the next, which passes into it. — *Engl. Bot. ed. Syme*, t. 1038. — New England, &c., at a few stations. (Nat. from Eu.)

M. SATIVA, L. Taller, generally more pubescent, the stem with reflexed soft hairs: leaves sharply serrate: calyx-teeth triangular-subulate, half the length of the cylindraceous tube, commonly hairy. — *Engl. Bot. ed. Syme*, t. 1031, 1032. *M. gentilis*, Smith in *Linn. Trans.* v. 208, & *Engl. Bot.* t. 2118, a glabrate variety with only calyx-teeth hairy, and these longer. — Waste damp places, Mass. to Penn.; uncommon. (Nat. from Eu.)

* * Indigenous: inflorescence axillary, consisting of distant sessile verticillate glomerules in the axils of leaves, as in the preceding species, the uppermost axils flowerless.

M. Canadensis, L. Stem often simple: leaves varying from oblong-ovate to oblong-lanceolate, sharply serrate, acute, generally tapering into the petiole: calyx hairy; the short teeth triangular-subulate. — *Spec. ii.* 577. — Wet places, through the Northern U. S. from Atlantic to Pacific, and Canada and Saskatchewan to New Mexico and California. Villous-hairy, with Pennyroyal odor: passes into

Var. glabrata, Benth., with leaves and stem almost glabrous, the former sometimes very short-petioled, and a sweeter scent, as of *Monarda*. — *M. borealis*, Michx. *Fl. ii.* 2. — Similar range.

10. LŶCOPUS, Tourn. WATER HOREHOUND, BUGLE-WEED, GIPSY-WORT. (*λύκος*, wolf, *πούς*, foot, wolf's-foot.) — Perennials, of wet or low ground (northern temperate and Australian). Mint-like, but bitter and only slightly aromatic; with sharply toothed or lobed leaves, and small white or whitish flowers in their axils. in sessile capitate-verticillate glomerules, the uppermost axils flowerless. Fl. summer. — Gray, *Proc. Am. Acad.* viii. 285.

* Stoloniferous: long filiform runners produced in summer from the base of the stem, often tuberiferous at their apex.

+ Calyx-teeth 4, or sometimes 5, obtuse or barely acutish, as also the very short bracts, in fruit shorter than the nutlets.

L. Virgínicus, L. (BUGLE-WEED.) Glabrous or somewhat pubescent: stem obtusely angled, 6 to 24 inches high: leaves ovate or oblong-lanceolate, coarsely serrate in the middle, acuminate at both ends, tapering into a short petiole: calyx-teeth ovate or lanceolate-ovate: sterile stamens minute rudiments. — Spec. i. 21; Raf. Med. Fl. t. 61. *L. uniflorus*, Michx. i. 14 (*L. pumilus*, Vahl, *L. Virg.* var. *pauciflorus*, Benth.), a diminutive and northern few-flowered form, a span high. *L. macrophyllus*, Benth. Lab. & in DC. Prodr. xii. 177 (var. *macrophyllus*, Gray, l. c.), a tall and large-leaved form of Northern Pacific coast. — Labrador to Florida, Missouri, and north-westward to Brit. Columbia and Oregon.

+ + Calyx-teeth 5, or occasionally 4, very acute, in fruit longer than the nutlets.

+ + Bracts minute: corolla nearly twice the length of the calyx: rudiments of posterior stamens very short, oval or lingulate: herbage glabrous or puberulent: stems 6 to 20 inches high.

L. sessilifolius, Gray, l. c. Stem ascending, rather acutely 4-angled: leaves all closely sessile, ovate or lanceolate-oblong (inch or two long), sparsely sharply serrate: calyx-teeth subulate, rigid. — *L. Europæus*, var. *sessilifolius*, Gray, Man. ed. 5, 345. — New Jersey, in pine barrens, late-flowering, *Canby, Parker*.

L. rubellus, Mönch. Stem rather obtusely 4-angled, erect or ascending: leaves ovate-oblong or oblong-lanceolate, sharply serrate in the middle, attenuate-acuminate at both ends (3 inches long), petioled: calyx-teeth triangular-subulate, not rigid-pointed. — Mönch, Meth. Suppl. 446; Fresenius in Regensb. Flora, 1842; Benth. in DC. l. c. *L. obtusifolius*, Vahl? not Benth. *L. Arkansanus*, Fresenius, l. c.: puberulent form, with rather broader triangular-lanceolate less pointed calyx-teeth, the rudiments of sterile stamens varying from lingulate to linear-spatulate. *L. Europæus*, var. *integrifolius*, Gray, Man. l. c. — Penn.: and Ohio to S. Carolina, Louisiana and Arkansas.

+ + Outer bracts conspicuous, very acute, often equalling the flowers: corolla hardly exceeding the calyx: rudiments of sterile stamens slender and capitate or clavate-tipped.

L. lúcidus, Turcz. Stem strict, stout, 2 or 3 feet high, hirsute-pubescent or glabrate, acutely angled above: leaves lanceolate and oblong-lanceolate (2 to 4 inches long), acute or acuminate, very sharply and coarsely serrate with triangular-subulate ascending teeth, sessile or nearly so by an obtuse or acute base, coarsely punctate: calyx-teeth attenuate-subulate. (Siberia, Japan.)

Var. AmericánuS, Gray, l. c. Leaves dull, often minutely puberulent both sides: calyx-teeth less rigid. — Bot. Calif. i. 592. *L. obtusifolius*, Benth. in DC. l. c. ? — Saskatchewan to Kansas, Arizona, and California.

* * Not stoloniferous, but rootstocks more or less creeping: calyx-teeth 5, cuspidate or spinulose-tipped, rigid, nearly equalling the corolla, in fruit surpassing the nutlets: subulate outer bracts often equalling the flowers.

L. sinuátus, Ell. Stem erect, 1 to 3 feet high, acutely 4-angled, glabrous, roughish, or minutely pubescent: leaves oblong or lanceolate ($1\frac{1}{2}$ or 2 inches long), acuminate, irregularly incised or lacinate-pinnatifid, or some of the upper merely sinuate or incisely toothed, tapering at base mostly into a slender petiole: calyx-teeth triangular-subulate and short-cuspidate: rudiments of sterile stamens slender, conspicuous, and with a globular or sub-clavate tip. — Sk. i. 187. *L. Europæus*, Walt. & c. *L. sinuatus*, *exaltatus* & *angustifolius*, Ell. l. c. *L. vulgaris* & *L. angustifolius*, Nutt. Gen., without char. *L. Europæus*, var. *sinuatus*, Gray, Man. l. c. — N. Canada to Florida, Texas, and west to Oregon and N. California.

L. EUROPEUS, L., has less acutely angled stems, mostly broader and shorter subsessile leaves with less unequal teeth or lobes, subulate-spinulose calyx-teeth, and rudiments of sterile stamens obsolete or minute. — Occurs as a ballast-weed at Norfolk and Philadelphia, *Durand, Parker*. (Probably not yet nat. from Eu.)

11. CUNÍLA, L. DITTANY. (An ancient Latin name of some Labiate plant, applied by Linnæus to a small American genus.) — Perennials, with small purplish flowers, in summer. (Gray, Proc. Am. Acad. 8, 365.)

C. Mariána, L. Herbaceous, cymosely much branched, a foot high, glabrous except the nodes: leaves nearly sessile, ovate with subcordate or rounded base, serrate, much punctate.

tate: flowers in peduncled loose cymes, rudiments of the upper pair of stamens generally apparent. — Spec. ed. 2, i. 30; Bart. Med. Bot. t. 42; Lodd. Bot. Cab. t. 1205; Sweet, Brit. Fl. Gard. t. 243; Torr. Fl. N. Y. t. 76. *Satureia origanoides*, L., ed. 1. — Dry soil, S. New York and Ohio to Georgia.

12. **HYSSÓPUS**, Tourn. **Hyssop.** (The ancient name, from a Hebrew word.) Only one species.

H. officinális, L. Perennial herb, with somewhat woody base, virgate branches, lanceolate or linear entire leaves, and blue-purple flowers in small spiked clusters, in summer. — Sparingly on roadsides eastward, and in California, escaped from gardens. (Nat. from Eu. and Asia.)

13. **PYCNÁNTHEMUM**, Michx. **MOUNTAIN MINT** or **BASIL**. (From *Πεννός*, dense, *ἄνθος*, blossom: glomerate inflorescence.) — Perennial erect herbs (all N. American, and all but one eastern), pleasantly pungent-aromatic, branching above; with capitate-verticillastrate glomerules or dense cymes (commonly multibracteate) in the upper axils, or mainly cymosely terminal; flowers small, whitish or purplish, often purple-dotted, in summer. — Michx. Fl. ii. 7, with *Brachystemum*, l. c. 5; Gray in Am. Jour. Sci. xlii. 44.

§ 1. Flower-clusters naked in a terminal corymbose cyme, small, rather dense; the proper bracts minute and loose: calyx short-tubular; the teeth equal: leaves sessile and small.

P. nudum, Nutt. Nearly glabrous; stem strict, 2 feet high: leaves oval, nearly entire, less than inch long, shorter than the internodes: calyx-teeth triangular, villous. — Gen. ii. 34. — Low pine barrens, N. Carolina? to Florida, Alabama, &c.

§ 2. Flowers densely verticillastrate-cymose or glomerate, usually conspicuously much bracted: calyx oblong or short-tubular. (Many of the species difficult of discrimination, perhaps on account of hybridizing.)

* Bracts and equal calyx-teeth aristate-tipped, rigid, naked, equalling the corolla: leaves slightly petioled, rather rigid.

P. aristatum, Michx. Minutely soft-puberulent, mostly canescent: leaves ovate- and lanceolate-oblong, sparingly denticulate; flower-clusters dense or capitate, terminal. — Fl. ii. 8, t. 33. *P. verticillatum*, Pursh, not Michx. *P. setosum*, Nutt. in Jour. Acad. Philad. vii. 100. *Origanum incanum*, Walt. — Pine barrens, New Jersey to Florida and Louisiana.

Var. hyssopifolium, Gray, l. c. (*P. hyssopifolium*, Benth.): leaves narrowly oblong or almost linear, nearly entire, obtuse. — Virginia to Florida.

* * Bracts and equal (or later species nearly equal) and similar calyx-teeth not aristate.

+ Leaves linear or lanceolate, nearly sessile, entire, mostly glabrous, very numerous throughout the stems and copious branchlets: capitate glomerules small and numerous, densely fastigiate-cymose, copiously imbricated with short appressed rigid and subulate-pointed or acute bracts, which do not exceed the equally 5-toothed calyx: lips of the corolla very short. (*Brachystemum Virginicum*, Michx.)

P. linifolium, Pursh. Glabrous up to the canescent inflorescence, 2 feet high, slender: leaves linear, somewhat 3-nerved: bracts subulate or cuspidate-tipped from a broad base: calyx-teeth lanceolate-subulate, rigid-pointed. — Fl. ii. 409. *Satureia Virginiana*, L., as to syn. Pluk. *Kallia capitata*, Mench, Meth. 408. *Brachystemum linifolium*, Willd. Enum. 623. *Pycnanthemum tenuifolium*, Schrad. Hort. Gott. 10, t. 4. — Dry ground, Massachusetts to Illinois, Florida, and Texas.

P. lanceolatum, Pursh, l. c. Stem stouter and somewhat pubescent: inflorescence villous-canescens: leaves lanceolate or almost linear, nervose-veined, obtuse at base: bracts ovate or lanceolate: calyx-teeth ovate-deltoid, merely acute. — *Satureia Virginiana*, Herm. Parad. t. 218; L. Spec. ii. 567. *Thymus Virginicus*, L. Mant. 409. *T. lanceolatus*, Poir. Suppl. v. 305. *Nepeta Virginica*, Willd. Spec. iii. 56. *Brachystemum lanceolatum*, Willd. Enum. 623. *Pycnanthemum Virginicum*, Pers. Syn. ii. 128. — Dry ground, Mass. and Canada to Nebraska and Georgia.

+ + Leaves from lanceolate to ovate sessile, or almost so, denticulate or sometimes entire, pinnately veined; flowers in larger and fewer less dense heads: verticillastrate glomerules, subtended by fewer and looser bracts.

P. Califórnicum, Torr. Usually tomentose-canescant, rather stout: leaves ovate-lanceolate or almost ovate, with rounded or subcordate sessile base; glomerules terminal and in the axils of 2 or 3 uppermost pairs of leaves, at first very dense (6 to 12 lines in diameter): bracts setaceous, lax: teeth of the calyx lanceolate-triangular, villous, 3 or 4 times shorter than the cylindraceous tube. — Jour. Acad. Philad. n. ser. ii. 99, & Pacif. R. Rep. iv. 122; Gray, Bot. Calif. i. 592. California and borders of Nevada. Passes into

Var. glabellum, not canescent: leaves and stems from pubescent to almost glabrous: inflorescence less dense. — Torr. l. c. — Upper Sacramento, *Bigelow, Brewer, &c.*

P. míticum, Pers. l. c. Puberulent, cinereous-pubescent, or glabrate but pale, much branched: leaves from lanceolate to ovate, subsessile, rather rigid, commonly obtuse at base; those subtending the (sometimes proliferous) dense capitate glomerules canescent: calyx-teeth ovate-deltoid or triangular-lanceolate, acute. — *Brachystemum míticum*, Michx. Fl. ii. 6, t. 32. *Pyc. Arkansanum*, Fresenius in Regensb. Flora, 1842, 325. — Maine to Florida and Arkansas. — *Brachystemum verticillatum*, Michx. l. c. t. 31 (coll. at Pittsburgh, Penn.), is intermediate between the typical (eastern) plant, with short bracts, shorter and broader calyx-teeth, and leaves glabrate or minutely cinereous, and

Var. pilósum. Cinereous with looser pubescence: leaves thinner, oblong-lanceolate, mostly acute or acutish at base, sometimes ovate (Memphis, *Fendler*): bracts and especially the rather narrower calyx-teeth canescent with more copious often villous pubescence. — *P. pilosum*, Nutt. Gen. ii. 33; Gray, l. c. — Ohio to Illinois and Arkansas. — Calyx often (but inconstantly) somewhat unequal, two or three of the teeth more united.

P. léptodon. Soft-pubescent, or glabrate below, loosely branched, tall: leaves membranaceous, green ($1\frac{1}{2}$ or 2 inches long), lanceolate or oblong-lanceolate, subsessile: glomerules larger and looser than in the preceding, canescent-hirsute: long-acuminate bracts and calyx-teeth slender-subulate, villous-hirsute. — *P. pilosum*, var. ? *leptodon*, Gray in Am. Jour. Sci. l. c. — North-western N. Carolina and S. Missouri, *Gray & Carey, Geyer*. — Perhaps a hybrid between *P. míticum*, var. *pilosum*, and *P. Tullia*, var. *dúbium*.

+ + + Leaves linear- or oblong-lanceolate, short-petioled, not even the uppermost canescent: flowers in mostly terminal capitate glomerules, which are dense even in fruit: calyx almost or quite equally 5-toothed, canescently pubescent, the teeth subulate. (Ambiguous species.)

P. Torrési, Benth. Puberulent: stem strict, corymbose at summit; leaves narrowly lanceolate, green, glabrate, entire or slightly and sparingly denticulate: heads cymose-corymbd, small; the bracts subulate, mostly appressed: corolla rather large. — Prodr. l. c. 188. *P. Virginicum*, Nutt. Gen. l. c. ? — Dry ground, S. New York to Pennsylvania.

P. clinopodioides, Gray, l. c. Pubescent: leaves broadly or oblong-lanceolate, sharply denticulate or sometimes entire: heads fewer and larger: bracts loose. — Dry soil, S. New York to E. Pennsylvania.

* * * Calyx distinctly bilabiate through the union of three teeth to form the upper lip: the teeth and the tips of the loose bracts if slender not rigid: flowers in dense flattened glomerate cymes, which are usually expanded with age: leaves membranaceous, mostly serrate, distinctly petioled, the uppermost more or less canescent: stems loosely branching.

P. Túllia, Benth. Rather stout, loosely more or less pubescent: leaves ovate- or lanceolate-oblong, acuminate, obtuse or acutish at base, somewhat serrate, thin (2 to 4 inches long), pale green both sides, only the uppermost tomentulose-whitened: calyx-teeth aristiform-subulate, equalling the tube in length, above and the long-attenuate tips of the bracts setose-barbate. — Lab. 328, & in DC. l. c. i. 87. *Tullia Pycnanthemoides*, Leavenworth in Am. Jour. Sci. xx. 243, t. 5. — S. Virginia and N. Carolina to Tennessee and Georgia, chiefly in and near the mountains.

Var. dúbium. Greener, not canescent, except the setose-villous bracts and calyx; the teeth of the latter shorter than the tube: leaves lanceolate. — *P. dubium*, Gray, l. c. — Ashe Co., N. Carolina, *Gray & Carey*. Perhaps a hybrid between *P. Tullia* and *P. leptodon*, or even *P. míticum*, var. *pilosum*.

P. incánium, Michx. l. c. Cinereous-pubescent: leaves ovate-oblong, with obtuse or rounded base, serrate (2 to 4 inches long), the lower surface or both surfaces of the uppermost canescent, at least when young, and with more or less loose or villous pubescence: calyx-teeth subulate or triangular-lanceolate and cuspidate or pointed, not exceeding half

the length of the tube, often bearing one or two bristle-like hairs. — *Clinopodium incanum*, L. Spec. ii. 588. *Origunum punctatum*, Poir. *Pycnanthemum Loomisii*, Nutt. in Jour. Acad. Philad. vii. 100; form approaching the next. — New England and W. Canada to Ohio, and south to Florida and Louisiana.

P. albescens, Torr. & Gray, l. c. Stems slender, puberulent, all the parts smaller leaves oblong- or ovate-lanceolate, obscurely serrate, small (inch or so long), canescent beneath and the uppermost on both sides with a minute close pubescence, as also are the short and beardless calyx and bracts; teeth of the former short, triangular-ovate, obtuse. — Am. Jour. Sci. l. c. *P. incanum*, var. *albescens*, Chapm. Fl. 316. — Alabama and Florida to Texas.

§ 3. Flowers densely verticillastrate-capitate; the globose glomerules sessile and solitary at the summit of the stem and in some of the upper axils, copiously and conspicuously bracteate: calyx tubular; the short teeth nearly equal: aspect somewhat of *Monarda*.

P. montanum, Michx. Sweet-aromatic, glabrous or nearly so: leaves ovate- or oblong-lanceolate, acuminate, acutely serrate, membranaceous (2 to 4 inches long), short-petioled: bracts thin, lanceolate, long-acuminate, villous-ciliate: calyx-teeth triangular-subulate, naked, very much shorter than the narrow tube. — Fl. ii. 8; Gray, l. c. *Monardella montana*, Benth. Lab. 331. *Monarda gracilis*, Pursh, Fl. i. 17? — Moist woods, Alleghany Mountains, S. Virginia and Tennessee to Georgia and Alabama.

14. MONARDÉLLA, Benth. (Diminutive of *Monarda*, which this wholly western American genus resembles in aspect, inflorescence, and calyx; while in the rest of the flower it is near *Pycnanthemum*.) — Flowers in terminal and solitary verticillastrate heads, subtended or involucrate by broad often membranaceous and colored bracts: corolla red, rose, purple, or rarely white. Pleasantly aromatic fragrant herbs, mostly entire-leaved. — Benth. Lab. 331, & in DC. Prodr. xii. 190; Gray in Proc. Am. Acad. xi. 100.

§ 1. Flowers large and comparatively few, rather loosely glomerate: tube of corolla much longer than the limb: anther-cells oval-oblong, divaricate: root perennial.

M. macrantha, Gray. A span high from creeping suffrutescent rootstocks, puberulent or pubescent: leaves subcoriaceous, ovate, obtuse, glabrate, 5 to 10 lines long, slender-petioled: heads 10-25-flowered, with lax and thin ovate or oblong obtuse bracts: calyx-teeth lanceolate, acute: corolla very much exerted, inch and a half long, scarlet, with tube slightly trumpet-shaped, and comparatively small lanceolate lobes only 3 or 4 lines long. — Proc. Am. Acad. l. c. & Bot. Calif. i. 593; Hook. f. Bot. Mag. t. 6270. — San Diego Co., California, *Cleveland, Palmer*. Also, in a more foliaceous and less showy form (taller, more hirsute-pubescent, with leaves thinner and a full inch long, and flowers rather smaller), San Bernardino Co., *Parry & Lemmon*.

M. nána, Gray, l. c. Hirsute-pubescent, a span high: leaves and heads nearly of the preceding: corolla slender, less than an inch long, white tinged with rose; pubescent tube, little exceeding the calyx. — S. California, in mountains behind San Diego, *Cleveland*.

§ 2. Flowers smaller, more numerous, and densely capitate: calyx only a quarter or a third of an inch long: tube of the corolla little exerted and little longer than the limb: anther-cells shorter and less divaricate.

* Perennials, in tufts, often slightly lignescent at base: corolla from whitish or flesh-color to rose-purple; the lobes linear: calyx-teeth lanceolate or triangular-lanceolate, merely or hardly acute, soft. (Seemingly transitional forms occur between all but the first species.)

+ Leaves from ovate to lanceolate, petioled, more or less obviously pinnately veined: bracts obtuse and pointless.

M. hypoleúca. Pubescent, a foot or two high: leaves densely tomentose-canescant beneath, silvery-white when young, glabrate and green above, ovate-oblong, obtuse, entire,

an inch or two long, all distinctly petioled; veins conspicuous, impressed above: heads large: bracts orbicular and ovate, nervose. — S. E. California, San Bernardino Co., *Parry & Lemmon*.

M. villósa, Benth. Soft-pubescent, or the heads and lower face of leaves villous, or sometimes the whole herbage glabrate, a span to a foot high: leaves ovate, 5 to 14 lines long, all petioled, from sparsely crenate-dentate to nearly entire: veins conspicuous, widely spreading: bracts ovate, foliaceous, more or less pinnately veined. — Lab. 332, Bot. Sulph. t. 21, & DC. l. c. 190; Gray, Bot. Calif. i. 592. — Woods and banks, nearly throughout the western part of California, especially along the coast. Leaves in the typical form often tomentose beneath.

Var. leptósiphon, Torr. A rather large-flowered form, cinereous with a finer pubescence, and ovate-oblong or ovate-lanceolate nearly entire leaves. — Bot. Mex. Bound. 129. — In the central part of the State.

Var. glabélla, Gray. Minutely cinereous-pubescent or puberulent, or glabrate, except the head: leaves oblong, entire or barely and sparingly denticulate; upper ones sometimes subsessile: veins much less conspicuous. — Bot. Calif. l. c. *M. Sheltoni*, Torr. in Jour. Acad. Philad. n. ser. ii. 99. — Pine woods, through the Sierra Nevada and valley of the Sacramento. There are transitions to the next.

M. odoratíssima, Benth. l. c. Cinereous-puberulent or minutely tomentulose, or nearly glabrous, but pale; a span to a foot high: leaves from narrowly oblong to broadly lanceolate, entire or nearly so, short-petioled, or the upper subsessile, firm in texture, both sides alike; the veins inconspicuous or obscure: bracts thin-membranaceous and colored (whitish or purple), nervose: calyx-teeth (as in the preceding) hirsute without and within: odor of Pennyroyal. — Dry hills, Washington Terr., Oregon, and through the higher mountains of California, Nevada, and Utah.

+ + Leaves linear or oblong-linear, entire, thickish and nearly veinless, half to two-thirds inch long, subsessile, or the lower oblong and petioled and with a few veins.

M. linóides, Gray. Canescent or cinereous with an almost imperceptible puberulence: stems a span to 18 inches high, strict and rigid: bracts ovate, mucronate-acute, scarious-membranaceous and white with pinkish, pinnately nervose: calyx-teeth narrowly lanceolate, merely pubescent: odor of Bergamot. — Proc. Am. Acad. & Bot. Calif. l. c. — Southern California, in mountains of San Diego Co. and on the Mohave, *Cleveland, Palmer, Parry & Lemmon*, &c.

M. Pálmeri. Glabrous and green, or obscurely puberulent up to the pubescent and proportionally large head, a span high: bracts ovate, very obtuse, more nervose, otherwise as in the preceding: calyx-teeth linear-lanceolate. — San Luis Obispo Co., California, under Redwoods in the Santa Lucia mountains, *Palmer*.

* * Annuals: from a span to a foot or more high, loosely branching: leaves entire or merely undulate, more distant, narrowed at base into a petiole: calyx-teeth mostly with rather strong marginal nerves.

+ Bracts rigidly cuspidate-acuminate, white and transparent-scarious, except the nerves or veins: corolla bright rose or purple.

M. Douglásii, Benth. l. c. Pubescent: leaves lanceolate: bracts ovate and ovate-lanceolate, tapering gradually into the cusp, more or less hirsute, fenestrate, the pinnate spreading greenish veins running from midrib to stout marginal nerves, forming a firm frame for the hyaline and silvery interspaces: teeth of the hirsute calyx rigid and subulate: scent strong. — *M. candicans*, var. *venosa*, Torr. in Pacif. R. Rep. iv. 123. — California, through the valley and westward.

M. Bréweri, Gray. Puberulent: leaves ovate-oblong: bracts broadly ovate, abruptly cuspidate-pointed, less translucent, and with slender more nervose and whitish veins, only those of the outermost bracts strongly pinnate, destitute of strong marginal nerves: calyx-teeth triangular-subulate, merely acute. — Proc. Am. Acad. vii. 386, xi. 102, & Bot. Calif. i. 594. — California, in Corral-Hollow, Contra-Costa Co.

+ + Bracts acute or obtuse: nervose, less translucent or the outer herbaceous: corolla rose-color or purple: calyx-teeth not subulate, short.

M. lanceoláta, Gray. Green and almost glabrous, or the stem puberulent: leaves oblong-lanceolate or narrower, tapering into a slender petiole; the uppermost and the ovate or ovate-lanceolate bracts acute; the latter with cross-veinlets between the nerves or

primary veins: calyx-teeth acutish, glabrate outside, densely hirsute within. — Proc. Am. Acad. xi. 102, & Bot. Calif. l. c. — California, common nearly through the State except on mountains.

M. unduláta, Benth. l. c. Cinereous-pubescent or glabrate: leaves spatulate-oblong to oblanceolate or linear with tapering base, obtuse, undulate-margined: heads mostly villous or pubescent: bracts broadly ovate, thin, whitish-scarious, obtuse, no cross-veinlets between the parallel nerves: calyx-teeth villous, obtuse: "odor of peppermint." — Gray, l. c. — California, near the coast.

+ + + Bracts obtuse or obtusely and slightly acuminate, broadly ovate, more or less white-scarious, nervose, and with some cross-veinlets between the nerves: corolla white or nearly so, small and short, not over 3 or 4 lines long: calyx-teeth villous and with white-scarious tips: herbage cinereous or canescent.

M. cándicans, Benth. Soft-puberulent, cinereous, but hardly canescent: leaves lanceolate or narrowly oblong, obtuse, tapering into a slender petiole: bracts minutely pubescent outside, ovate, greenish along the numerous nerves, at least the tip and margins white-scarious, shorter than the flowers: calyx-teeth short, rather broad and obtuse, villous both sides. — Pl. Hartw. 330; Gray, l. c. — California, valley of the Sacramento and foothills of the neighboring Sierra Nevada.

Var. exilis. Smaller: bracts mostly with a short scarious acumination: calyx-teeth acute. — S. E. California or adjacent Arizona, *Palmer*.

M. leucocéphala, Gray. Low, much branched, cinereous-pubescent: leaves oblong or broadly lanceolate, short-petioled: bracts ovate-orbicular with slight acumination, wholly thin-scarious and bright white, lightly nervose and with very sparing cross-veinlets (about 4 lines long and broad): calyx hirsute; the teeth attenuate-subulate. — Proc. Am. Acad. vii. 385, xi. 102, & Bot. Calif. l. c. — California, on the plains near Merced, in sandy soil, *Brewer*.

15. ORÍGANUM, Tourn. WILD MARJORAM. (Ancient Greek name, from ὄρος, a mountain, and γάρος, delight.) — Old World plants, one introduced.

O. vulgáre, L. Branching erect perennial, villous: leaves ovate, petioled: short spiciform branches of the cymes densely paniced, crowded with ovate and obtuse purplish-colored bracts: corolla purple. — Roadsides, Atlantic States: fl. summer. (Sparingly nat. from Eu.)

16. THÝMUS, Tourn. THYME. (Classical name, perhaps from θύω, to burn perfume, Thyme having been used for incense.) — Low and small-leaved and small-flowered perennials, with persistent often somewhat woody base; fl. summer. Old World genus, one species introduced.

T. serpyllum, L. (CREEPING THYME.) Prostrate-tufted: leaves green, flat, ovate, entire, veiny, more or less ciliate, short-petioled, 2 to 4 lines long, the floral ones similar: flowers crowded at the end of the ascending branches, purplish. — Old fields, E. Massachusetts and Pennsylvania. (Sparingly nat. from Eu.)

17. SATURÉIA, Tourn. SAVORY. (Ancient Latin name.) — Small-leaved and low plants, sweet aromatic; the genuine species all of the Old World; the single American one almost generically distinct.

§ 1. **Satureia** proper. Bracts of the loose inflorescence small or none: calyx mostly equalling the tube of the corolla: fl. summer.

S. horténsis, L. (SUMMER SAVORY.) Annual, much branched, minutely pubescent: leaves oblong-linear or lanceolate, tapering at base: flowers in axillary clusters, above becoming interruptedly spicate: corolla short, pale purplish: stamens short. — Cult. as a sweet-herb; escaping from gardens is sparingly wild in Ohio, Illinois, Nevada, &c. (Nat. from Eu.)

§ 2. **Pycnothýmus, Benth.** Flower-clusters crowded in a terminal oblong head or spike, conspicuously bracteate: bracts as long as the corolla: calyx very small, thin, much shorter than the slender tube of the corolla: fl. spring.

S. rigida, Bartram. Cespitose-procumbent, suffrutescent: leaves crowded, rigid, subulate-lanceolate, with strongly revolute margins, obtuse, quarter inch long, scabrous or becoming smooth, above passing into the broader and flatter villous-hirsute bracts: calyx equally and deeply 5-cleft, membranaceous: corolla light purple; the tube (3 lines long) much shorter than the lips: filaments at length exserted. — Benth. Lab. 354, & DC. Prodr. xi. 211. — E. Florida, in sand.

18. MICROMÉRIA, Benth. (*Μικρός*, small, and *μέρος*, a part, from small size of flowers, &c.) — Chiefly of the Old World. Our two species, of the section **HEPEROTHYMUS**, are diffusely spreading or creeping perennial herbs, with slender stems, rounded and petioled veiny thin leaves, and 1 to 3 slender-pedicelled purplish flowers in their axils; in summer. To these an anomalous Californian species is added.

M. Bróunei, Benth. Glabrous, or nearly so: leaves roundish, obscurely crenate: pedicels bractless: calyx villous in the throat; teeth lanceolate-ovate. — Lab. 372; Schmidt in Fl. Bras. viii. t. 32. *Thymus Brownei*, Swartz. — River-banks, Florida. (W. Ind., S. Am.)

Var. pilosiuscula, with leaves (perhaps shorter-petioled) and sometimes stem and calyx sparsely pilose-pubescent: passes into *M. Xalapensis*, Benth., and as such is enumerated in Bot. Mex. Bound. 129. — Texas, near San Antonio (*Thurber*), and southward. (Mata-moras, *Berlandier*, Mex., &c.)

M. Douglásii, Benth. l. c. (*YERBA BUENA*.) Somewhat pubescent: trailing and creeping stem elongated: leaves broadly ovate or roundish: pedicels 2-bracteolate below: calyx naked in the throat; the teeth subulate. — *M. barbata*, Fisch. & Meyer. *Thymus Douglasii* & *T. Chamissonis*, Benth. in Linn. vi. 80. — Woods, Vancouver's Island to Los Angeles Co., California.

M. purpúrea, Gray. Erect, much branched, probably from an annual root, minutely and loosely pubescent: leaves short-petioled, lanceolate, acuminate, acutely serrate (inch long), with dense umbelliform cymes subsessile in their axils: calyx oblong-campanulate, a line and a half long, about equalling the pedicels, naked in the throat; teeth slender-subulate, almost equalling the small "purple-blue" corolla. — Bot. Calif. i. 595. *Hedeoma purpurea*, Kellogg in Proc. Calif. Acad. v. 52. (All 4 stamens antheriferous.) — Webb's Landing on an island in the San Joaquin River, California, Kellogg.

M. BRACTEOLÁTA, Benth. l. c., founded on "*Hedeoma bracteolata*. Pubescent, stem simple, slender: leaves linear-sublanceolate, acute at each extremity, entire: pedicels setaceously bracteolate, 3-5-flowered: calyx oblong, equal: corolla minute? In Carolina." — Nutt. Gen. Addend. This is wholly obscure.

19. CALAMÍNTHA, Tourn., Mœnch. **CALAMINT.** (Old Greek name of some plant of this order.) — Herbs or undershrubs, chiefly of warm-temperate regions, of various habit, flowering all summer. Ours are perennials, and are various in habit.

C. PÁLMERI, Gray, Proc. Am. Acad. xi. 100, an annual, of the *Acinos* section and the habit and odor of *Hedeoma*, belongs to Lower California, much beyond our limits.

§ 1. Flowers loose, and without long-subulate bracts: calyx in ours usually villous in the throat: anthers naked.

* Herbaceous, small-flowered: corolla pale purple or nearly white.

+ Introduced, pubescent: peduncles short but mostly distinct, several-flowered: calyx conspicuously villous in the throat.

C. NÉPETA, Link. (**BASIL THYME**.) Villous- or cinereous-pubescent, 1 to 3 feet high: leaves roundish-ovate, crenate (half inch long), short-petioled; uppermost reduced to bracts: bractlets minute: corolla 4 lines long. — Benth. Lab. & in DC. xii. 228. *Melissa Nepeta*, L. *Thymus Nepeta*, Smith, Engl. Bot. t. 1414. — Dry waste grounds, from Maryland to Arkansas. (Nat. from Eu.)

C. OFFICINÁLIS, Mœnch, Meth. 409, the common Calamint of Europe, is inclined to escape from cultivation in a few places.

+ + Indigenous on wet limestone river-banks, glabrous or nearly so, except a villous ring in the throat of the calyx: common peduncles in the axils hardly any: pedicels 1 to 5: conspicuous bracts at their base subulate-acuminate: petioles short or none.

C. glabélla, Benth. Stems lax or decumbent, a foot or two long: leaves oblong or broadly lanceolate with tapering base; the larger ones serrate: axils 3-5-flowered: calyx-teeth of both lips attenuate-subulate: corolla nearly half inch long, barely twice the length of the calyx. — DC. Prodr. xii. 230. *Cunila glabella*, Michx. Fl. i. 13. *Zizophora glabella*, Rœm. & Sch. Syst. i. 209. — Banks of the Tennessee near Nashville (*Michaux*) and of the Kentucky River near Frankfort, *Short & Peter*.

C. Nuttállii, Benth. l. c. Stems slender, branching, erect or ascending, a span or two high, copiously stoloniferous at base: leaves entire, thickish and veinless, with slightly revolute margins; cauline linear or the lower spatulate, sessile, 5 to 9 lines long; those of the creeping stolons ovate and orbicular, short-petioled, 2 or 3 lines long: flowers 1 to 3 in the axils: corolla a third of an inch long, fully twice the length of the calyx. — Gray, Man. ed. 1 (1848), 325. *Hedeoma glabra*, Nutt. Gen. i. 16. *H. Arkansana*, Nutt. in Trans. Am. Phil. Soc. n. ser. v. 186. *Cunila glabra*, Torr. Fl. 23. *Micromeria glabella* (mainly) & *M. Arkansana*, Benth. Lab. 730, 871. *M. glabella*, var. *angustifolia*, Torr. Fl. N. Y. ii. 67. *Calamintha glabella*, var. *Nuttallii*, Gray, Man. ed. 2, 307, ed. 5, 349. — Niagara Falls to Lake Superior, S. Missouri to Texas.

* * More or less woody or shrubby at base: a foot or two high: lips of the calyx-teeth more unequal; the broader upper one barely and mostly obtusely 3-toothed.

C. Caroliniána, Sweet. Nearly glabrous: leaves ovate, obtuse, somewhat crenate (6 to 14 lines long), abruptly narrowed into a short petiole: flowers few or several in the axils, in a crowded subsessile cyme: bracts foliaceous: calyx oblong, strongly striate, very villous in the throat, scarcely gibbous: corolla pink-purple or whitish and purple-spotted, half inch long; the upper lip somewhat concave and incurved. — Hort. Brit. 809; Benth. in DC. Prodr. l. c. 229. *Thymus Carolinians*, Michx. ii. 9. *T. grandiflorus*, Sims, Bot. Mag. t. 997. *Melissa Caroliniána*, Benth. Lab. 388. — Dry ground, N. Carolina to Florida.

C. coccínea, Benth. l. c. Very minutely cinereous-puberulent or glabrous, bushy: branches virgate: leaves obovate or cuneate-oblong, obtuse, subsessile, entire or obscurely crenate, with somewhat revolute margins, thickish, veinless, about half inch long: short peduncles 1-3-flowered: corolla scarlet, narrow, inch and a half long; the lips much shorter than the tube. — *Melissa coccínea*, Spreng. Syst. ii. 224. *Cunila coccínea*, Nutt.; Hook. Exot. Fl. t. 163. — *Gardoquia Hookeri*, Benth. Lab. 401; Bot. Reg. t. 1747; Brit. Fl. Gard. ser. 2, t. 271. *Satureia coccínea*, Bertol. Misc. viii. 23. — Sandy soil, W. Florida to Mobile, Alabama, near the shore; flowering late.

C. dentáta, Chapm. Tomentulose-cinereous, diffusely branched: leaves obovate or somewhat cuneate, few-toothed at the rounded apex, subsessile, canescent and obscurely veined beneath: flowers solitary or in threes, short-pedicelled: calyx shorter than in the preceding; the short obscurely 3-toothed upper lip tinged with purple; subulate teeth of the lower lip hairy: "upper stamens abbreviated, sterile." — Fl. 118. — Sand ridges near Aspalaga, W. Florida, *Chapman*. In foliage, &c. much resembles *C. coccínea*, apparently smaller-flowered: no perfect corolla seen.

* * * Herbaceous to the base? and large-flowered: calyx less bilabiate; the teeth of the upper lip very like those of the lower: corolla orange.

C. mimuloides, Benth. Tall, somewhat viscidly hirsute: leaves ovate, coarsely serrate, membranaceous, on slender petioles: flowers mostly solitary in the axils, on slender pedicels foliaceous-bracteate at base: calyx tubular (8 lines long), nearly naked in the throat; the teeth cuspidate from a broad ovate or triangular base, equal in length, those of the upper lip spreading: corolla inch and a half long, with a narrow tube twice the length of the calyx. — Pl. Hartw. 33. — California, on shady banks of Carmel River, near Monterey, *Hartweg*.

§ 2. **CLINOPÓDIUM, Benth.** Flowers verticillastrate-capitate, and as it were involucrate with conspicuous setaceous-subulate rigid bracts: calyx nearly naked in the throat: anthers naked.

C. Clinopódium, Benth. (BASIL.) Herbaceous, hirsute: leaves ovate, obtuse, almost entire, petioled: verticillastrate heads globular, many-flowered: teeth of the narrow tubu-

lar and gibbous calyx and the bracts very hirsute, nearly equalling the light purple narrow corolla. — *Clinopodium vulgare*, L.; Smith, Engl. Bot. t. 1401. — Borders of thickets and fields, common northward, and seemingly introduced: indigenous from the Great Lakes to the Rocky Mountains. (Eu., Asia.)

20. MELÍSSA, Tourn. BALM. (Greek name of the honey-bee, transferred to a plant the blossoms of which are sought by bees.) — Herbs, of the Old World, only one common species.

M. OFFICINÁLIS, L. (COMMON BALM.) Upright or spreading and branching perennial, pubescent; with broadly ovate or cordate crenate-toothed lemon-scented leaves, and loose axillary cymes of white or whitish flowers; in summer. — Escaped from gardens to waste grounds, eastward. (Sparingly nat. from Eu.)

21. CONRADÍNA, Gray. (Named in memory of *Solomon W. Conrad*, of Philadelphia, botanist, and publisher of his friend Muhlenberg's works.) — Proc. Am. Acad. viii. 244. — Founded on a single species; with leaves resembling Rosemary.

C. canescens, Gray, l. c. Somewhat shrubby, much branched, minutely canescent, leafy: the leaves also fascicled in the axils, narrowly linear, obtuse, with revolute margins: flowers solitary or in threes in the upper axils, short-pedicelled: teeth of the calyx and sometimes the tube villous with long spreading hairs: corolla pink or white, dotted in the throat, hairy outside, half inch long. — *Calamintha canescens*, Torr. & Gray in DC. Prodr. xii. 229; Chapm. Fl. 318. — Sandy sea-shore and adjacent pine woods, Alabama and Florida, from Mobile to Tampa Bay (*Hulse*), and Indian River on the east (*Palmer*): fl. summer.

22. POLIOMÍNTHA, Gray. (*Πολίός*, hoary-white, and *μύρθα*, Mint.) — Texano-Mexican low suffrutescent plants, canescent throughout or nearly so; with entire leaves, and few-several-flowered cymes or glomerules in their axils, the uppermost sometimes diminished and bract-like. Corolla rose-color or purple, with tube either equalling or much surpassing the calyx. — Proc. Am. Acad. viii. 295, 365; Benth. & Hook. Gen. ii. 1189. (Genus too near *Gardouquia*, of the Andes from Mexico to Chili, not to be distinguished if that becomes really diandrous.)

P. incána, Gray, l. c. A foot or so high, very much branched, silvery with very close and minute tomentum: branches virgate: leaves linear or the lower oblong (3 to 9 lines long), sessile, veinless and the midrib obscure; the upper floral shorter than the 1 to 3 subsessile flowers in their axils: calyx oblong or cylindraceous, 15-nerved, white-villous (3 lines long), with conspicuous subulate teeth, half the length of the corolla, equalling its tube, which is pilose-annulate at the summit. — *Hedeoma incana*, Torr. Mex. Bound. 130. — Western Texas to S. Utah, *Wright*, *Bigelow*, *Parry*, *Brandegee*, *Mrs. Thompson*, &c.

P. mollis, Gray, l. c. A foot or more high, more tomentose, herbaceous nearly to the base: leaves ovate or oval, narrowed into a short petiole, 3-5-plinerved: calyx-teeth minute, unequally spreading, one-fifth the length of the 13-striate tube, which is hardly half the length of the corolla: tube of the latter not annulate but sparsely pilose within. — *Hedeoma mollis*, Torr. l. c. 129. — Borders of Mexico and Texas, on cliffs of the Rio Grande at Puerte de Paysano, *Bigelow*.

23. HEDEÓMA, Pers. (Name altered from the Greek *Ἠδύσμουρ*, a sweet-smelling herb, probably of this family. The plants have the scent and taste of the European Pennyroyal, *Mentha Pulegium*.) — Low herbs, all American, chiefly of Atlantic U. S. and Mexico; with small flowers, in summer. — Gray, Proc. Am. Acad. viii. 366; Benth. & Hook. Gen. ii. 1188.

§ 1. EUEDEOMA, Gray, l. c. Flowers pedicellate, cymulose or rarely solitary in the axils of the leaves, the uppermost of which are sometimes diminished and bract-like: corolla with an even open throat: throat of the calyx in fruit closed with a ring of villous hairs (except in *H. acinoides*): low and diffuse or much branched herbs, of dry soil, pungently sweet-aromatic, with small and whitish or purplish flowers: pubescence of the stem usually retrorse.

* Filaments of the posterior stamens manifest, bearing a capitate rudiment or sometimes a polliniferous anther: calyx rather short, conspicuously bilabiate; its upper and lower lips very dissimilar.

H. pulegioides, Pers. (AMERICAN PENNYROYAL.) Annual, erect, minutely pubescent: leaves ovate or oblong, somewhat serrate, narrowed at base into a slender petiole; floral similar or the upper merely smaller: calyx in fruit ovate-campanulate or oblong, strongly gibbous; upper lip broad and spreading, with 3 triangular teeth, about equalling the two setaceous-subulate and hispid-ciliate teeth: corolla hardly exserted, 2 or 3 lines long. — Syn. ii. 131; Bart. Med. t. 41. *Melissa* & *Cunila pulegioides*, L. Canada to Iowa and southward; common.

* * Filaments of the posterior stamens minute subulate rudiments, or sometimes obsolete: teeth of both lips of the calyx subulate,

+ About equal in length, all erect or in fruit curved upward: bracts linear or acerose-subulate, spreading or at length reflexed: erect annuals, with the upper flowers somewhat capitately or spicately crowded.

H. acinoides, Scheele. Minutely pubescent, slender: leaves nearly glabrous, thinnish, slender-petioled, obscurely denticulate; the lower ovate, upper oblong, or the upper floral oblong-linear: bracts equalling the slender pedicels: calyx tubular, gibbous at base (3 lines long), barely hairy in the throat; limb slightly bilabiate; the teeth setaceous-subulate, minutely ciliate, barely one-third the length of the tube: tube of the purple corolla exserted, slender (4 lines long); its lower lip much larger than the upper, and middle lobe deeply emarginate. — Linn. xxii. 592; Gray, Proc. Am. Acad. viii. 366. — Arkansas, *Leavenworth*. Texas, *Wright*, *Lindheimer*, &c.

H. hispida, Pursh. Mostly low: leaves all similar, linear, entire, thickish, somewhat nervose-veined, nearly sessile, crowded, almost glabrous, but their margins at least towards the base hispid-ciliate: bracts mostly equalling the calyx, rigid: limb of the calyx bilabiate; the lips about half the length of the oblong gibbous hispid tube; the teeth of the upper subulate, of the lower more aristiform and hispid, equalling the (3 lines long) bluish corolla. — Fl. ii. 414. *H. hirta*, Nutt. Gen. i. 16. *Cunila hispida*, Spreng. Syst. i. 54. — Plains west of the Mississippi, from Dakota to Louisiana and Arkansas; also Illinois, there apparently lately introduced.

+ + Two lower calyx-teeth decidedly longer than the three upper: bracts mostly erect and subulate.

+ + Leaves entire, or in the first species with rare and obscure denticulations or crenulations, into which the few and inconspicuous veins do not run: root either indurated and perduring-annual or perennial.

H. thymoides. Cinereous-pubescent or puberulent, about a span high, at length diffusely branched from the base: leaves ovate, obtuse (3 to 5 lines long), petioled; the lower little exceeding and the upper shorter than the flowers: bracts mostly subulate and shorter than the pedicels: calyx oblong-tubular and at length rather strongly gibbous (the tube $1\frac{1}{2}$ or 2 lines and the setaceous lower teeth a line or sometimes more in length); teeth of the upper lip recurved away from the straightish and moderately longer lower ones: corolla little exserted, only 3 lines long. — *H. dentata*, var. *nana*, Torr. Bot. Mex. Bound. 130. *H. piperita*? Gray, Proc. Am. Acad. viii. 366, not Benth., which must have much larger calyx, flat pedicels, and more crenate leaves. — E. New Mexico to Arizona, *Wright*, *Bigelow*, *Palmer*, &c.

Var. **oblongifolia**. Stems erect, even strict, sometimes a foot high: leaves oblong, or the lower ovate, shorter-petioled; the reduced floral ones subsessile and acute. — *H. piperita*, var. *oblongifolia*, Gray, l. c. — New Mexico and Arizona; same collectors.

H. Drummóndi, Benth. Cinereous-pubescent or puberulent, a span or two high, copiously branched: leaves from oblong (or the lowest oval) to linear, obtuse, subsessile, or narrowed at base into a very short petiole, thickish; the upper mostly rather shorter than the few flowers in their axils: small subulate bracts not longer than the pedicels:

calyx hirsute or hispid, from cylindraceous to at length ovate-tubular, slightly gibbous, in age more or less curved, not obviously bilabiate; the subulate-setaceous teeth at length all connivent and slightly curved upward; the lower nearly twice the length of the upper: corolla from 3 or 4 lines long, and little exserted, to 6 lines and double the length of the calyx. — Lab. 308, & DC. l. c. 245; Gray, l. c. *H. ciliata*, Nutt. Gamb. 183, not Benth. — Common from Texas to Arizona, and north to the plains of Colorado and even Nebraska. (Adjacent Mex.)

Var. Reverchóni. Rigid: leaves greener, coriaceous, elliptical (half inch long, 3 lines or more broad), or the floral oblong, hirsute-pubescent or at least ciliate, the few veins more prominent beneath. — Rocks, Brown Co., Texas, *Reverchon*.

- H. hyssopifolia, Gray.** Nearly glabrous throughout: stems slender, erect and simple from a lignescens perennial base, 8 to 12 inches high: leaves all sessile and entire, nervose veined (especially beneath), narrowly linear-lanceolate and about half inch long, or the lowest much shorter and oblong or oval: short peduncles linear-bracteate, 1-5-flowered: calyx obscurely pubescent, narrowly cylindrical, not gibbous (the tube $2\frac{1}{2}$ lines long), not bilabiate; the subulate-setaceous lower teeth nearly twice the length of the similar upper ones, all straightish: corolla much exserted, 7 or 8 lines long, purplish. — Proc. Am. Acad. xi. 96; Rothrock in Wheeler Rep. ined. t. 17. — Arizona, on Mount Graham, *Rothrock*.

++ ++ Leaves serrate with salient acute and callous teeth in which the veins terminate, all sessile or the lower short-petioled: many-stemmed perennials: cymes few-flowered: calyx narrow, at length somewhat gibbous or curved, 2 or 3 lines long, minutely hirsute.

- H. dentata, Torr.** Hirsute-pubescent: stems erect and slender, a foot high: leaves oblong-lanceolate (4 to 6 lines long), coarsely few-dentate; veins ascending, rather indistinct: calyx-tube slender; limb hardly bilabiate; subulate-setaceous lower teeth erect and moderately longer than the recurved-spreading upper ones: corolla pink, nearly twice the length of the calyx, 4 lines long. — Bot. Mex. Bound. 130, in part; Gray, l. c. — S. Arizona, near Santa Cruz, *Thurber*, *Rothrock*.

- H. plicata, Torr. l. c.** Minutely soft-pubescent, a span or more high, at length diffuse: leaves approximate, rigid, rhombic-ovate or the lower roundish-ovate and the uppermost floral oblong (3 or 4 lines long), numerous and coarsely callous-serrate, conspicuously lineate with the copious strong and straight mostly simple veins, which are very prominent beneath and extend from the midrib through the acute teeth: calyx of the preceding, but less slender and more gibbous or curved, also more evidently bilabiate: corolla shorter, 2 or 3 lines long. — Mountains along the Rio Limpio and Rio Grande, S. W. Texas, *Wright*, *Bigelow*. (There is a similar, but larger flowered and villous species, *H. costata*, S. Mex., *Giesbreght*, no. 815.)

§ 2. **STACHYDEÓMA, Gray, l. c.** Flowers sessile or subsessile, verticillastrate in a terminal interrupted spike, the floral leaves diminished to bracts, except sometimes the lowermost: throat of the pink or purple corolla with a pair of longitudinal projecting folds under the lower lip: calyx hardly at all gibbous, rather short, long-hirsute: stem erect: leaves all sessile or nearly so, glabrous or glabrate, with at least the uppermost hirsute-ciliate.

- H. ciliata, Benth.** A span or two high from an annual root: stem retrorsely puberulent and above mostly hirsute with some spreading hairs: leaves oblong, obtuse, entire, veinless (inch or less long): flowers several in the clusters of the spike: calyx moderately bilabiate; its 15-nerved tube and the subulate-linear bractlets conspicuously white-hirsute; throat villous-bearded; teeth more naked, similar and of equal length, slender-subulate ciliolate, connivent after anthesis: tube of the rose-purple corolla not exserted; upper lip 2-lobed; throat hairy at the insertion of the short included stamens: sterile filaments wanting. — DC. Prodr. xii. 245; Gray, l. c. 367. — Sandy ground, Texas, *Berlandier* (ex Benth.), *Drummond*, *E. Hall*.

- H. gravéolens, Chapm.** Stems numerous, a foot or more high from a perennial base or root, strict, often simple, soft-hirsute or pubescent: leaves round-ovate, subcordate, obscurely pinnately veined (the larger half inch long); lower short-petioled and sparingly dentate; upper passing into similar bracts, which are shorter than the usually solitary flowers they subtend: bractlets oblong, foliaceous: tube of the 12-13-nerved and conspic-

uously bilabiate calyx oblong-campanulate; the teeth especially hispid or hirsute with long whitish hairs; those of the broad upper lip short and deltoid; the two of the lower aristiform subulate, equalling the tube of the purple and spotted corolla: fertile stamens equalling the emarginate upper lip of the corolla; sterile filaments subulate, sometimes with small rudiments of anthers. — Gray, l. c.; Chapm. in Bot. Gazette, iii. (1878), 10. — Low pine barrens, W. Florida, *Chapman*. From the name the species apparently is not sweet-scented.

24. POGÓGYNE, Benth. (*Πόγων*, beard, *γυνή*, female; the style bearded.) — Californian annuals, of low stature, sweet-aromatic; with oblong-ovate or oblanceolate mostly entire leaves, the lower narrowed into a petiole, the upper diminished into bracts, these and the calyx usually conspicuously ciliate-bearded with hirsute or hispid hairs. Flowers verticillastrate-glomerate and sessile, at least the upper glomerules spicate or capitate. Calyx-teeth mostly 3-nerved. Corolla blue or violet purple, sometimes paler. Fl. spring and summer. — Benth. Lab. 414, & DC. l. c. 243; Gray in Bot. Calif. i. 596.

§ 1. Stamens all four with perfect anthers: style conspicuously bearded above; its subulate lobes or stigmas almost equal: corolla 6 to 9 lines long, with funnel-form tube, and throat surpassing the (variable) calyx.

* Inflorescence oblong- or cylindrical-spicate and nearly continuous, conspicuously white-hirsute or hispid with the long and rigid marginal hairs of the bracts and calyx.

P. Douglassii, Benth. l. c. Rather stout, a span to a foot high: leaves spatulate-oblong or narrower, veiny, rarely dentate: bracts linear, acute: flowers comparatively large, blue or violet; lower calyx-lobes twice the length of the tube, much longer and narrower than the others. — Hook. Bot. Mag. t. 5886; Gray, Bot. Calif. i. 597. *P. multiflora*, Benth. l. c., is merely a smaller form, with rather shorter bracts. — California, through the foothills of the Sierra and westward.

P. parviflora, Benth. l. c. More slender and lower: leaves narrower: spike shorter: bracts mostly obtuse: corolla barely half inch long: lower calyx-lobes hardly longer and the upper ones shorter than the tube. — From San Francisco Bay northward, *Douglas*, *Bolander*, &c.

* * Verticillastrate clusters more or less distant: bracts and calyx inconspicuously hirsute-ciliate: anthers of posterior stamens smaller but polliniferous.

P. nudiuscula, Gray. A span to a foot high: branches slender, puberulent: leaves spatulate or narrower, obtuse, not over an inch long, glabrous: bracts linear-subulate and cuspidate: corolla only half inch long, about twice the length of the calyx: lobes of the latter lanceolate- or linear-subulate and cuspidate. — Bot. Calif. i. 597. — Near San Diego, *D. Cleveland*.

§ 2. **HEDEOMOIDES**, Gray, l. c. Posterior stamens sterile: style sparingly hairy, its lobes very unequal: flowers smaller, some of the lower ones often distant and solitary or nearly so in the axils of ordinary leaves.

P. tenuiflora, Gray, Proc. Am. Acad. xi. 100, of Guadalupe Island off Lower California, has the tube of corolla longer than the calyx, as in the preceding section. In the following species the corolla is only 2 lines long, and at least its tube included.

P. ziziphoroides, Benth. Stem 2 to 6 inches high: leaves ovate or oval, thickish; uppermost, with the rigid narrow bracts and calyx, hirsute-ciliate with strong and white bristly hairs: inflorescence capitate or short-spicate: calyx-lobes slightly unequal, broadly lanceolate, very acute, hardly twice the length of the tube, the longer about equalling the corolla: posterior filaments as large as the anterior, but their anthers abortive. — Pl. Hartw. 330; Gray, Bot. Calif. l. c. — Valley of the Sacramento River, *Hartweg*, *Andrews*, *Bolander*.

P. serpylloides, Gray. Stems slender, branched from the base, ascending or at length diffuse, 3 to 6 inches high: leaves obovate-oval or spatulate, 3 or 4 lines long; the lower distant, most of them single- or few-flowered in the axils; upper more floriferous, approximate and becoming bracts to the oblong or often longer and much interrupted spike; the

base of these and the calyx hirsute: lobes of the latter unequal, all much longer than the tube, the longer fully equalling the violet or bluish corolla: sterile filaments small, with small capitate rudiment of anthers: style bearded above with very few coarse hairs. — Proc. Am. Acad. vii. 386, & Bot. Calif. i. 598. *Hedeoma?* *serpylloides*, Torr. in Pacif. R. Rep. iv. 123. — Monterey to Humboldt Co.; common.

25. CERANTHÉRA, Ell. (*Κέρας*, a horn, and *ἀνθήρα*, anther: cells of the anther cornute.) — Peculiar to the southern Atlantic States, nearly glabrous and slender erect annuals, a foot high, sweet-aromatic; with broadly or narrowly linear and obtuse entire leaves; the uppermost on the virgate branches diminished to similar bracts of the thyrsoid-racemose inflorescence. Flowers autumnal, handsome: corolla pink-purple and spotted, the calyx commonly purplish. — Sk. ii. 93; Benth. & Hook. Gen. ii. 1191. *Dicerandra*, Benth. in Bot. Reg. 1300, Lab. 413, & DC. Prodr. xii. 242.

C. linearifolia, Ell. l. c. Inflorescence loose: cymes short-peduncled, few-flowered: calyx-teeth obscurely ciliate, hardly equalling the tube of the (about half inch) corolla: anther-cells slender-aristate. — *Dicerandra linearis*, Benth. Lab. l. c. *D. linearifolia*, Benth. in DC. Prodr. l. c.; Chapm. Fl. 318. — Sandy pine barrens, Georgia, Florida, and Alabama.

C. densiflora. Inflorescence dense; the pedicels shorter and peduncle hardly any: calyx-teeth appressed-ciliate, equalling the tube of the corolla: anther-cells conical-cornute: leaves mostly shorter and broader. — *Dicerandra densiflora*, Benth. in DC. Prodr. l. c. — E. Florida, *J. Reed*, &c.

26. ACANTHOMÍNTHA, Gray. (*Ἄκανθα*, a prickle or thorn, and *μύρθα*, mint.) — Benth. & Hook. Gen. ii. 1192. *Calamintha?* § *Acanthomintha*, Gray, Proc. Am. Acad. viii. 368, & Bot. Calif. i. 596. — Single species.

A. ilicifolia, Gray, l. c. Low and nearly glabrous annual, slightly aromatic (rather heavy-scented), branching from the base, leafy to the top: leaves coriaceous, rotund or broadly cuneate, coarsely crenate-dentate (half inch or more long, the blunt teeth of the upper ones mostly mucronate or cuspidate), contracted at base into a slender petiole: axils nearly all verticillate-floriferous: bracts a pair in each axil, almost as large as the leaves, but sessile, equally coriaceous and more rigid, orbicular or dilated-subcordate, pinnately few-veined and with fine reticulated veinlets, the callous margin armed with a few distant and long slender prickles, each pair subtending 3 to 5 sessile flowers: corolla white and rose-color, half inch long. — Southern borders of California, San Diego Co., *Wm. Rich*, *Cleveland*. Allied to *Glechom* of Brazil, which is also referred to this tribe, rather than to the *Stachydeæ*.

27. SPHÁCELE, Benth. (*Σφάκος* is the Greek name of Sage, which these plants resemble in foliage.) — Shrubby or suffrutescent plants (chiefly S. American); with the floral leaves gradually reduced in size, and the flowers single in their axils, above forming a leafy raceme.

S. calycina, Benth. Shrubby at base, 2 to 5 feet high, tomentulose-villous or glabrate: branches leafy: leaves (2 to 4 inches long) ovate or oblong, obtuse, from crenate or obtusely serrate to entire, obtuse or rarely subcordate at base, rugose-veiny, more or less petioled; uppermost and bracts of the short raceme sessile: lobes of the very loose calyx triangular-lanceolate, rather shorter than the purplish or lead-colored (inch long) corolla: anthers short. — Lab. 563, & DC. Prodr. xii. 255; Torr. Bot. Mex. Bound. 131, t. 37; Gray, Bot. Calif. i. 598. — Hillsides, common throughout the western part of California, especially from San Francisco southward.

Var. glabélla, Gray, l. c. A minutely tomentulose and soon glabrate form, probably of shady places. — Santa Barbara Co., and southward.

Var. Wallácei. Copiously villous: lower cauline leaves with truncate or hastate-subcordate base: calyx-lobes attenuate-lanceolate from a narrower base, over half inch long. — Probably near Los Angeles, *Wallace*.

28. *SÁLVIA*, L. SAGE. (The old Latin name, from *salveo*, to save.) — A vast genus, widely dispersed, comparatively few species N. American, and those mainly southward: fl. chiefly in summer.

S. OFFICINÁLIS, L., Common Sage, of the Old World, represents the genus in the gardens. *S. SPLÉNDENS*, Sellow, of Brazil, and *S. FÚLGENS*, Cav., of Mexico, are the two commoner red-flowered species of ornamental cultivation.

§ 1. *SALVIASTRUM*, Gray. Throat of the calyx *conspicuously bearded* and in fruit closed by a ring of long and dense villous hairs: upper lip with 3 broad and short teeth, lower 2-parted into lanceolate teeth, all cuspidate: corolla ringent (blue or purple), pilose-annulate within: upper emarginate-2-lobed; lower ample, with 3 roundish spreading lobes, middle one 2-lobed: stamens separate: lower anther-cells porrect, shorter, more, or less polliniferous: nutlets abundantly spirilliferous: Texan low perennials, simple-stemmed, with copious mostly narrow and entire leaves; the diminished floral or bracts persistent, subtending 1 to 3 flowers; these racemose or spicate. — Proc. Am. Acad. viii. 308. *Salviastrum*, Scheele in Linn. xxii. 584; Benth. & Hook. Gen. ii. 1196. § *Trichosphace*, Engelm. in Bot. Zeit. ix. 45.

S. Texána, Torr. Stems (a span or two high) with margins of the leaves and the calyx hirsute with long and spreading bristly hairs: flowers spicate, the upper floral leaves not exceeding the calyx, which equals the dilated throat of the widely ringent blue corolla. — Mex. Bound. 132; Gray, l. c. *Salviastrum Texanum*, Scheele, l. c.; Torr. & Gray, Pacif. R. Rep. ii. t. 6. — Open rocky soil, W. Texas to the borders of New Mexico.

Var. *canéscens*, Gray, l. c., a form with leaves hoary-white with fine tomentum, all narrowly linear, with strongly revolute margins, and fewer flowers in the axils of the upper ones. — Hills of the Pecos and Rio Grande, S. W. Texas, *Wright, Schott*.

S. Engelmánni, Gray, l. c. Minutely puberulent and glabrate, the setose hairs few and scattered or nearly wanting: leaves thinner; lower sometimes denticulate; floral mostly equalling the more scattered flowers: corolla (an inch or more long) with narrower tube and throat twice the length of the calyx, light purple. — W. Texas, *Wright, Lindheimer*.

§ 2. *ECHINÓSPHACE*. (§ *Echinosphace* & § *Pycnosphace*, Benth. Lab.) Throat of the calyx villous-hairy or naked: upper lip much longer than the lower, more or less incurved, 3-2-toothed; the lower 2-parted; teeth all spinulose-aristate: corolla ringent (blue or purple); tube pilose-annulate inside; upper lip 2-lobed: stamens separate, remote from the upper lip; lower fork of the long filiform connective bearing a polliniferous anther-cell: Californian winter-annuals; with pinnatifid leaves, and densely capitate-verticillastrate inflorescence: globular heads many-flowered, involucrate with the persistent bract-like floral leaves. (Called CHIA: nutlets abundantly mucilaginous in water, infused for drink.)

S. carduácea, Benth. White-woolly with lax cobwebby hairs: stem stout, simple, a foot or two high, naked and scape-like, only at base subtended by a cluster of oblong sinuate-pinnatifid and spinulose-toothed Thistle-like leaves: verticillastrate heads 1 to 4 (an inch or more in diameter), equalled or somewhat surpassed by the involucrate whorl of lanceolate or ovate-lanceolate bracts, which are oftener pectinate with spinescent teeth: calyx long-lanate; the tube multi-nervulose between the principal nerves; the large upper lip strongly 3-toothed, the middle tooth much the larger, the lateral distant, mostly surpassing those of the lower lip: throat villous: corolla lavender-color (an inch long); its tube slightly exerted; upper lip erose-dentate or fimbriate and 2-cleft; lower with small lateral erose lobes, and a larger flabelliform and deeply fimbriately multifid middle one: proper filament hardly any: anther-cells pubescent. — Lab. 302, & Prodr. l. c. 349; Hook. Bot. Mag. t. 4874; Gray, Bot. Calif. i. 599. *S. (Echinosphace) gossypina*, Benth. Pl. Hartw. 330. — Dry grounds through the lower parts of California, especially southward.

S. Columbáriæ, Benth. Soft-puberulent: stems slender, branching and leafy below, 6 to 20 inches high, naked and pedunculiform above, terminated by solitary or two profliferous heads: leaves deeply 1-2-pinnatifid or pinnately parted into oblong crenately toothed or incised obtuse divisions, muticous, rugose: involucre floral leaves or bracts not exceeding the head, broadly ovate, entire, resembling the more membranaceous sometimes purplish abruptly acuminate-aristate inner bracts: flowers small: calyx naked within; its large upper lip arcuate-concave, hispid at base outside, tipped with a pair of connivent and partly connate short aristiform teeth (the third or middle tooth apparently always wanting), very much surpassing the two small at length porrect teeth of the lower lip: corolla blue, hardly exceeding the calyx; its upper lip emarginate-2-lobed at apex, the lower with small lateral lobes and a much larger transversely oval short-unguiculate somewhat 2-lobed but otherwise entire or merely crenulate middle one: filaments slender. — Common through California, and in adjacent Arizona and Nevada.

§ 3. **HETERÓSPHACE, Benth.** Throat of the calyx naked (or in a single species ciliate-hirsute); the upper lip broadly truncate and remotely 3-toothed; the lower 2-cleft: corolla elongated, mostly pilose-annulate inside; upper lip emarginate or entire: stamens separate: connective shorter than the slender often exerted filament; the porrected lower fork also bearing a polliniferous anther-cell: herbs, ours Atlantic-American perennials, with mostly lyrate-lobed or toothed or pinnately divided leaves; inflorescence loosely racemose, the small bract-like floral leaves persistent.

* Corolla blue or violet, thrice the length of the calyx: leaves at most pinnatifid; the cauline, if any, sessile or narrowed at base into wing-margined petioles.

S. lyráta, L. Perennial from a somewhat tuberous root, pilose or hirsute: stem commonly scapiform, a foot or more high: radical leaves obovate, sinuate or repand-dentate, or lyrate-pinnatifid; cauline of one or two somewhat similar pairs, or none; floral oblong or lanceolate and mostly shorter than the calyx: raceme of few or several at length distant about 6-flowered loose clusters, rarely branching: calyx campanulate, membranaceous; the broad and truncate upper lip with short or very short widely separated aristulate teeth; lower with 2 longer lanceolate cuspidate-pointed teeth: corolla (almost an inch long) ampliate-funnelform beyond the calyx; its erect upper lip much shorter and smaller than the lower. — Spec. i. 23 (Dill. Elth. t. 175; Moris. Hist. &c.); Michx. Fl. i. 14. *S. lyrata* & *S. obovata*, Ell. Sk. i. 33; Benth. in DC. l. c. 353; the latter merely a form with thin and barely dentate leaves; calyx-teeth variable in length. — Sandy woodlands, New Jersey to Illinois, Florida, and Texas; flowering early.

* * Corolla scarlet-red, four times the length of the calyx: herbage softly and often canescently pubescent: cauline leaves all slender-petioled, at least the lower ones 3-5-foliolate.

S. Rømeriána, Scheele. Stems (a foot or two high) and petioles below often sparsely hirsute with long spreading hairs; leaves or terminal leaflet roundish or reniform-cordate, coarsely repand-toothed or crenately incised (an inch or two broad), membranaceous; the lower usually with 2 or 3 similar but smaller (subsessile or slender-petiolulate) lateral leaflets, these occasionally reduced to dentiform appendages on the petiole: raceme loose and elongated: floral leaves mostly shorter than the pedicels: calyx somewhat pubescent, naked within; its upper lip 3-aristulate or with the middle tooth obsolete; the 2-parted lower one of triangular-lanceolate cuspidate-acuminate teeth: corolla (an inch or more long) deep scarlet, puberulent, narrowly tubular-funnelform, somewhat arcuate; its spreading lower lip with rounded and obcordate-2-cleft middle lobe, hardly longer than the erect strongly emarginate upper lip; lobes of the style more or less unequal. — Scheele in Linn. xxii. 586; Torr. Bot. Mex. Bound. 132. *S. porphyrantha* (or *porphyrata*), Decaisne in Rev. Hort. 1854, t. 16; Fl. Serres, t. 1080; Hook. Bot. Mag. t. 4939. — In light fertile soil, W. Texas, Wright, Lindheimer, &c. (Adjacent Mex.)

S. Hénryi, Gray. More slender, less soft-pubescent: leaves or mostly leaflets smaller, seldom cordate, angulate-lobed; lower floral ones often similar, all as long as the pedicels: calyx hirsute, ciliate-bearded or villous in the sinuses and throat: corolla apparently narrower and with shorter less notched lips; the bearded ring at base within obsolete. — Proc. Am. Acad. viii. 368. *S. Rømeriana*, Torr. l. c., in part. — New Mexico, on the Mimbres,

Dr. Henry, Thurber; Florence Mountains, *Bigelow*. Adjacent borders of Texas, *Wright*. — Throat of the calyx rather sparsely but not inconspicuously bearded!

§ 4. **CALÓSPHACE**, Benth. Throat of calyx naked, and of corolla not pilose-annulate: anterior portion of the connective deflexed, linear or gradually somewhat dilated downward, closely approximate or connate, and destitute of an anther-cell: all American species, with upper lip of corolla erect and concave.

* Corolla crimson, its tube villous-annulate towards the base inside; upper lip conspicuously larger and longer than the lower: anterior fork of connectives free and spatulate-dilated downwards, obscurely one-toothed at base, longer than the filament.

S. pentstemonoides, Kunth. Perennial, nearly glabrous, or below sparsely hirsute: stems 2 to 5 feet high, leafy to the summit: leaves thickish, oblong-lanceolate, acute, mucronate, entire or obscurely denticulate and with ciliolate-scabrous margins, the lower (3 to 5 inches long) on long margined petioles; upper gradually much smaller and sessile; the floral and the similar persistent bracts and bractlets of the elongated racemiform or narrowly thyrsoidal inflorescence ovate-lanceolate or narrower, cuspidate: cymules subsessile, 3-5-flowered: calyx equalled by the pedicels, campanulate, strongly bilabiate (half inch long), glandular-puberulent; upper lip broad, truncate, with 3 short and broad cuspidate-mucronate teeth; lower 2-parted, its teeth lanceolate and cuspidate: corolla inch and a half long, slightly pubescent; its large and nearly straight upper lip half the length of the gradually enlarged exerted tube; middle lobe of the small lower lip concave and entire: style glabrous. — *Ind. Sem. Berol.* 1848, 13. — W. Texas, on the Cibolo and Pierdenales and towards the Rio Grande, *Lindheimer*, *Wright*.

* * Lower and sterile forks of the connectives mostly united with each other longitudinally, linear, oblong, or semibastate: corolla naked within throughout,

+ Red or scarlet, with tube exerted; the spreading lower lip longer than the erect upper one, its broad middle lobe 2-cleft: upper lip of tubular-campanulate calyx and teeth of the 2-parted lower lip ovate, mucronate-acute: inflorescence naked-racemose; the small floral leaves or bracts more or less deciduous or caducous.

S. Gréggii, Gray. Shrubby, 1 to 3 feet high, glabrous or obscurely farinaceous-puberulent: branches slender, leafy: leaves coriaceous (3 to 9 lines long), 1-ribbed, almost veinless, oblong, very obtuse, entire, narrowed at base into a short petiole: flowers rather few in the raceme: calyx slightly pubescent or glandular (barely half inch long), with at length spreading lips fully half the length of the tube: corolla (inch long, "red" or "purplish-red") glabrous; its tube enlarging and strongly ventricose-gibbous; throat abruptly contracted under the lower lip, which nearly equals the slightly glandular-puberulent upper one: lower fork of connective oblong-linear: style hairy along the upper side. — *Proc. Am. Acad.* viii. 369. *S. microphylla*, Torr. Bot. Mex. Bound. 131, not HBK. — S. borders of Texas, on the Rio Grande, *Parry*, *Schott*. (Near Saltillo, Mex., *Gregg*.)

S. coccínea, L. Perennial or annual, canescently pubescent or glabrate, or hirsute towards the base with long spreading hairs: leaves membranaceous, veiny, cordate or ovate, mostly acute, erenate, slender-petioled, mostly soft-tomentulose beneath: raceme virgate; the clusters few-several-flowered and rather distant: lips of the calyx hardly half the length of its tube: corolla (inch or less long, pubescent or puberulent outside) deep scarlet-red, twice or thrice the length of the calyx; its narrow tube moderately enlarging above; lower lip twice the length of the upper, from which the stamens protrude: lower forks of the connective long and narrowly linear: style glabrous. — *Mant.* 88; *Murr. Comm. Gott.* 1778, t. 1. — Var. *pseudo-coccínea* is a commonly tall form of this species, with stem, petioles, and often margins of floral leaves conspicuously beset with hirsute hairs. *S. pseudo-coccínea*, Jacq. T. Rar. t. 209; Bot. Mag. t. 2864. *S. ciliata*, Benth. Lab. 286. — S. Carolina to Florida (but probably introduced), S. Texas. (Mex., &c.)

+ + Corolla blue or purplish, sometimes white, never red.

+ + Herbs.

= Flowers from near an inch to over half inch and calyx fully quarter inch long: inflorescence virgate-racemose or spiciform, sometimes paniculate: small floral leaves or bracts mostly deciduous: corolla with prominently exerted tube, erect and very concave or galeate and pubescent upper lip: the lower longer and much larger: style bearded above: perennials, 1 to 5 feet high.

S. farinácea, Benth. Minutely and canescently puberulent, or below glabrous: stems numerous in a cluster: lower leaves ovate-lanceolate or even ovate, with obtuse or cuneate

or rarely subcordate base, coarsely and irregularly serrate, on slender petioles; upper lanceolate or linear-lanceolate, sometimes entire; floral subulate or ovate-lanceolate, mostly caducous: spiciform inflorescence on a long naked peduncle, interrupted, of densely many-flowered clusters, finely and the calyx very densely and softly white-tomentose (often tinged with violet); the latter oblong-cylindrical and in age striate-sulcate, as it were truncate; the teeth 3, very broad and obtuse, exceedingly short: lower lip of the violet-blue corolla with middle division obovate-two-lobed. — Lab. 274; Braun in Bot. Zeit. ix. 44. *S. trichostyla*, Bischoff, Ind. Sem. Heidelb. 1847. *S. amabilis*, Kunth, Ind. Sem. Berol. 1848. *S. cæsia*, Scheele in Linn. xxii. 588. — Texas, in rich soil; common.

S. azúrea, Lam. Glabrous or puberulent: lower leaves lanceolate or oblong, obtuse, denticulate or serrate, tapering into a slight petiole; upper narrower, often linear, entire; floral or bracts subulate, somewhat persistent: spiciform inflorescence looser, more interrupted, and fewer flowers in the clusters, sometimes thyrsoidal or paniculate-branched: pedicels short: calyx oblong-campanulate, usually minutely puberulent, obscurely bilabiate; the very broad and obtuse upper lip and the two similar but acutish lobes of the 2-parted lower lip distinct but short: corolla deep blue (sometimes varying to white); lower lip sinuately 3-lobed and emarginate. — “Diar. Hist. Nat. i. 409,” & Diet. vi. 625; Pursh, Fl. i. 19; Bot. Mag. t. 1728. *S. Mexicana*, Walt. Car. 65, not L. *S. acuminatissima*, Vent. Cels, t. 50. *S. angustifolia*, Michx. Fl. i. 13, not Cav. *S. acuminata*, Pers. Syn. i. 24. *S. elata*, Poir, Dict. vi. 625. *S. coriifolia*, Scheele in Linn. l. c. — S. Carolina to Florida and Texas. Westward varies insensibly into

Var. grandiflora, Benth. Cinereous-puberulent: denser inflorescence and calyx tomentulose-sericeous. — DC. Prodr. xii. 302. *S. Pitcheri*, Torr. in Benth. Lab. & DC. l. c. *S. elongata*, Torr. in Ann. Lyc. N. Y. ii. 231, not HBK. *S. longifolia*, Nutt. in Trans. Am. Phil. Soc. n. ser. v. 185. — Mississippi to Kansas, Colorado, and Texas.

S. angustifolia, Cav. Slender, usually glabrous, except usually some scattered spreading bristly hairs, especially at the nodes: leaves linear ($1\frac{1}{2}$ to 3 inches long, 1 or 2 lines wide), entire or obscurely denticulate, acute, somewhat petioled: inflorescence virgate, slender, of distant few-flowered clusters: pedicels very short: calyx narrowly oblong or cylindrical, with lips half the length of the tube; upper ovate, entire, acute; lower of 2 similar but more pointed lobes: lower lip of the blue corolla as wide as long; the middle lobe emarginate or undulate. — Ic. iv. 9, t. 317; Benth. l. c.; Bot. Reg. t. 1554; Brit. Fl. Gard. n. ser. t. 219. *S. reptans*, Jacq. Schœnbr. t. 319. *S. virgata*, Ort. — (Mex.)

Var. glabra. Wholly glabrous, even the hairy ring at the nodes wanting or obsolete. — *S. azurea*, Torr. Bot. Mex. Bound. 131, in part: that including these three species. — S. W. Texas, Wright, &c. (Mex., Hartweg.)

== Flowers barely half inch long or shorter, and bilabiate calyx a quarter inch long: corolla-tube hardly at all exerted: style glabrous or nearly so.

a. Annuals: leaves from linear- to oblong-lanceolate, tapering into the slender petiole: inflorescence virgate-spiciform, interrupted, naked, the floral leaves or bracts very small: upper lip of calyx ovate and entire.

S. lanceolata, Willd. Puberulent or nearly glabrous, branched from the base, 5 to 12 inches high: leaves lanceolate or linear-oblong, obtuse, irregularly serrate with obtuse appressed teeth or nearly entire: the inconspicuous floral ones lanceolate or subulate, somewhat persistent, seldom exceeding the pedicels: calyx minutely hairy on the nerves, deeply bilabiate; its lower lip 2-cleft, the teeth ovate and mucronate-acute: corolla small (4 lines long), little exceeding the calyx, its lower lip little prolonged: lower fork of the connective narrowly linear, bearing its lateral lobe nearer the insertion. — Enum. 37; Jacq. f. Ecl. i. t. 13. *S. trichostemoides*, Pursh, Fl. i. 19. — Plains, Nebraska to Texas, Arizona, and southward. Also E. Florida, Leavenworth. (Mex.)

S. subincisa, Benth. More pubescent above, a foot or more high: leaves oblong-lanceolate, incisely dentate (inch or two long); the floral minute, ovate, caducous: calyx glandular-pilose, hardly equalling the throat of the (half inch) corolla; the broad lower lip merely 2-toothed: lower fork of the connective bearing its lateral lobe at the middle. — Pl. Hartw. 20. — New Mexico and Adjacent Texas, Fendler, Wright, Bigelow. (Mex.)

b. Perennials, or the Arizonian species uncertain: leaves ovate, serrate, mostly slender-petioled; those of the interrupted spiciform or racemiform inflorescence small and caducous.

S. serotina, L. A span to 2 feet high, much branched, pubescent: leaves ovate and with truncate or subcordate base, obtuse, crenate-serrate (9 to 20 lines long); floral minute:

racemes simple, at first oblong, and the flowers crowded: calyx glandular-hirsute, with oblong-campanulate tube (3 lines long in fruit) of nearly thrice the length of the lips; upper lip broadly ovate, acutish; lower deltoid-ovate, mucronate-acute: corolla 3 to 5 lines long, the whole tube included: style beardless. — Mant. 25; Jacq. Ic. Rar. t. 3; Chapm. Fl. 319. *S. Dominica*, Vahl, Enum. i. 223; Swartz, Obs. 18, t. 1, fig. 1, not L. — *S. Florida*. (W. Ind.)

S. albiflora, Mart. & Gal. Glabrous throughout, 2 to 4 feet high, paniculately branched: leaves rhombic-ovate or ovate-lanceolate, acuminate, acutely serrate (inch or two long); floral abruptly reduced to minute lanceolate and subulate bracts: clusters of rather loose raceme approximate: calyx (often amethystine-tinged) with campanulate tube (2 lines long), twice the length of the lips; upper lip broadly ovate and entire; lower 2-toothed or parted into broad acute lobes: corolla (probably bluish) 4 or 5 lines long, with tube almost included: style bearded along the base of the much longer upper lobe. — (Bull. Acad. Brux., ex Benth. in DC. Prodr. l. c. 307 ?) Torr. Bot. Mex. Bound. 131. — *S. Arizona* or Mexican border near it, *Thurber, Schott.* (Mex.)

S. Arizónica. Glabrous, except 2 puberulent lines down the stem, a foot or more high: leaves deltoid-ovate or with abruptly cuneate base, acute, coarsely and obtusely serrate (an inch long besides the slender petiole): inflorescence spiciform and interrupted; clusters several-flowered: pedicels short (a line long): floral leaves abruptly reduced to membranaceous ovate-lanceolate and caudate bracts, which equal the flowers and are caducous: calyx 4 lines long, bilabiate to the middle or nearly; its upper lip subulately 3-toothed and lower more strongly 2-toothed: corolla (blue) fully half inch long, with tube a little exserted: style beardless. — *S. Arizona*, on Mount Graham, at 9,250 feet, *Rothrock*.

S. urticifolia, L. A foot or two high, villous-pubescent and somewhat viscid, or glabrate: leaves coarsely and obtusely serrate, ovate, acute, with truncate or sometimes cuneate base decurrent into a winged petiole, pale beneath, 2 to 4 inches long; floral all reduced to small ovate and slender-acuminate very caducous bracts: inflorescence racemose-spiciform, of numerous and several-flowered distant clusters: pedicels as long as the tube of the oblong-campanulate calyx; the broad lips of which are divergent and half the length of the tube, the upper mucronately (often minutely) 3-toothed, lower 2-cleft, its teeth broadly triangular-ovate and mucronate: corolla blue and white (5 or 6 lines long), twice the length of the calyx, its ample sinuately 3-lobed lower lip about twice the length of the upper, its broad middle lobe emarginate: connective ciliate opposite the insertion; its subulate antheriferous fork obtusely toothed toward the base, and lower fork semihastate: style strongly villous-bearded along the base of its much longer upper fork. — Spec. i. 24. *S. Claytoni*, M. A. Curtis, Cat. Pl. N. Car., not Ell. ? — Maryland and Kentucky to Georgia and Louisiana.

== = Flowers only a third or a quarter inch long; corolla tube not exserted: inflorescence slender-spicate; the flowers or small clusters mostly distant.

a. Style-lobes or stigmas one or both subulate.

S. Chapmáni. Tall and erect perennial, tomentulose or cinereous-puberulent: leaves thickish, ovate or ovate-lanceolate with short cuneate base, somewhat appressed-serrate or crenulate (2 or 3 inches long); the floral all reduced to small and membranaceous ovate cordate-acuminate caducous bracts: calyx campanulate, in fruit 2 lines long; teeth short and broad, mucronate: corolla 4 lines long and with the ample lower lip of the preceding species. — *S. urticifolia*, var. *major*, Chapm. Fl. 319. — Middle Florida, *Chapman*. Alabama, *Buckley*.

S. Blodgettii, Chapm. Fl. 319, founded on incomplete specimens from S. Florida (Key West), *Blodgett*, apparently an annual, with indurated base; thin ovate leaves obtuse at both ends, about half inch long, on filiform petioles of equal length; bracts of filiform racemes lanceolate or subulate, rather persistent, shorter than the pedicels; these a line long; calyx 2 lines, very like that of *S. serotina*. It may prove to be either *S. tenella*, Swartz, or *S. micrantha*, Vahl (referred to it by Grisebach), weedy and insignificant W. Indian species, likely to stray to Key West.

b. Style-lobes or stigmas both broad and thin, roundish, very obtuse or truncate: calyx glandular-hirsute.

S. occidentális, Swartz. Diffuse annual, minutely pubescent or nearly glabrous up to the very slender inflorescence (which has the aspect of that of *Verbena officinalis*): stems 2

to 6 feet long: leaves ovate, with rounded or cuneate base, serrate; floral or bracts minute, ovate, acuminate, persistent: flowers few in the clusters, subsessile, seldom 2 lines long including the slightly exerted corolla: calyx oblong, with very short pointless or mucronate teeth, nearly closed in fruit, then only 2 lines long. — Fl. Ind. Occ. i. 43; Benth. in DC. l. c. 296. — S. Florida, *Garber*. (Trop. Am., &c.)

S. privoides, Benth. l. c. Resembles the preceding (and both stigmas in our specimens obtuse): but flowers more pedicellate, larger; with fructiferous calyx fully 3 lines long, rather deeply bilabiate; the upper lip and the lobes of the lower abruptly aristulate. — Bot. Sulph. 150 & in DC. l. c. *S. occidentalis*, var. ? *Garberi*, Chapm. in Bot. Gazette, iii. 10. — Manatee, Southern Florida, *Garber*. A much less hairy form than the original, and more resembling the West Indian *S. micrantha*, Vahl, except in the style and the awn-tipped calyx-lobes. (Trop. Am.)

++ ++ Shrubby.

== Leaves oblong or elliptical, short-petioled: calyx cylindraceous or campanulate.

S. chamædryoides, Cav. Low, much branched, canescent and scabrous: leaves thickish, more or less crenulate, obtuse (less than inch long); bract-like floral ones caducous: flowers geminate or few in the clusters of the raceme: calyx cylindraceous-campanulate (4 lines long), striate, hispidulous on the nerves; ovate upper lip and teeth of the 2-parted lower lip acute or acuminate, not half the length of the tube: corolla blue, over half inch long; middle lobe of lower lip broader than long, obovate-lobed. — Ic. ii. 77, t. 197; Bot. Mag. t. 808. *S. Chamædryis*, Willd. Hort. Berol. t. 29. — S. W. borders of Texas, in cañons of the Rio Grande, &c., *Wright, Parry*. Specimens insufficient, probably of this species. (Mex.)

S. Párryi, Gray. Low, much branched: leaves ovate-oblong, mostly with truncate base, obtuse, crenate, short-petioled, tomentulose-canescant, as are the branchlets: bract-like floral leaves ovate, acuminate, membranaceous, glabrous above, apparently persistent, longer than the interruptedly spicate flowers: these several in each cluster: calyx campanulate, densely lanate with white dendritic-branched hairs; upper lip 3-toothed, lower 2-cleft, equalling the tube of the short and small (blue?) slightly dendritic-pubescent corolla: upper lip of the latter emarginate; middle lobe of the lower ample, 3-lobed, with its middle portion much larger, rounded, and emarginate: connectives free; lower fork semihastate, as long as the subulate antheriferous one. — Proc. Am. Acad. viii. 369. *S. spicata*? Torr. Bot. Mex. Bound. 131, not Rœm. & Sch. — Apache Springs on the Rio Grande, on the borders of Texas. Lower leaves not seen, upper 9 to 5 and floral 3 or 4 lines long.

== Leaves mostly ovate, slender-petioled: calyx short-funnelform, in fruit with ampliate reticulate-veiny 2-3-lobed limb exceeding the tube of the short corolla: lower fork of the connective linear-oblong: style ciliate-bearded above.

S. ballotæflóra, Benth. (MAJORANO of the Mexicans.) Shrub 2 to 8 feet high, tomentulose-canescant: leaves ovate or somewhat oblong, truncate-cuneate or subcordate at base, crenate, reticulate-veiny, mostly rugose, glabrate and green above, white beneath (4 to 12 lines long): flowers in short and rather dense simple racemes and in axils of upper ordinary leaves, 4 lines long: calyx twice the length of the pedicel, in flower 2 or barely 3 and in fruit 4 or 5 lines long, then pendulous; narrow tube striate-nerved; its 3 lobes broadly ovate, obtuse, entire, almost equal: connective hairy opposite its insertion: throat of small bluish or purple corolla ventricose-gibbous. — Benth. Lab. 270; Torr. Bot. Mex. Bound. 131. *S. ballotæflora* & *S. laxa*, Benth. in DC. l. c. 313. — Southern and Western Texas. (Adjacent Mex.)

S. PLATYCHEILA, Gray, Proc. Am. Acad. viii. 202, from Carmen Island in the Gulf of California resembles the preceding, but has the lower lip of the calyx similar to the upper, except that the apex is 2-toothed.

§ 5. **SCLÁREA, Benth. & Hook.** Throat of calyx naked, and of corolla not pilose-annulate: anterior portion of the connectives deflexed, abruptly dilated and connected by the callose lower extremity, destitute of an anther-cell, or with a sterile rudiment: upper lip of corolla erect and concave, or falcate-compressed. Old World species, sparingly introduced.

S. SCLÁREA, L. (CLARY.) Biennial, villous-pubescent, viscid: stem stout, 2 or 3 feet high: leaves ample, long-petioled, ovate and cordate, crenate, rugose; floral forming bracts of the cylindrical or interrupted spike, ovate, acuminate, tinged with white and rose-color: calyx campanulate; teeth spinulose-acuminate: corolla white and bluish, rather large, widely ringent; its short tube included; long upper lip falcate and compressed. — Pennsylvania, escaped from gardens. (Nat. from Eu.)

S. VERBENACEA, L., Muhlb. Perennial, pubescent or villous, a foot or two high: leaves ovate or oblong, often cordate at base, obtuse, mostly sinuate-incised or moderately pinnatifid and the lobes crenate-toothed, rugose, almost glabrous; the few cauline mostly sessile; the floral inconspicuous, rounded-ovate: raceme interrupted: calyx reflexed after flowering; its broad and rounded upper lip recurved-spreading, with 3 minute connivent teeth; the lower of 2 longer triangular-subulate and cuspidate teeth, equalling the throat of the small bluish corolla, the upper lip of which is nearly straight. — *S. Claytoni*, Ell., excl. reference to Clayton, whose plant is *S. lyrata*? — Dry sandy pastures around Beaufort, S. Carolina, *Elliott*. Sparingly seen in the Middle States. (Nat. from Eu.)

29. AUDIBÉRTIA, Benth. (*M. Audibert* of Tarascon, Provence.) — W. North American (all Californian, one species of wider range), fruticose or perennial-herbaceous, mostly canescent-tomentose; with crenate or crenulate and reticulated leaves, and flowers resembling those of *Salvia* of the *S. officinalis* type: fl. spring and summer. (Noted bee-plants in S. California.)

§ 1. Inflorescence densely verticillastrate-glomerate and interrupted-spicate, much bracteate: corolla with tube longer than the limb.

* Large-flowered: corolla fully inch and a half long, crimson-purple; upper lip rather erect and short, emarginate: lower leaves cordate or hastate at base.

A. grandiflora, Benth. Stem villous and glandular, stout, suffrutescent, 2 or 3 feet high: leaves very rugose, tomentose beneath, sinuate-crenate; lower mostly hastate-lanceolate, obtuse, 3 to 8 inches long, on margined petioles; upper oblong and sessile; floral and bracts of the large heads broadly ovate, membranaceous: calyx spathaceous, deeply cleft between the two small anterior cuspidate-tipped teeth; ample concave upper lip 3-denticulate: stamens much exserted: a conspicuous slender tooth representing the lower fork of the connective. — Lab. 312, & DC. Prodr. xii. 359; Torr. Bot. Mex. Bound. t. 38 (sterile filaments wrongly represented); Gray, Bot. Calif. i. 600. — California Coast Ranges, &c., from San Mateo Co. southward.

* * Smaller-flowered: corolla less than an inch long, violet or bluish: leaves not cordate.

+ Bracts, upper floral leaves, and bilabiate calyx scarious-membranaceous, reticulated, usually colored, obtuse and mucous (or at most mucronate); the former large and roundish, half inch or more long, imbricating the close heads: corolla only half inch long, narrow, and with short limb: low suffrutescent species of the interior arid region.

A. incána, Benth. l. c. Closely tomentose-canescens, leafy: leaves spatulate or obovate, obtuse or retuse, not rugose, entire (or sparsely crenulate), seldom inch long: bracts obovate or oval, pubescent and ciliate, purple-tinged: calyx turbinate; anterior teeth ovate or oblong, rather shorter than the truncate and emarginate very broad upper lip: stamens much exserted: connective with or without a dentiform appendage. — Lindl. Bot. Reg. t. 1469; Gray, l. c. — From interior of Washington Terr. and Idaho south to Arizona, and along the eastern borders of California.

A. capitata, Gray. Cinereous-puberulent: leaves oblong, acutish, very rugose, crenulate, slender-petioled: bracts of solitary head ovate or oval, apparently whitish: flowers, &c., of the preceding. — Proc. Am. Acad. vii. 387, & Bot. Calif. l. c. — Providence Mountains, San Bernardino Co., S. E. California, *Cooper*.

+ + Bracts more or less herbaceous, at least not colored: leaves minutely rugose, crenulate: species restricted to California.

++ Corolla barely half inch long: all the calyx-teeth and bracts subulate or aristate-tipped.

A. humilis, Benth. l. c. Stems simple and only a span high from a thickened suffrutescent base, almost leafless and scapiform: leaves crowded at the base, lanceolate or spatulate-oblong, very obtuse, finely rugose, densely crenulate, canescent, an inch or more long,

tapering into a slender petiole; the mostly inconspicuous floral ones and the bracts villous, membranaceous, ovate-lanceolate and lanceolate: calyx distinctly bilabiate but rather more deeply cleft between the anterior teeth; these and the 3 teeth of the ample concave upper lip subulate but not rigid; lower lip of the corolla crenulate-erose: stamens and style long-exserted: connective continuous with the filament. — From the Yuba River to San Diego Co., but rare.

A. stachyoides, Benth. l. c. Shrubby, branching and leafy, a yard or more high, cinereous-tomentulose or glabrate, rigid: leaves somewhat less rugose than in the last, more crenate, oblong-lanceolate, narrowed at base or short-petioled; the floral and ovate or oblong bracts with the teeth of the bilabiate calyx cuspidate-acuminate or spinulose-aristulate (rarely almost muticous): style and especially the stamens little exserted: subulate appendage of connective often manifest. — From San Francisco Bay to the southern borders of the State: forming thickets.

++ ++ Corolla from two-thirds to three-fourths inch long, with tube much surpassing the calyx and short more or less pointed thinnish bracts: upper lip of the calyx 1-3-mucronate; teeth of the lower cuspidate: stamens and style moderately exserted: stems woody below, 4 to 8 feet high, with herbaceous long and virgate branches: glomerules rather large, scattered or rather distant: foliage minutely tomentose-canescens.

A. Palmeri, Gray. Leaves oblong-lanceolate, acute (not unlike those of the preceding species), the larger 2 or 3 inches long: verticillastrate heads several (4 to 8) and remote in the elongated virgate spike: bracts oblong or lanceolate, slender-cuspidate or acuminate: lower calyx-teeth subulate-setaceous. — Bot. Calif. i. 601. — Near Tighe's Ranch, mountains north-east of San Diego, *Palmer*.

A. Clevelandi, Gray. Leaves oblong, or the upper lanceolate-oblong, all obtuse, seldom over an inch or so in length: heads fewer, often solitary or terminating short axillary branches: bracts ovate or oblong, mucronate or abruptly short-pointed, viscid-pubescent, as is the calyx; the lower teeth of which are short and subulate, the upper lip entire and cuspidate-tipped. — Proc. Am. Acad. x. 76, & Bot. Calif. l. c. — Mountains behind San Diego, *Cleveland, Palmer*.

++ ++ ++ Corolla barely half inch long; its tube hardly exceeding the herbaceous obtuse and muticous bracts and calyx teeth: whole plant hoary-white.

A. nivea, Benth. Canescent with a close white-farinoso tomentum, 3 or 4 feet high, shrubby below, leafy: leaves oblong-lanceolate, or the lowest ovate, obtuse; upper with truncate base, very short-petioled: bracts oval or oblong: calyx splitting down anteriorly, at length emarginate posteriorly: corolla light-purple: stamens and style much exserted: connective almost continuous with the filament. — Lab. 313 & DC. l. c. — Dry hills, from Santa Barbara to San Diego Co.

§ 2. Inflorescence thyrsoid-paniculate: floral leaves, bracts, and bractlets small and loose, at length reflexed, lanceolate or subulate, cuspidate-tipped: corolla with ample lower lip twice the length of the upper; the tube very short.

A. polystachya, Benth. l. c. Shrubby, 3 to 10 feet high, minutely tomentose-canescens: branches and elongated naked thyrsus virgate: leaves mostly very white, oblong-lanceolate, minutely rugose and crenulate, 2 or 3 inches long: flowers subsessile, loose: upper lip of the calyx truncate or 3-toothed, at length concave or galeate, longer than the triangular-subulate lower teeth: corolla pale or white; lower lip half inch and tube quarter inch long: style and divergent stamens long-exserted: filiform connective continuous with the filament, its lower end usually indicated by a minute tooth. — Arid hills, Santa Barbara to San Diego Co. One of the shrubs called Grease-wood.

30. MONARDA, L. HORSE-MINT. (*Nicolas Monardes*, early writer upon American medicinal plants.) — Aromatic erect herbs (of Atlantic N. America, reaching to the Rocky Mountains), usually tall; with the large verticillastrate-capitate glomerules single, or as if proliferous-spicate, or in upper axils, and involucrate by numerous sometimes colored outer bracts and floral leaves: flowers rather large, in summer. (Gray, Proc. Am. Acad. viii. 369.)

§ 1. *EUMONARDA*, Benth. Heads solitary and terminal or sometimes 2 or 3, as if proliferous: stamens and style conspicuously exserted from the linear and mostly acute upper lip of the (red, purple, or white) corolla: leaves acutely more or less serrate, pinnately veiny: root perennial.

* Leaves distinctly petioled: calyx-teeth little if at all longer than the width of the tube: corolla with middle lobe of lower lip longer and narrower, emarginate.

M. didyma, L. (OSWEGO TEA, BEE-BALM.) Villous-hirsute to glabrate: stem acutely 4-angled: leaves thin, ovate-lanceolate, acuminate: bracts, &c., tinged with red: calyx slightly hirsute in the throat; teeth narrowly subulate: corolla nearly glabrous, scarlet-red ($\frac{1}{2}$ or 2 inches long).—Spec. i. 22; Sims, Bot. Mag. t. 546; Schk. Handb. t. 2. *M. purpurea*, Lam. Dict. iv. 256. *M. fistulosa*, Sims, Bot. Mag. t. 145. *M. coccinea*, Michx. Fl. i. 16; Desc. Ant. v. t. 369. *M. Kalmiana*, Pursh, Fl. i. 17, t. 1. *M. Oswegoensis*, Bart. Prodr. Penn. i. 34.—Wet banks of streamlets, Canada to Michigan, and south to Georgia in the mountains; also in gardens.

M. clinopodia, L. Nearly glabrous to villous-pubescent: stem rather acutely angled: leaves ovate-lanceolate and ovate, slender-petioled, thin, coarsely and sharply serrate: bracts whitish: calyx moderately hirsute in the throat: corolla slightly pubescent, dull white or flesh-colored, an inch long.—Spec. i. 22, excl. syn. Gronov. *M. glabra*, Lam. Dict. iv. 256. *M. rugosa*, Ait. Kew. ed. 1, i. 36. *M. altissima*, Willd. Enum. 33; Reichenb. Ic. Exot. ii. t. 182. *Pycnanthemum Monardella*, Michx. Fl. ii. 8, t. 34. *Monardella Caroliniana*, Benth. Lab. 332.—Shady places, ravines, &c., W. Canada to Illinois, and along the mountains to Georgia.

M. fistulosa, L. l. c. Soft-pubescent with short hairs, or somewhat hairy, or glabrate: stem mostly with obtuse angles: leaves commonly of firmer texture than in the preceding: bracts whitish or rarely purplish, the inner mostly hirsute-ciliate: calyx conspicuously and densely bearded at the throat: corolla pubescent, at least on the upper lip, purple or purplish-dotted, an inch or more long.—*Origanum fistulosum Canadense*, Cornuti, Canad. 13, t. 14. *Monarda oblongata*, Ait. l. c., narrow-leaved form. *M. longifolia*, Lam. l. c., narrow-leaved form. *M. allophylla*, Michx. Fl. i. 16. *M. varians*, Bart. l. c. *M. involuerata*, and many others, Wenderoth, Sem. hort. Marb. *M. altissima, mollis* (Willd.), *undulata* (Tausch), & *affinis* (Link), Reichenb. Ic. Exot. t. 170, 171, 181, 182.—Dry soil, Canada and Vermont to Florida and Texas, west to Brit. Columbia and Arizona. The following are the more marked forms of this polymorphous species.

Var. rubra. Corolla bright crimson or rose-red: habit of *M. didyma*, but upper lip of corolla villous-bearded on the back at tip: throat of calyx conspicuously hirsute, with external bristly hairs widely spreading.—*M. purpurea*, Pursh, l. c., excl. syn. Bot. Mag.?—Alleghany Mountains, in moist ground.

Var. media. Corolla deep purple.—*M. media*, Willd. Enum. 32; Sweet, Brit. Fl. Gard. t. 98. *M. purpurea*, Lodd. Cab. t. 1396.—Alleghany and southern Rocky Mountains.

Var. mollis, Benth. Corolla from flesh-color to lilac, glandular, and its upper lip hairy outside or more bearded at the tip: leaves paler, soft-pubescent beneath, often shorter-petioled; throat of the calyx mostly filled with dense beard, with or without an external ring of more bristly widely spreading hairs.—*M. mollis*, L. Amœn. Acad. iii. 399; Reichenb. l. c. t. 171. *M. scabra*, Beck (in Am. Jour. Sci. x. 260), & *M. menthaefolia*, Graham, in Bot. Mag. t. 2958; form with smaller firmer leaves and stem roughish-hirsute on the angles. *M. Lindheimeri*, Engelm. & Gray, Pl. Lindh. i. 20.—This extends to Saskatchewan, Brit. Columbia, interior of Oregon and Arizona.

* * Leaves subsessile or very short-petioled; floral ones often purplish or whitish: corolla flesh-color or whitish, its lower lip usually spotted with purple: calyx-teeth loose or stellate-spreading after flowering: stem slender: head solitary.

M. Bradburiána, Beck. Pubescent with slender hairs or glabrate: leaves ovate or ovate-lanceolate from a broad roundish or subcordate base, acuminate: calyx hirsute and somewhat contracted at the orifice; its teeth elongated and aristiform: tube of the corolla not exceeding the long and narrow pubescent upper lip; the middle lobe of its broad lower lip much longer than the lateral ones.—Am. Jour. Sci. x. 260; Benth. Lab. 317. *M. fistulosa*, Hook. Bot. Mag. t. 3310, excl. syn. *M. amplexicaulis*, Bischoff, Ind. Sem. Heidelb. 1838. *M. villosa*, Martens; Walp. Repert. iii. 683.—Thickets, Illinois to Tennessee and Kansas.

M. Russelliana, Nutt. Slender, sparingly pubescent: leaves lanceolate or narrowly ovate-lanceolate from a rounded or subcordate base: calyx naked at orifice; its slender-subulate teeth muricate-glandular: corolla nearly glabrous, slender, with long and much exerted tube; lower lip shorter, obscurely 3-lobed at the extremity. — Trav. Arkans. & Trans. Am. Phil. Soc. n. ser. v. 185; Hook. Bot. Mag. t. 2513 & Exot. Fl. t. 130; Sweet, Brit. Fl. Gard. t. 166. — Arkansas, *Nuttall, T. L. Harvey.*

§ 2. **CHEILYCTIS, Benth.** Heads (i. e. verticillastrate glomerules) commonly in the axils of all the upper pairs of leaves, or interrupted-spicate, foliose-bracteate: upper face of the floral leaves and larger bracts often canescent and sometimes purple-tinged: corolla with shorter almost included tube, more dilated throat, and oblong lips; the upper arching, emarginate or cleft at apex (either sparsely bearded or glabrous in the same species), seldom at all surpassed by the stamens; lower with middle lobe often broadest: leaves lanceolate or oblong, sparsely serrate or denticulate, tapering into the petiole: minute pubescence more or less cinereous. — *Cheilyctis*, Raf. *Monarda* § *Coryanthus*, Nutt.

* Corolla yellowish with copious brown-purple spots: calyx-teeth lanceolate- or triangular-subulate: floral leaves and involucre bracts mostly mucous: root perennial.

M. punctata, L. (HORSE-MINT.) Stem commonly 2 feet high: floral leaves and bracts (either whitened or purplish or both) often slender-acuminate: calyx-teeth rigid, soon stellate-spreading, hardly longer than the width of the villous orifice of the tube. — Spec. i. 22; Andr. Bot. Rep. t. 546; Bot. Reg. t. 87. *M. lutea*, Michx. Fl. i. 16. — Sandy ground, New York to Wisconsin, and south to Florida and Texas. Varies in foliage, pubescence, &c., passing into

Var. lasiodonta, Gray, l. c., with throat and teeth of calyx densely villous: plant sometimes robust, often smaller, and narrow-leaved. — Texas, *Drummond*. New Mexico and Arizona, *Wislizenus, Woodhouse, Rothrock.*

* * Corolla white or pinkish, not spotted, but more or less punctate: calyx-teeth aristiform or subulate-setaceous: involucre bracts conspicuously aristate-tipped: root annual.

M. pectinata, Nutt. Rather low and slender: floral leaves and bracts of the comparatively small heads mostly green; the latter oblong, short-aristate, obscurely 3-nerved, hirsute-ciliate: calyx-teeth subulate-setaceous from a broad base, soon spreading, villous-hirsute within, twice the length of the width of the very villous orifice. — Pl. Gamb. 182. *M. citriodora*, var. *aristulata*, Gray, Proc. Am. Acad. viii. 369, in part, where Nuttall's name was inadvertently written "*M. penicillata*." — New Mexico, near Santa Fé, *Gambel*. Not since seen. Seemingly a hybrid between *M. punctata* and *M. citriodora*.

M. clinopodioides. Slender, a foot or more high: bracts of the rather small heads mostly green or greenish, erect, oblong-ovate to obovate-lanceolate, rigid, strongly 3-5-nerved, hispid-ciliate: calyx-teeth always erect, rigid, aristiform-attenuate (tapering gradually from the base), fully two-thirds the length of the hirsute tube, purplish, sparsely hispid; throat densely short-villous. — *M. aristata*, Hook. Bot. Mag. t. 3526, not Nutt. *M. citriodora*, var. *aristulata*, Gray, l. c., in part. — Texas, *Drummond, Wright, Reverchon.*

M. citriodora, Cerv. Usually more robust, the larger forms (2 or 3 feet high) with the aspect of *M. punctata*: bracts narrowly oblong, similarly whitened or purple-tinged, at least their spreading or recurving and abruptly aristulate or slender aristate tips: throat of the calyx densely villous; the teeth slender-aristiform, at length usually spreading, half or two-thirds the length of the mostly glabrous tube, from sparsely hirsute-plumose with long soft hairs to naked. — Cervantes in Lag. Nov. Gen. & Spec. 2 (1816); Gray, l. c., the var. *tenui-aristata*. *M. aristata*, Nutt. in Trans. Am. Phil. Soc. n. ser. v. 186; Benth. Lab. 318, & DC. l. c. 363: excl. the char. of the calyx-teeth at the close, which was taken from *M. punctata*, var. *lasiodonta*. — Plains of Nebraska to Texas, Eastern Colorado, and Arizona. (Mex.)

M. GRACILIS, Pursh, Fl. i. 17, described from a specimen in Lyon's herbarium, said to come from the mountains of South Carolina (to which Virginia and the accustomed *v. v.* are added by Pursh), is not identified by the description. It may not improbably be *Pycnanthemum montanum*, Michx.

31. BLEPHÍLIA, Raf. (From *βλεφαρίς*, the eye-lash, suggested by the conspicuously ciliate bracts, &c.) — Perennial herbs, of the Atlantic United States, resembling *Monarda* in foliage, &c., but with smaller verticillastrate-capitate glomerules, the upper more spicate; and small purple or bluish-white corolla, with the lower lip darker-spotted: fl. summer.

B. ciliáta, Raf. Stem a foot or two high, often simple, downy with short soft pubescence: leaves short-petioled, oblong, obtuse, obscurely serrate; the upper sessile and mostly narrowed at base; lower floral similar, uppermost and outer bracts of the mostly spicate-approximate heads ovate, cuspidate-acuminate, chartaceo-membranaceous, somewhat colored, strongly ciliate, conspicuously many-nerved from a stout midrib, about equalling the calyx: corolla villous-pubescent outside, purple. — Jour. Phys. lxxxix. 98; Benth. Lab. 319 & DC. Prodr. xii. 364. *Monarda ciliata*, L. Spec. i. 23 (Pluk. Alm. t. 164, fig. 3; Moris. Hist. iii. sect. 11, t. 8, fig. 6.) — Dry ground, Penn. (and recently at Hadley, Mass.), to Wisconsin, Georgia, and Missouri. Varies westward with more villous pubescence.

B. hirsúta, Benth. l. c. Taller, loosely branching, villous-hirsute: leaves slender-petioled, ovate or ovate-lanceolate, acuminate, with rounded or subcordate base; lower floral similar, subtending remote heads; upper floral and the bracts lanceolate and linear, subulate or aristate, few-nerved, hirsute with long hairs, as is the calyx: corolla less pubescent, pale, with some conspicuous dark spots. — *B. nepetoides*, Raf. l. c. *Monarda hirsuta*, Pursh, Fl. i. 19. *M. ciliata*, Michx. Fl. i. 16, not L. — Moist shady places, Canada and Vermont to Wisconsin, south to Missouri and E. Texas, and through the Alleghanies to Georgia.

32. LOPHÁNTHUS, Benth. (*Λόφος*, crest, and *ἄθος*, flower: application not evident.) — Perennial erect herbs (of N. America and N. E. Asia), mostly tall and coarse; with serrate and veiny petioled leaves, the lower usually subcordate and the upper ovate, and small flowers in dense and sessile verticillastrate glomerules, which are congested into a terminal spike, either continuous or interrupted below: floral leaves reduced to short ovate and acuminate bracts. Nutlets minutely hairy or glandular at the top. Fl. summer. — Bot. Reg. xv. & Lab. 462. *Agastache*, Clayt., Gronov. Virg. ed. 2, 88.

* Calyx-teeth green and herbaceous, ovate, obtuse: corolla greenish-yellow, almost included.

L. nepetoides, Benth. l. c. Glabrous or barely puberulent: stem $2\frac{1}{2}$ to 5 feet high, acute-angled: leaves ovate, acute: spike cylindrical, linear, nearly continuous. — *Hyssopus nepetoides*, L. Spec. ii. 569; Jacq. Vind. t. 69. — Borders of woods, Vermont and Connecticut to Wisconsin, and south to mountains of Carolina and Texas.

* * Calyx-teeth acute, membranaceous, more or less colored: corolla purplish or bluish, more conspicuous.

L. scrophulariæfólius, Benth. l. c. Stem 4 to 6 feet high, stout: leaves ovate or the lower cordate, acuminate, more or less pubescent or glabrous: spikes thickish, mostly interrupted, 4 to 16 inches long: calyx-teeth ovate-lanceolate, acute, whitish: corolla dull purplish. — *H. scrophulariæfolius*, Willd. Spec. iii. 48. — Borders of thickets, New York to Wisconsin, Kentucky, and mountains of N. Carolina.

L. anisátus, Benth. l. c. Glabrous or very minutely puberulent, 2 or 3 feet high: leaves ovate, often subcordate, canescent beneath, *anisate-scented* when crushed: spike short and narrow, interrupted, sometimes leafy below and paniculate: calyx canescently puberulent; the teeth ovate-lanceolate and merely acute, tinged with purple or violet: corolla blue. — Bot. Reg. t. 1282. *Hyssopus anisatus*, Nutt. Gen. ii. 27. *H. discolor*, Desf. Cat. Par. *Stachys feniculum*, Pursh, Fl. ii. 407. — Plains, Wisconsin to Saskatchewan, the northern Rocky Mountains, and Nebraska.

L. urticifólius, Benth. l. c. Like the last, but leaves green both sides, mostly crenate and more or less cordate, sweet-aromatic: calyx-teeth lanceolate, subulate-acuminate: corolla light violet or purplish. — Western slopes of Rocky Mountains to Oregon, Nevada, and California.

33. CEDRONÉLLA, Mœnch. (Diminutive of *κέδριον*, oil of cedar, from the sweet-scented leaves of *C. triphylla* of the Canaries and Madeira, the Balm-of-Gilead of English gardens.) — The following are the other species; sweet-odorous perennials; with petioled leaves, and flesh-colored or purplish flowers, in summer. — Meth. 411; Benth. Lab. 501.

§ 1. Tube of corolla little exerted beyond the ample calyx, its throat inflated: stamens shorter than the upper lip: flowers rather few, loosely and almost simply spicate.

C. cordáta, Benth. l. c. Low, hirsute-pubescent, producing long leafy runners: leaves long-petioled, cordate, crenate; the floral reduced to ovate bracts, each subtending 1 to 3 short-pedicelled minutely bracteolate flowers: calyx campanulate: corolla purplish, hairy inside, over an inch long. — *Dracocephalum cordatum*, Nutt. Gen. ii. 35. — Moist shady banks, W. Penn. to Kentucky and mountains of N. Carolina and Tennessee.

§ 2. Corolla slender, with tube exerted beyond the narrow calyx: stamens exerted: erect herbs of the Mexican region; with the verticillastrate glomerules or condensed cymes interrupted-spicate in the manner of *Lophanthus*, but less condensed.

C. Mexicána, Benth. Puberulent or almost glabrous: stems 1 to 3 feet high: leaves ovate-lanceolate, or the lower ovate and cordate, crenate-dentate; lower floral sessile and often entire; upper ones lanceolate and reduced to short bracts of the many-flowered spicate clusters: teeth of the purplish calyx subulate: corolla bright pink (an inch or more long), thrice the length of the calyx. — *Dracocephalum Mexicanum*, HBK. Nov. Gen. & Spec. ii. 322, t. 160. *Gardoquia betonicoides*, Lindl. Bot. Reg. xxiv. misc. 86; Hook. Bot. Mag. t. 3860. — Mountains of S. Arizona, near Santa Cruz, Wright. A form with mainly ovate and obtuse coarsely crenate leaves, resembling *C. pallida*, Lindl. Bot. Reg. xxxii. t. 2), but with (inch long) much exerted corolla. (Mex.)

Var. cána, Gray. Pale and very minutely cinereous, or inclined to be so: leaves smaller (half to inch and a half long), less toothed: corolla an inch long or sometimes much smaller. — Proc. Am. Acad. viii. 370. *C. cana*, Hook. Bot. Mag. t. 4618; Torr. Bot. Mex. Bound. 133, chiefly. — New Mexico, Wright, Bigelow, &c. A form with much smaller (seemingly not well-developed) flowers is *C. pallida*, var., Torr. l. c. and *Hyptis spicata*? Torr. l. c. 129. — S. Arizona, Wright, Thurber. (Adjacent Mex.)

C. micrántha, Gray, l. c. Puberulent: stems slender, branching above: leaves thin, slender-petioled, coarsely crenate-dentate; the lower cordate-ovate, obtuse; upper ovate-lanceolate or oblong; upper floral reduced to minute bracts and shorter than the calyx: capitate clusters sessile, many-flowered, mostly approximate in a cylindrical naked spike: calyx ovate-campanulate, less than 2 lines long, greenish; the triangular-subulate teeth about half the length of the tube: corolla (whitish, barely 2 lines long) and stamens little exerted. — S. W. Texas, towards the border of New Mexico (station not recorded), Wright. Spikes 2 inches long.

34. NÉPETA, L. CAT-MINT. (Probably from the Etrurian city *Nepete*.) — A large genus in the Old World; two are naturalized weeds in the New, representing distinct sections, differing in habit and inflorescence, rather than in the flowers, which are produced all summer.

N. CATÁRIA, L. (CATNIP.) Erect, branched, tall, minutely tomentose: leaves ovate or oblong and cordate, coarsely crenate, green above, caescent beneath: glomerate cymes many-flowered, spicate-crowded at the extremity of the branches, subtended by small floral leaves: bracts and calyx-teeth slender-subulate, soft: corolla whitish with some dark dots; the middle lobe of lower lip crenate-dentate. — Common eastward, especially near dwellings. (Nat. from Eu.)

N. GLECHÓMA, Benth. Procumbent or creeping, slender, somewhat pubescent, equally leafy throughout: leaves long-petioled, reniform or round-cordate, coarsely crenate: flowers 2 or

3 together in the axils of the leaves, short-pedicelled : bracts setaceous : calyx-teeth setaceous-acuminate from a broad base, soon spreading : corolla light blue, inch or less long : pairs of stamens very unequal : anthers in perfect flowers closely approximate in pairs ; the anther-cells diverging at a right angle, and each pair forming a cross : but the plant is gynodioecious, i. e. some produce only female flowers with abortive stamens. — Lab. 485. *Glechoma hederacea*, L. — Damp or shady places east of the Mississippi, in woods as well as near dwellings. Popularly named Gill-over-the-Ground. (Nat. from Eu.)

35. DRACOCÉPHALUM, Tourn. DRAGON-HEAD (as the name, composed of *δράκων* and *κεφαλή*, denotes). — Herbs, chiefly of North Asia, one North American, peculiar for its small and included corolla.

D. parviflorum, Nutt. Annual or biennial, 6 to 20 inches high, rather stout, somewhat pubescent : leaves lanceolate or oblong, petioled, incisely dentate, or the lower pinatifid-incised ; the lower floral similar : flowers numerous in sessile glomerules crowded in a thick terminal leafy-bracted head or short spike interrupted at base : bracts pectinate-laciniate and the teeth aristate : upper tooth of the calyx ovate, the others lanceolate and subulate-acuminate : corolla bluish, slender, hardly exceeding the calyx. — Gen. ii. 35 ; Benth. in DC. xii. 400. Rocky or gravelly soil, N. New York (shore of Lake Ontario) and L. Superior, to Brit. Columbia, and along the mountains to Utah and New Mexico : fl. spring.

36. SCUTELLÁRIA, L. SKULLCAP. (*Scutella*, a dish or platter, from the form of the fruiting calyx.) — Large and widely diffused genus, of bitter (not aromatic) chiefly perennial herbs, rarely undershrubby ; with single (mostly blue or bluish) flowers in the axils of leaves, or when the floral leaves are reduced to bracts then in (commonly secund) spikes or racemes : fl. spring and summer. Corolla arrect. All but two of our species are perennial, and the flowers in all are opposite, one in each axil.

§ 1. Nutlets wingless, mostly marginless, on a low or slightly elevated gynobase.

* Flowers small (only a quarter inch long), in axillary and sometimes also terminal racemes.

S. lateriflora, L. (MAD-DOG SKULLCAP.) Glabrous, a foot or two high, leafy : leaves thin, oblong-ovate and ovate-lanceolate, acuminate, coarsely serrate, rounded at base, slender-petioled ; the lower floral ones of the terminal racemes similar : lips of the corolla short, equal in length. — Spec. ii. 598 ; Lam. Dict. t. 515 ; Raf. Med. Fl. t. 84 ; Bart. Fl. Am. Sept. i. t. 21. — Wet borders of streams, Canada to Florida, New Mexico, and northwardly to Oregon and Brit. Columbia.

* * Flowers larger (half to full inch long), in terminal single or paniced racemes, which are commonly more or less leafy below, the floral leaves being gradually reduced to bracts.

+ Canine leaves all cordate, crenate-toothed, and slender-petioled : lateral lobes of the corolla almost equalling the short upper lip : anthers minutely ciliate.

S. versicolor, Nutt. Soft-pubescent : stem rather stout, erect, 1 to 3 feet high : leaves rugosely very veiny, broadly cordate, mostly obtuse (3 or 4 inches long) ; the floral ovate, entire (half inch long), crowded : racemes glandular-pubescent : corolla bright blue with lower side and lip whitish. — Gen. ii. 38. *S. Caroliniana*, Walt. Car. 163 ? *S. cordifolia*, Muhl. Cat. — Banks of streams, Penn. and Wisconsin to Florida and Texas.

Var. bracteáta, Benth. Robust, with larger and firmer floral leaves, many of the lower occasionally longer than the flowers, which thus appear to be axillary rather than racemose. — Lab. 433. — Texas.

Var. minor, Chapm. Low, slender, and thin-leaved : floral leaves small. — Fl. 323. *S. rugosa*, Wood, Class-Book. — Mountains of Virginia, &c.

S. saxatilis, Riddell. Slightly and sparsely pubescent, or glabrous : stems slender, weak, ascending (a span or two high), stoloniferous from the base : leaves thin, moderately veiny, cordate-ovate, obtuse, crenate-dentate (inch or two long) ; floral ovate or oblong, entire : raceme simple, loose : corolla light blue. — Cat. Pl. Ohio, Suppl. (1836) 14 ; Benth. in DC. Prodr. xii. 422 ; Gray, Man. ed. 1, 327. — Shaded moist banks, Delaware to Ohio and Tennessee.

Var. argúta. Pilose-pubescent: thin leaves narrower, acutish, more deeply crenate-dentate. — *S. arguta*, Buckley in Am. Jour. Sci. xlv. 175; Chapm. Fl. 323. *S. saxatilis*, var. ? *pilosior*, Benth. l. c., at least in part. *S. Chamædrys*, Shuttleworth in Ind. Sem. Lips., on char. — Mountains of Carolina and Georgia.

+ + Cauline leaves crenate-dentate or serrate, only the lowest if any cordate at base, more or less petioled: lateral lobes of the blue corolla shorter than the galeate upper lip and more connected with it.

+ + Corolla a full inch long, nearly glabrous: stem (a foot or two high) and loosely flowered somewhat leafy erect raceme simple, or rarely a pair of racemes at the base of the terminal one: leaves (3 to 5 pairs) coarsely and sharply serrate, acute or acuminate, mostly acute at base, 2 to 4 inches long; the lowest floral usually large and similar; upper entire and lanceolate.

S. montána, Chapm. Soft-pubescent: leaves oblong-ovate or the lowest subcordate: calyx velvety-pubescent: tube of the corolla ampliate upward, and the lips very broad, the upper emarginate. — Bot. Gazette, iii. 11. — Dry woods and fields, in the mountains of the north-western part of Georgia, *Chapman*.

S. serráta, Andr. Glabrous, or obscurely pubescent: leaves thin, ovate or ovate-oblong: corolla with narrow tube, moderately ampliate throat, and rather narrow upper lip. — Bot. Rep. t. 494; Benth. in DC. l. c. 422. — Woods, Penn. to Illinois and N. Carolina.

+ + Corolla two-thirds or three-fourths inch long, canescently puberulent: racemes numerous, thyrsoid-paniculate, many-flowered.

S. canéscens, Nutt. Minutely and canescently pubescent: stem 2 to 4 feet high, leafy: leaves from oblong-ovate to lanceolate-oblong, crenate-serrate, acute (3 or 4 inches long), the base obtuse or rounded, or of the uppermost acute, and lowest occasionally subcordate, the upper surface green and glabrous, the lower canescent, as also the racemes and especially the calyx: upper lip of corolla considerably surpassing the lower. — Gen. ii. 38; Benth. l. c. *S. pubescens* & *S. incana*, Muhl. Cat. *S. serrata*, Spreng. Syst. ii. 703, not Andr. — River-banks, W. Canada and Penn. to Illinois, and the mountains of Carolina and N. Alabama. Varies with the foliage greener, only a little paler beneath, and in

Var. punctáta, Chapm., glabrate and minutely punctate beneath. — Georgia and Florida, *Chapman*.

+ + Corolla half inch long, nearly glabrous: raceme simple and terminal, or also from the axils of one or two pairs of leaves.

S. pilósa, Michx. Hirsute-pubescent: stem slender, a foot or two high: leaves rather remote, oblong-ovate, obtuse, crenate, veiny (inch or two long); the lower subcordate and slender-petioled; upper cuneate at base and subsessile; floral oblong: bracts of the oblong raceme spatulate. — Fl. ii. 11; Benth. l. c. *S. Caroliniana*, Walt. Car. 163? *S. elliptica*, Muhl. Cat.? *S. polymorpha*, C. Hamilton, Monogr. 39, in part, ex Benth. — Dry or sterile ground, S. New York and Michigan to Florida and Texas.

Var. hirsúta, a large form, sometimes nearly 3 feet high, more hirsute: larger leaves 2 or 3 inches long, very coarsely crenate. — *S. hirsuta*, Short, Cat. Pl. Kentucky. — Richer soil, Kentucky, *Short*.

Var. ovalifólia, Benth., a form with shorter and finer pubescence, and narrower less veiny leaves. — *S. ovalifolia*, Pers. Syn. ii. 136. — New Jersey to Virginia.

S. villósa, Ell. Sk. ii. 90, from upper part of Georgia (villous, and with lanceolate leaves 3 or 4½ inches long, coarsely dentate and acute at both ends, brachiate racemes, but flowers not seen), is not identified.

+ + Cauline leaves entire (except in the first species), obtuse, narrowed at base: racemes mostly simple and terminal, leafy below: corolla blue, upwardly much ampliate and with large lips.

+ + These much shorter than the downwardly attenuate tubular portion: pubescence wholly soft or cinereous.

S. integrifólia, L. Manifestly pubescent or puberulent: stems mostly simple from a fibrous root, 8 to 20 inches high, slender: leaves thinnish, from oblong to nearly linear, an inch or more long; the upper narrowed at base and subsessile or short-petioled; lowest varying to ovate or even cordate and slender-petioled, often with a few coarse crenatures or obtuse teeth: corolla slightly pubescent, near an inch long; lower lip about equalling the upper: anthers long-ciliate: nutlets tuberculate. — (Pluk. Aln. t. 313, fig. 4.) *S. integrifolia* & *S. hyssopifolia*, L. Spec. ii. 599, the latter a narrow-leaved form. *S. Caroliniana*, Lam. Ill. t. 515, fig. 3. *S. polymorpha*, A. Hamilton, Monogr. 33, in part. — Dry ground, New England to Florida and Texas.

S. brevifolia. Cinereous-puberulent throughout: stems numerous from a suffrutescent base, rigid, a foot or less high, very leafy: leaves thickish, narrowly oblong, 6 to 8 lines long by 2 or 3 wide, all subsessile; the floral similar, gradually smaller: corolla soft-pubescent, three-fourths inch long; lower lip rather longer than the upper: anthers short-ciliate: nutlets granulate. — *S. integrifolia*, var. *brevifolia*, Gray in Cat. Coll. Tex. Hall, no. 458. — Dry banks, Dallas, Texas, *E. Hall*, *Reverchon*.

++ ++ Lips of the corolla about the length of the broad tube and throat.

S. Floridána, Chapm. Obscurely puberulent: stems slender, a foot or more high, rather remotely leafy and with some axillary fascicles: leaves very narrowly linear (8 to 12 lines long, seldom a line wide), with somewhat revolute margins; the lowest minute and scale-like: raceme rather loose: corolla nearly inch long: anthers long-ciliate. — Fl. 324. — Pine-barren swamps, Apalachicola, Florida.

* * * Flowers solitary in the axils of cauline leaves, or some occasionally imperfectly racemose through the reduction in size of the upper leaves of the stem or branches.

+ Annuals, loosely branched from the base: corolla pubescent, half inch or less long: nutlets muriculate.

S. cardiophylla, Engelm. & Gray. Puberulent, slender, a foot or two high, with virgate branches: leaves cordate-ovate or deltoid-subcordate, mostly obtuse, thin, veiny; principal cauline inch long, coarsely crenate, slender-petioled; floral gradually smaller and less toothed, the uppermost entire and subsessile (3 lines long, barely exceeding the calyx): corolla slender, blue. — Pl. Lindh. i. 19; Benth. in DC. l. c. 429. — Open woods, Arkansas and Texas.

S. Drummóndii, Benth. Villous-pubescent, a span or more high, soon diffuse, leafy: leaves ovate or obovate-oblong, very obtuse, half inch or more long, contracted at base, the lower into distinct petioles; floral subsessile and about equalling the flowers; all entire or nearly so (rarely subcrenulate): corolla violet purple or blue (3 to 5 lines long), commonly with the calyx villous-pubescent, at least when young; lower lip longer than the upper, violet-spotted. — Lab. 441, & DC. Prodr. xii. 428. — Damp or rich soil, Texas; common. (Mex.)

+ Perennials, from a firm or ligneous stock, neither stoloniferous nor tuberiferous: nutlets granulate.

S. Wrightii, Gray. A span or so high, many-stemmed in a tuft, minutely cinereous-puberulent, very leafy: leaves ovate, oval, or spatulate-oblong, entire, subsessile, about half an inch long; upper floral shorter than the flowers: corolla pubescent, half an inch long, usually violet; lips nearly equal in length; tube rather slender. — Proc. Am. Acad. viii. 370. — Texas, quite to the western borders, *Wright*, *Lindheimer*, *E. Hall*, &c. Kansas, *Gordon*, *L. Watson*, with a white-flowered variety.

+ Perennials, completely herbaceous and fibrous-rooted, mostly producing filiform stolon-like rootstocks:

++ These more or less moniliform-tuberiferous.

= Flower 2 to 4 lines long: leaves broadest at base and all but the lower sessile; primary veins prominent underneath.

S. párvula, Michx. Minutely (sometimes more conspicuously) pubescent, branching from the base, commonly erect, 4 to 10 inches high: filiform subterranean shoots bearing a long moniliform string of small tubers: leaves ovate or the uppermost ovate-lanceolate, sessile by a truncate or slightly cordate base, about half inch long; some of the lower with one or two coarse teeth, the lowest slender-petioled: pedicels as long as the calyx: corolla violet, pubescent, twice or thrice the length of the calyx: nutlets strongly muricate, girt with a thickish ring or border, which is conspicuous when young. — Fl. ii. 12; Hook. Exot. t. 106. *S. ambigua*, Nutt. Gen. ii. 37. — Sandy banks, W. New England and along the Great Lakes to Wisconsin, South Florida, and Texas.

Var. móllis, Gray. More spreading, softly pubescent throughout (the pubescence somewhat viscid): leaves larger, less firm. — Sandy banks of the Mississippi, at Oquawka, S. Illinois, &c., *H. N. Patterson*. A remarkable form, with somewhat the aspect of *S. Drummóndii*.

= Flower half or two-thirds inch long: leaves narrowed at base or petioled: plants depressed or weak and diffuse.

S. nána, Gray. Minutely cinereous-puberulent, 2 inches high, much branched: filiform subterranean shoots copiously moniliform-tuberiferous: leaves crowded, from ovate to

spatulate-obovate, entire, thickish, nearly veinless, half inch long, tapering into a petiole: corolla white, rather broad and with dilated throat, hardly exceeding the leaves; lips of equal length. — Proc. Am. Acad. ii. 100, & Bot. Calif. i. 604. — N. W. Nevada, near Pyramid Lake, *Lemmon*.

S. tuberósa, Benth. Soft-pubescent or villous: stems slender, rather sparsely leafy, 1 to 4 inches high and erect, or sometimes reaching a foot in length and trailing: leaves mostly ovate, either truncate or cuneate at base, thin, coarsely and obtusely few-toothed, or rarely entire (a quarter to inch and a half long), nearly all petioled; floral about equalling or longer than the violet or blue narrow corolla: nutlets strongly muricate. — Lab. 441; Gray, Bot. Calif. i. 601. — Hills, &c., nearly throughout California.

= = = Flower larger, violet-blue: stems erect, equally leafy: leaves from oblong to linear, all but the lower sessile and entire: moniliform tubers more rare or obscure, except in the first species.

S. resinósa, Torr. Barely a span high, branched from the base, minutely pubescent and resinous-atomiferous, somewhat viscid: leaves uniform, oval and oblong, or uppermost narrower, obtuse, mostly sessile (5 to 10 lines long), nervose-veined: pedicels shorter than the calyx: corolla pubescent, an inch long, with slender tube and ampliate throat; lower lip glabrous inside: nutlets tuberculate. — Ann. Lyc. N. Y. ii. 232; Benth. l. c. — Plains of Colorado, Wyoming, and Nebraska.

S. angustifolia, Pursh. A span to a foot high, minutely puberulent or almost glabrous: stems or branches often simple and slender: leaves from linear to narrowly oblong (6 to 12 lines long), all but the lower acute or contracted at base; lower more petioled and sometimes few-toothed; radical orbicular or cordate and small: pedicels as long as the calyx: corolla three-fourths to nearly inch long, puberulent, with slender tube and moderately ampliate throat; lower lip villous inside: nutlets minutely granulate. — Fl. ii. 412; Gray, Bot. Calif. i. 603. — Moist ground, British Columbia and Montana to California, even as far south as San Bernardino Co.

Var. canescens, Gray, l. c. More branching, tomentulose-canescens: corolla more arched by the curvature of the base of the tube. — *S. siphocampylodes*, Vathek in Bot. Zeit. xxx. 717. — Western part of California, in cañons, &c.

S. antirrhinoides, Benth. Resembles broader leaved forms of the preceding: stems more branching, diffuse or ascending: leaves oblong (6 to 9 lines long), mostly obtuse at base as well as apex, more petioled: corolla shorter and broader, 7 to 10 lines long; the tube shorter and less slender. — Bot. Reg. xviii. under 1493, & DC. l. c. 428; Gray, Proc. Am. Acad. viii. 396. *S. resinosa*, Watson, Bot. King, 237. — Moist shady ground, Oregon, northern part of California, and mountains of Nevada.

++ Filiform rootstocks or subterranean stolons not tuberiferous: corolla half to two-thirds inch long,

= Dull yellow or whitish, with ampliate-inflated throat, villous within (at least the lower lip), and short proper tube: all the upper leaves entire, obtuse.

S. Californica. Puberulent: stems 8 to 20 inches high, slender: leaves from lanceolate-oblong to oval-ovate, mostly roundish at base, short-petioled; the lower an inch or more long, often somewhat serrate; upper gradually reduced to half inch or less; uppermost shorter than the flowers: lips of the corolla about equal: nutlets obscurely rugose-granulate. — *S. antirrhinoides*, var. *Californica*, Gray in Proc. Am. Acad. viii. 396, & Bot. Calif. l. c., mainly. — Banks of streams, California, from Tehama Co. southward, and in the Sierra Nevada. Narrow-leaved forms resemble the preceding; broader-leaved forms are more like the following species.

S. Bolánderi, Gray. Pubescent: stem simple or branched from the base, a foot high, equably and very leafy to the summit: leaves ovate-elliptical, very obtuse, closely sessile by an obscurely cordate base, an inch or less long, veiny from the base: flowers very short-pedicelled, seldom equalling the leaf: lower lip of the corolla rather longer. — Proc. Am. Acad. vii. 337, & Bot. Calif. l. c. — Sierra Nevada, California, in Mariposa and Plumas Co., *Bolander, Lemmon*.

= = Corolla violet-blue, with slender tube and less ampliate throat, naked within.

S. galericuláta, L. Nearly glabrous or slightly pubescent, slender, 1 to 3 feet high, simple or paniculately branched above: leaves membranaceous, ovate-lanceolate or oblong-lanceolate, broadest next the subsessile or very short-petioled subcordate base (2 inches or less long), all but the upper and more reduced ones appressed-serrate: pedicels shorter than

the calyx: corolla puberulent; lower lip nearly erect and surpassing the upper: nutlets densely muriculate-scabrous. — Spec. ii. 599; Engl. Bot. t. 593; Schk. Handb. t. 167. — Wet soil, Atlantic States, from mountains of Carolina to Newfoundland, Mackenzie River, and westward from mountains of Arizona to Brit. Columbia. (Eu., N. Asia.)

§ 2. Nutlets raised on a slender gynobase, each surrounded by a conspicuous membranaceous wing in the manner of *Perilomia*, the faces muricate. (Here also a Japanese species, *S. Guilielmi*.)

S. nervósa, Pursh. Glabrous: rootstocks or stolons filiform: stems slender, rather simple, 4-quetrous (10 to 20 inches high): leaves membranaceous, coarsely few-toothed, rather prominently quintuple-ribbed from near the base; the lowest cordate and short-petioled; the others sessile or nearly so; middle ones ovate; floral ovate-lanceolate, gradually smaller and more entire, much surpassing the axillary secund flowers: corolla bluish, 4 lines long, with lower lip exceeding the straightish merely concave upper one. — Pursh, Fl. ii. 412; Gray, Proc. Am. Acad. viii. 370. *S. tenerifolia*, Smith. *S. gracilis*, Nutt. Gen. ii. 37. — Moist thickets, New York to Virginia, Ohio, and Missouri.

37. SALIZÁRIA, Torr. (In honor of *Don José Salizar y Larrequi*, the Mexican Commissioner of the U. S. and Mex. Boundary Survey.) — Bot. Mex. Bound. 133, t. 39. — Single species of a remarkable genus.

S. Mexicána, Torr. l. c. Shrubby, 2 or 3 feet high, with diffuse or sarmentose slender soft-canescens branches: leaves remote, glabrate, small, oblong or broadly lanceolate, short-petioled, mostly entire; floral reduced to bracts of the short and loose terminal racemes: flowers less than inch long: corolla purplish, or the spreading lower lip deep purple: fructiferous vesicular calyx half inch or more in diameter. — Bot. Calif. i. 604. — Ravines, S. E. California in the Mohave desert, S. Nevada and Utah, Arizona, *Fremont*, *Parry*, *Cooper*, *Palmer*. (Adjacent Mex.)

38. BRUNÉLLA, Tourm. SELF-HEAL, or HEAL-ALL. (Commonly written *Prunella*, but said to come from the old German word *Breune* or *Branne*, an affection of the throat, which the plant was thought to cure.) — Low perennials; with nearly simple stems, terminated by a short verticillastrate-spicate or capitate inflorescence, with imbricated round-ovate and nervose bracts or floral leaves of about the length of the calyx, each subtending 3 subsessile flowers: fl. all summer.

B. vulgaris, L. Leaves ovate-oblong, entire or toothed, slender-petioled, commonly pubescent: corolla not twice the length of the purplish calyx, violet, purplish, &c., rarely white. — Fields and borders of copses, Newfoundland to Florida, and west to California and northward; evidently indigenous in some of the cooler districts. (Eu., Asia, Mex.)

39. BRAZÓRIA, Engelm. & Gray. (Discovered on the Rio Brazos, Texas.) — A genus of two annuals, of rather low stature: leaves oblong, mostly sessile, denticulate; lowest tapering into a petiole; floral diminished to small ovate or oblong-lanceolate bracts to the single flowers of the virgate racemes or spikes: corolla rose-purple: fl. summer. — Pl. Lindh. i. 47; Gray, Chloris, 34, t. 5; Benth. in DC. Prodr. xii. 434.

B. truncáta, Engelm. & Gray, l. c. Somewhat pubescent, at least the raceme and calyx viscid-hairy: spike dense and strict, simple or sometimes branching: calyx much reticulated, truncate, its broad lips of equal length, obscurely lobed, mucronately denticulate (3 or 4 inches in fruit): corolla three-fourths inch long; upper lip and middle lobe of lower deeply emarginate, all the lobes denticulate; palate somewhat prominent; tube pilose-annulate near the base: anthers somewhat hairy: nutlets puberulent. — Chloris, l. c. t. 5. *Physostegia truncata*, Benth. Lab. 305; Hook. Bot. Mag. t. 3494. — Sandy soil, in plains and prairies of E. Texas, *Berlandier*, *Drummond*, *Lindheimer*, &c.

B. scutellarioides, Engelm. & Gray, l. c. Almost glabrous: spikes or racemes loose, mostly paniced: lips of the calyx unequal; the upper with 3 ovate-rounded, lower with 2 triangular-lanceolate lobes, all but the uppermost cuspidate: corolla (a third inch long) not pilose-annulate; its lobes entire or merely retuse: anthers barely ciliolate: nutlets glabrous. — *Physostegia truncata*, Hook. Bot. Mag. t. 3494 (wrongly cited in DC. under preceding species). — Richer prairie soil, Texas, Drummond, Wright, Lindheimer, &c.

40. PHYSOSTÉGIA, Benth. FALSE DRAGON-HEAD. (*Φῦσα*, bladder, and *στέγη*, covering; from the turgid fruiting calyx, but more applicable to the inflated corolla.) — Perennial erect N. American herbs, almost glabrous; with lanceolate or oblong and callose-denticulate or serrate leaves; the upper ones sessile, lowest tapering into a petiole, floral reduced to small subulate bracts of the simple or paniced spikes, most of them shorter than the calyx. Flowers cataleptic (remaining in whatever position they may be turned on the short pedicel, either right or left of the normal position). Corolla showy, rose or flesh-color, often variegated: in summer.

P. Virginiana, Benth. l. c. Stem in larger forms 3 or 4, in smaller 1 or 2 feet high, terminated by a simple virgate or sometimes several paniced spikes: leaves thickish: calyx tubular-campanulate or somewhat turbinate-campanulate, in fruit broader and with a narrowed base; its teeth ovate-triangular and very acute, only half the length of the tube: corolla commonly an inch long. — *Dracocephalum Virginianum*, L. Spec. ii. 594; Sims, Bot. Mag. t. 467. *D. lancifolium*, Mench, Meth. 410. *D. variegatum*, Vent. Cels, t. 44. *Prasium purpureum* & *P. coccineum*, Walt. Car. 166. — Wet grounds, N. Vermont, W. Canada and Saskatchewan to Florida and Texas: common in gardens. Varies greatly; the extremes are

Var. speciosa, a tall form, with very acutely serrate lanceolate leaves, and dense and paniced spikes. — *Dracocephalum speciosum*, Sweet, Brit. Fl. Gard. t. 93, with horizontal flowers *Physostegia imbricata*, Hook. Bot. Mag. t. 3386 (not Benth.), a Texan form, with erect imbricated flowers.

Var. denticulata, a more slender and commonly low form, with crenulate-denticulate or obscurely serrate leaves, and more slender or loosely-flowered spike. — *Dracocephalum denticulatum*, Ait. Kew. ii. 317; Sims, Bot. Mag. t. 214. — Middle Atlantic States.

Var. obovata, with oblong or obovate and often obtuse leaves. — *Dracocephalum obovatum*, Ell. Sk. ii. 86. — Georgia to Arizona.

P. intermedia, Gray. Stem slender, 1 to 3 feet high, remotely leaved: leaves linear-lanceolate, repand-denticulate: spikes filiform, commonly rather remotely flowered: calyx short and broadly campanulate; the triangular acute teeth about as long as the tube: corolla 5 or 6 lines long, much dilated upwards. — Proc. Am. Acad. viii. 371. *Dracocephalum intermedium*, Nutt. in Trans. Am. Phil. Soc. n. ser. v. 187. — Barrens, W. Kentucky and Arkansas to Louisiana and Texas.

P. parviflora, Nutt. Stem rather slender, leafy, a foot or two high: leaves lanceolate or ovate-lanceolate, denticulate; spikes short (1 to 4 inches long): calyx short-campanulate, inflated-globular in fruit and with short mostly obtuse teeth: corolla rather narrow, half inch long. — Nutt. (ex Benth., under *P. imbricata*, Benth. l. c., not Hook. Bot. Mag.); Gray, Proc. Am. Acad. viii. 371. — Banks of streams, Saskatchewan and Wyoming to Brit. Columbia, and Oregon.

41. MACBRÍDEA, Ell. (In memory of *Dr. James Macbride*.) Glabrous or sparsely hirsute perennials (of S. Atlantic States); with simple stems, a foot or more high, lanceolate or spatulate-oblong repand-toothed or entire minutely punctate leaves; the floral becoming thickish and rounded imbricated bracts of a capitate and rather few-flowered capitate inflorescence. Flowers showy (corolla over an inch long), in late summer. (Anthers not pilose *within the cell*, as stated, but mainly on the inner face.) — Ell. Sk. ii. 56; Chapm. Fl. 324.

M. pulchra, Ell. l. c. Leaves oblong-lanceolate, mostly acute at both ends and tapering into a petiole, thinnish; floral or bracts ovate, acute: lateral lobes of the calyx entire or

emarginate: corolla rose-purple (streaked with a deeper hue and white); its upper lip entire. — *M. pulchella*, Benth. Lab. 505, & DC. Prodr. xii. 435. *Thymbra Caroliniana* & *Prasium incarnatum*, Walt. Car. ex Benth. *Melittis Caroliniana*, Spreng. Syst. ii. 700. — Pine-barren swamps, southern borders of N. Carolina to Georgia and Alabama.

M. álba, Chapm. l. c. Leaves spatulate-oblong or oblanceolate, obtuse, thickish, all but the lowest sessile; floral ones round-ovate or orbicular: lateral lobes of the calyx strongly emarginate or 2-cleft: corolla white; its upper lip emarginate. — Low pine-barrens, W. Florida near the coast, *Chapman*.

42. SYNÁNDRA, Nutt. (*Σύν*, together, and *ἀνθή*, for anther, the posterior and sterile anthers connate.) — Single species, large-flowered, and with the aspect of *Lamium*.

S. grandiflora, Nutt. Fibrous-rooted biennial, a foot or two high, hirsute: leaves membranaceous, cordate, coarsely crenate, all but the floral long-petioled; these reduced to ovate sessile bracts, each subtending a single flower: corolla inch and a half long, white or nearly so: filaments bearded. — Gen. ii. 29; Benth. l. c. — Shady banks of streams, S. Ohio to Illinois and Tennessee: in spring.

43. MARRÚBIUM, Tourn. HOREHOUND. (From Hebrew word, meaning bitter.) — Perennials; all natives of the Old World, but one species widely dispersed and naturalized, viz.

M. vulgare, L. Hoary-woolly, branched from the base, aromatic-bitter (hence used in popular medicine): leaves roundish, crenate, very rugose-veiny: flowers verticillate-capitate in the upper axils: calyx with 10 short recurving teeth, these and the bracts at length hooked at the tip. — Escaped from gardens into waste or open ground: fl. late summer. (Nat. from Eu.)

44. BALLÓTA, L. BLACK HOREHOUND. (Greek name, of obscure derivation.) — Weedy perennials of the Old World; with bitter and unpleasant-scented herbage; fl. summer.

B. nigra, L. Soft-pubescent, but not hoary, spreading: leaves ovate, crenate or toothed, slightly rugose, slender-petioled: flowers numerous in rather loose axillary verticillate cymes: bracts setaceous: calyx with dilated somewhat foliaceous mucronate-tipped teeth, equalling the purplish corolla. — Sparingly in waste places, New England, Penn., &c. (Nat. from Eu.)

45. PHLÓMIS, Tourn. JERUSALEM SAGE. (Ancient Greek name of a woolly plant, perhaps of this genus.) — Perennials, of the Old World, one sparingly introduced, viz.

P. tuberosa, L. Tall, 3 to 5 feet high, from a thick tuberous root, somewhat glabrous: lower leaves ovate and cordate, crenate, slender-petioled, rugose-veiny; floral oblong-lanceolate and mostly sessile, subtending dense verticillate-capitate clusters: bracts setaceous, hirsute: calyx-teeth setaceous-subulate from a short and dilated truncate-emarginate base, divaricate: corolla pale purple, its upper lip densely white-bearded. — S. shore of Lake Ontario, New York: fl. early summer. (Nat. from Eu.)

46. LEONÓTIS, R. Br. (*Λέων*, lion, and *ὄσ, ὠτός*, ear, from the corolla.) — African plants; with dense verticillate-capitate clusters of showy scarlet or orange flowers; sparingly naturalized on our southern borders: fl. summer.

L. nepetefolia, R. Br. Tall annual, minutely soft-pubescent: leaves long-petioled, ovate, coarsely serrate or crenate, veiny; upper floral lanceolate: verticillate heads large and dense: calyx about 8-toothed: corolla an inch long, orange-red, densely hirsute. — Bot. Reg. t. 281. — Waste grounds, Georgia and Florida. (Nat. from Afr.)

47. LEONŪRUS, L. MOTHERWORT. (*Λέων*, a lion, and *οὐρά*, tail.) — Herbs of the Old World, weeds or escapes from gardens in the New: herbage bitter: flowers small, in summer.

L. CARDÍACA, L. (COMMON MOTHERWORT.) Tall perennial, more or less pubescent: leaves long-petioled, palmately cleft; the lower rounded; floral rhombic-lanceolate, 3-cleft; lobes lanceolate: flowers much shorter than the petioles; corolla pale purple; its upper lip very villous outside, narrowed at base, hardly galeate, at length often recurved; lower deflexed, spotted: stamens often recurving outwards after anthesis: anther-cells parallel. — Waste and cult. ground, in manured soil. (Nat. from Eu.)

L. MARRUBIÁSTRUM, L. Tall biennial, minutely soft-pubescent: leaves ovate or oblong, or the floral lanceolate, coarsely serrate or incised: calyx-teeth slender, rather aristiform than spinescent: corolla minute, whitish, almost glabrous; its lips less divergent: stamens little exerted beyond the throat: anther-cells diverging. — *Chaiturus Marrubiastrum*, Ehrh. — Waste grounds, New Jersey to Delaware, and southward; rare. Related as much to *Sideritis* as to *Leonurus*; might be placed next to *Marrubium*. (Nat. from Eu.)

L. SIBÍRICUS, L. Tall biennial, minutely puberulent or nearly glabrous: leaves 3-parted; the divisions 2-5-cleft, or deeply 3-7-cleft and incised: corolla purplish, twice the length of the calyx; upper lip fornicate, lower little spreading. — Waste grounds, Pennsylvania (near Philadelphia, *Martindale*), New Mexico, &c. (Sparingly nat. from Eu. & Asia.)

48. LÁMIUM, Tourn. DEAD-NETTLE. (From *λαῖμος*, the throat, alluding to the ringent corolla.) — Spreading or decumbent herbs, with mostly cordate incised or doubly toothed leaves; the lower long-petioled; upper becoming sessile or roundish at base, subtending sessile and loose or capitate clusters of purple or sometimes white flowers. Anthers in our species hirsute. Natives of the Old World, some naturalized in waste places or fields, eastward.

L. AMPLEXICAŪLE, L. Biennial or winter annual, weak and slender, low: leaves distant; lowest small, roundish-cordate, coarsely crenate, long-petioled; upper subsessile or clasping, crenately lobed and incised: corolla slender, purple, with spotted lower lip, truncate lateral lobes, and upper lip villous on the back. — Rather common, Canada to Florida. (Nat. from Eu.)

L. PURPŪREUM, L. Resembles the last, but with leaves (even the upper floral) all petioled and only crenate-serrate: calyx-teeth more slender: small lateral teeth to the orifice of the corolla. — Penn. and New England. (Sparingly nat. from Eu.)

L. ÁLBUM, L. Stouter, a foot or two high, more leafy and hirsute-pubescent: root perennial: leaves ovate, cordate or truncate at base, acuminate, coarsely serrate, mostly petioled: corolla white, an inch long, with tube curved upwards and throat rather narrow; upper lip oblong; a long slender appendage at each side of the throat. — E. New England. (Sparingly nat. from Eu.)

49. GALEÓPSIS, L. HEMP-NETTLE. (*Γαλέα*, a weasel, and *ὄψις*, resemblance, "very like a weasel" to a lively imagination only. The popular name is 'little less natural.') — Annual weeds of Europe: naturalized in waste places and garden soil: fl. late summer.

G. TETRÁHIT, L. Hispid: stem swollen below the joints: leaves ovate, acuminate, coarsely serrate: corolla light purple, variegated, 6 to 10 lines long. — Common. (Nat. from Eu.)

G. LÁDANUM, L. Pubescent, lower and smaller: leaves oblong-lanceolate: corolla red or rose-color. — E. New England, in few places. (Barely nat. from Eu.)

50. STÁCHYS, Tourn. WOUNDWORT. (*Στήχης*, a spike, primarily a spike or ear of corn, and the ancient Greek name of this genus or of some similar plants, from the spicate inflorescence.) — A large genus, widely dispersed; ours all herbs, with the flowers verticillastrate-capitate or clustered, or sometimes few

or solitary in the axils of the floral leaves, forming usually an interrupted spicate inflorescence; in summer.

* Root annual; corolla with short tube, mostly purplish or reddish.

† Even the lower lip hardly exceeding the subulate or aristulate tips of the calyx-teeth: leaves obtuse, crenate, an inch or less long; lower subcordate and slender-petioled: upper subsessile: stems a span or two high: lower flower-clusters remote.

S. ARVÉNSIS, L. Hirsute, often decumbent: upper leaves ovate with cuneate base: verticillate clusters in their axils few-flowered: calyx oblong-campanulate, 3 lines or more long, almost hispid, in fruit declined; the lanceolate teeth aristulate. — Waste grounds, E. Mass. (Locally nat. from Eu.)

S. agrária, Cham. & Schl. Hirsute pubescence finer and softer: stems slender, erect: upper leaves subcordate or oval; upper floral shorter than the small and several-flowered clusters: calyx even in fruit not over 2 lines long and not declined, short-campanulate; the subulate teeth cuspidate-aristulate. — Linn. v. 100; Benth. in DC. Prodr. xii. 479. *S. Grahami*, Benth. Lab. 551. — Moist or shady places, common in Texas. (Mex.)

† Lips of the corolla surpassing the slender-subulate and aristulate calyx-teeth: fructiferous calyx 4 lines long: stem a foot or two high.

S. Drummóndii, Benth. Soft-hirsute: leaves ovate and oval, obtuse, crenate, all the lower cordate: upper pairs distant; floral with narrowed base, the uppermost lanceolate or subulate and shorter than the flowers: these mostly in sixes: calyx-tube in fruit globular-campanulate and rather shorter than the setaceous-attenuate teeth: upper lip of the corolla nearly 2, and lower 3 or 4 lines long. — Lab. 551, & DC. l. c. — Moist ground, Texas, *Drummond, Wright, Lindheimer*. (Mex.)

S. ANNUA, L., an Old-World species, with glabrous leaves not cordate, and whitish flowers only four lines long, sparingly occurs as a ballast weed, near Philadelphia.

* * Root perennial.

† Corolla white or whitish, with tube shorter or hardly longer than the calyx-teeth; lips only 2 or 3 lines long; the upper villous-bearded or woolly on the back: flowers sessile or nearly so: herbage from soft-hirsute to white-tomentose. (Californian and one New Mexican species.)

S. Rothróckii, Gray. A span high, branched from the base, canescently lanate-pubescent throughout: leaves all sessile and lanceolate, obtuse, almost entire (inch long); floral gradually smaller and oblong, subtending about 3 flowers: spike rather dense and short: calyx campanulate; the teeth ovate- or subulate-deltoid, with very acute but soft tips: corolla 4 or 5 lines long; the tube included. — Proc. Am. Acad. xii. 82. — Zuni village, New Mexico, *Rothrock*.

S. ajugoídes, Benth. A span to a foot high, villous with very soft white hairs: leaves oblong, very obtuse, crenately serrate, 1 to 3 inches long, roundish or acutish at base; the lower petioled; upper sessile; even the upper floral as long as the (about 3) subtended flowers: clusters mainly distant: calyx short-campanulate or in fruit turbinate, very silky-villous; the teeth triangular-ovate, aristulate-acuminate, barely equalling the tube of the corolla. — Linn. vi. 80, & DC. l. c. 474; Gray, Bot. Calif. i. 605. — California, common in moist ground. Also (in a dubious form) Willow Spring, Arizona, *Rothrock*.

S. álbens, Gray. Tall (1 to 5 feet high), soft-tomentose or lanate with white or whitish wool, leafy: leaves oblong or ovate, usually with more or less cordate base, acutish, crenate, 2 or 3 inches long; lower short-petioled; upper nearly sessile; most of the floral shorter than the dense interrupted capitate clusters of the virgate spike: calyx turbinate-campanulate; the teeth triangular and aristulate, nearly equalling the tube of the corolla. — Proc. Am. Acad. vii. 387, & Bot. Calif. l. c. *S. pycnostachya* (meaning *S. pycnantha*, Benth.), Torr. in Wilkes Exped. xvii. 408. — Wet ground, mountains and foot-hills of California, from Shasta to Kern Co.

S. pycnantha, Benth. Soft-hirsute with somewhat fulvous hairs, leafy, 2 or 3 feet high: leaves oblong-ovate and subcordate, obtuse, crenate, 2 to 4 inches long, mostly rather long-petioled; floral all reduced to small bracts of the dense oblong or cylindraceous spike (of 1 to 3 inches long), each subtending about 3 flowers: calyx-teeth deltoid, mucronulate, very hirsute, fully equalling the tube of the corolla: upper lip of the latter strongly bearded. — Pl. Hartweg. 331; Gray, Bot. Calif. i. 605. — California, in the Coast Range, from Monterey to above San Francisco, *Hartweg, Kellogg*.

+ + Corolla purple or rose-red (not scarlet-red), with tube equalling or longer than the calyx: flowers sessile or subsessile,

+ + Not over half inch long: tube of the corolla not exceeding the tips of the calyx-teeth: spike mostly much interrupted: stems erect from filiform and sometimes tuberiferous rootstocks. (Atlantic species, one extending north-westward to the Pacific.)

= Leaves obscurely or not at all cordate, sessile or short petioled.

S. hyssopifolia, Michx. Glabrous and smooth throughout, or sometimes a hirsute ring at the nodes: stems slender, about a foot high: leaves linear, sometimes oblong-linear (1 or 2 inches long, $1\frac{1}{2}$ to 3 lines wide), entire or merely denticulate, even the lowest narrowed at base and sessile: spike rather short and slender; the clusters 2-6 flowered: calyx 2 or 3 lines long, occasionally with a few bristly long hairs; teeth broadly subulate: corolla glabrous. — Fl. ii. 4; Benth. l. c.; Gray, Man. ed. 2, 317, ed. 5, 358. *S. palustris*, Walt. Car. 162, not L. — Wet and sandy soil, coast of Mass. to Michigan and Florida.

Var. ambigua. Stouter, 1 or 2 feet high, sometimes with scattered retrorse bristles on the angles of the stem: leaves broader, 3 to 6 lines wide, serrulate. — Georgia, *LeConte*. Kentucky and Illinois, *Short, Buckley, E. Hall, &c.*

S. palustris, L. From densely soft-pubescent to roughish-hirsute, leafy: stem 1 to 3 feet high, hirsute or hispid: leaves from ovate to oblong-lanceolate, crenate-serrate, mostly acute or acuminate ($1\frac{1}{2}$ to 3 inches long), sessile or subsessile by a broad and abrupt or obscurely subcordate base; the lowest little petioled; all sometimes almost velvety-tomentose beneath: clusters of the spike mostly approximate, 6-10 flowered: calyx pubescent or hirsute; the teeth subulate, nearly the length of the tube: upper lip of corolla distinctly pubescent. — Spec. ii. 580; Fl. Dan. t. 1103; Engl. Bot. t. 1675; Benth. l. c. — Wet ground, Newfoundland to the Pacific in Oregon, south to Pennsylvania, and in the Rocky Mountain region to New Mexico, north to Mackenzie River. (Eu., N. Asia.)

S. aspera, Michx. l. c. Taller, 2 to 4 feet high, usually less leafy, sparsely hirsute or hispidulous-pubescent to nearly glabrous: stem mostly retrorse-hispid on the angles: leaves thinner, from oblong-ovate to oblong-lanceolate ($1\frac{1}{2}$ to $4\frac{1}{2}$ inches long), acute or acuminate, rather obtusely serrate, nearly all distinctly petioled and with truncate or merely subcordate base: calyx glabrous or glabrate, or with some scattered bristles; the tube obscurely striate when dry: corolla glabrous throughout. — Benth. l. c. *S. arvensis*, Walt. Car. 162, not L. *S. hispida*, Pursh, Fl. ii. 407. *S. palustris*, var. *aspera*, Gray, l. c. — Wet ground, Canada to Florida and W. Louisiana. Too near *S. palustris*. (Japan.)

Var. glabra. Even the angles of the stem smooth and naked or nearly so: leaves more conspicuously petioled, acuminate, and serrate. — *S. annua*, Walt. Car. 161, not L. *S. tenuifolia*, Willd. Spec. iii. 100. *S. glabra*, Riddell, Cat. Ohio Pl. Suppl. (1836), 16. *S. aspera*, var. *glabrata*, Benth. l. c. *S. palustris*, var. *glabra*, Gray, Man. l. c. — W. New York to Illinois and southward. Filiform stolon-like rootstocks more or less tuberiferous.

= = Most of the leaves distinctly petioled: lower all long-petioled and cordate: corolla glabrous or nearly so throughout, barely 5 lines long.

S. floridana, Shuttlew. Barely a foot high, with filiform stolon-like rootstocks terminated by a moniliform tuber (of 2 or 3 inches in length), nearly glabrous, or the slender stem minutely hirsute, at least the angles: lower leaves cordate-oblong, very obtuse, crenate-dentate (three-fourths to 3 inches long), slender-petioled; floral small and with cuneate subsessile base, hardly surpassing or shorter than the rather remote clusters of the short spike: calyx-teeth aristulate-subulate, little shorter than the oblong-campanulate tube. — Benth. in DC. Prodr. xii. 478; Chapm. Fl. 327, but root not annual. — E. Florida, *Rugel, Buckley, Conly, Palmer, Curtis.*

S. cordata, Riddell. Two or three feet high, rather weak, hirsute: leaves all ovate or oblong-cordate, acuminate, crenate (2 to 5 inches long), nearly all long-petioled; the floral mostly minute: spikes slender, of numerous and small few-flowered clusters: calyx (only 2 lines long) with broadly subulate teeth much shorter than the campanulate tube. — Cat. Ohio Pl. Suppl. (1836), 15. *S. sylvatica*, Nutt. Gen. ii. 30, not L., but near it. *S. Nuttallii*, Shuttlew. in DC. l. c. 469. *S. palustris*, var. *cordata*, Gray, Man. l. c. — Thickets, S. Ohio to Virginia and Tennessee. — Not rarely leaves as broad at the base as in *S. sylvatica*.

+ + Flowers half inch long: tube of corolla somewhat exceeding the calyx. (Pacific species.)

S. bullata, Benth. A foot or two high from a slender rootstock, hirsute-pubescent, varying to villous or to somewhat hispid: leaves mostly petioled, ovate to oblong, usually

obtuse, cordate or roundish-truncate at base, crenate, sometimes bullate-rugulose, not rarely villous-canescens, especially beneath: spike naked, interrupted: teeth of the calyx deltoid-subulate and aristulate-acuminate, fully half the length of the campanulate tube: corolla with the little or more manifestly exserted tube about 4 lines long, nearly equalled by the widely spreading lower lip; the short upper lip villous or pubescent on the back. — Lab. 547, & DC. l. c. 474; Gray, Bot. Calif. i. 606. *S. Californica*, & *S. Nuttallii*, var. ? *occidentalis*, Benth. in DC. l. c. 469. *S. Nuttallii*, var. *leptostachya*, Benth. Pl. Hartw. 331. *S. rigida*, Nutt. ex Benth. in DC. l. c. 472. *S. coccinea*, Hook. & Arn. Bot. Beech. 156, ex Benth. *S. sylvatica* & *S. agraria*, Torr. in Wilkes's Exped. xvii. 408. — California to Oregon, near the coast, and south-eastward to the Mohave. — A variable species: leaves thinner and not rugose when growing in shade.

++ ++ Flowers ample: tube of the rose-red corolla over half inch long, fully twice the length of the lower lip and of the cylindraceous-campanulate calyx: leaves mostly ample (3 to 5 inches long), petioled, oblong-ovate and subcordate, crenate, veiny: stems 2 to 6 feet high, almost always retrorsely hispid on the angles: verticillate clusters of the spike mostly 6-flowered.

S. Chamissonis, Benth. Leaves softly villous-canescens beneath, sericeous-hirsute above, oblong-ovate, rather obtuse, rugose-veiny; petioles retrorsely hispid: short spike mostly naked; the floral leaves reduced to bracts and shorter than the flowers: calyx densely hirsute-pubescent; teeth deltoid and cuspidate: tube of corolla commonly three-fourths inch long; outside of the lips (at least of the upper) hirsute-pubescent. — Linn. vi. 80; & DC. l. c. 468; Hook. & Arn. Bot. Beech. 155; Gray, Bot. Calif. i. 606. — California, in swamps along San Francisco and Bolinas Bay, &c.

S. ciliata, Dougl. Green and glabrate, or sparsely pilose-pubescent: leaves thin, ovate, mostly acute or acuminate: petioles and angles of the stem retrorsely hispid-ciliate: lower floral leaves often similar to the cauline and much surpassing the flowers; uppermost reduced to small bracts, merely equalling the calyx, which is more tubular than in the preceding, either nearly glabrous or pilose-pubescent, and the teeth narrower: corolla rather smaller, nearly glabrous. — Benth. Lab. 539, & DC. l. c. 467. — Oregon to Brit. Columbia along the coast, in damp and shady places.

Var. pubens. Soft-pilose-pubescent or villous-hirsute, especially the calyx and lower face of the leaves: flowers commonly rather smaller or shorter. — *S. Riederi*, Cham. & Benth. l. c. ? *S. palustris*, var., Torr. in Wilkes Exped. l. c. — Washington Terr. to Fraser River, &c. Connects *S. ciliata* with *S. Chamissonis*.

+ + Corolla scarlet-red, with narrow cylindrical tube much exceeding the calyx and the lips: flowers short-pedicelled or subsessile: cauline leaves slender-petioled: pubescence short and soft.

S. coccinea, Jacq. Rather slender, a foot or two high: leaves ovate-lanceolate with cordate base, or oblong-deltoid, obtuse, crenate (inch or two long); floral sessile; the upper very small: spike interrupted: flowers generally distinctly pedicelled: calyx in flower cylindraceous, with tube twice the length of the slender-subulate teeth (in fruit more campanulate), a third to nearly half the length of the (9 to 12 lines long) corolla. — Hort. Schœnb. iii. 18, t. 284; Bot. Mag. t. 666; Andr. Bot. Rep. t. 310; Benth. in DC. l. c. 467. *S. cardinalis*, Kunze in Bot. Zeit. ii. 645, ex Benth. — W. Texas to S. Arizona. (Mex.)

S. Bigelovii, Gray. Minutely cinereous-pubescent, slender: foliage, &c., nearly of the preceding: flowers fewer in the clusters, almost sessile: calyx (only 3 lines long) oblong-campanulate; its teeth broader: tube of the (red ?) corolla only half inch long; lower lip 3 lines long, much larger than the upper. — Proc. Am. Acad. viii. 371. — S. W. Texas, in crevices of basaltic rocks, Wright, Bigelow.

BETÓNICA OFFICINÁLIS, L., or **STACHYS BETONICA**, Benth., Wood Betony, of Europe, has been found in thickets near Boston, an escape from gardens.

ORDER CV. PLANTAGINACEÆ.

An anomalous order of Gamopetalæ, chiefly acaulescent herbs with one-several-ribbed or nerved radical leaves, simply spicate inflorescence, and regular 4-merous flowers having a free ovary, a filiform and entire long-stigmatose style, amphitropous and peltate ovules and seeds, a mostly straight embryo in firm-fleshy albumen, the cotyledons little broader than the radicle, and the *corolla scarious*

and veinless, mostly marcescent-persistent. Consists of one European and one Andine-American genus, each of a single or at most two species and monœcious or diœcious, and of the large and widely dispersed genus,

1. **PLANTÁGO**, Tourn. **PLANTAIN**, **RIBWORT**. (The Latin name.) — Flowers perfect or polygamo-diœcious, each subtended by a bract. Calyx of 4 imbricated sepals, persistent. Corolla salverform with a short tube, or nearly rotate; limb 4-parted; lobes imbricated in the bud, two lateral exterior. Stamens 4, or sometimes 2, on the tube of the corolla: filaments commonly capillary: anthers 2-celled, versatile. Ovary 2-celled (or rarely falsely 3-4-celled), with one or more ovules in each cell. Style or stigma mostly hairy. Capsule (pyxidium) circumscissile toward the base, and with a loose partition falling away with the lid; the seeds attached to its face. Seed-coat developing copious mucilage when wetted. Scape from the axils of the radical or subradical leaves, mostly bearing a single simple spike or head of greenish or whitish small flowers, in summer.

§ 1. Stamens 4: flowers all perfect: corolla remaining expanded, never closed over the fruit.

* Flowers dichogamous, proterogynous: the style projecting from the apex of the unopened corolla; the anthers long-exserted on capillary filaments after the corolla has expanded.

+ Corolla glabrous (as also the whole inflorescence, except in *P. macrocarpa*): seeds not hollowed (or barely concave) on the inner face: leaves 3-8-nerved or ribbed, plane: root perennial.

++ Ribs or nerves of the broad leaves mainly confluent with the thick and dilated lower portion of the midrib: ovules only 2 in each cell: seeds by abortion sometimes solitary.

P. cordáta, Lam. Glabrous and very smooth: leaves cordate or ovate (3 to 8 inches long), sometimes repand-dentate, long-petioled, 7-9-ribbed: scape fistulous, stout, a foot or two high, including the narrow spike: bracts rotund-ovate, convex, fleshy, with slightly scarious margins, very obtuse, as are the ovate and obovate sepals and the corolla-lobes: capsules broadly ovoid, very obtuse, about twice the length of the calyx: seeds 4 to 2, large, oblong, flat on the face. — Ill. i. 338; Jacq. Eclog. t. 72. *P. Kentuckensis*, Michx. Fl. i. 94. — Along streams (Canada? *Pursh*), New York to Wisconsin, Alabama, and Louisiana, common only westward.

++ ++ Ribs or nerves of the leaf free quite to the contracted base.

= Leaves ovate or oval, or in small forms oblong, rarely subordinate; several-ribbed; base abruptly contracted into a distinct petiole, not fleshy, varying from glabrous to pubescent, and from entire to sparingly repand-dentate: ovules and seeds at least 2 in each cell: scapes with the spike a span to 2 feet high.

P. mājor, L. (COMMON PLANTAIN.) Spike commonly dense, obtuse at apex: sepals rotund-ovate or obovate, scarious-margined; the exterior and the bract more or less carinate: ovules 8 to 18: seeds as many or by abortion fewer, small, angled by mutual pressure, usually light brown, minutely reticulated: capsule ovoid, very obtuse, circumscissile near the middle and near the level of the summit of the sepals. — Waysides and near dwellings throughout the country, doubtless introduced from Europe, but also native from Lake Superior far northward. Runs into some monstrosities and several varieties, an extreme in saline soil being var. *minima*, Decaisne in DC. Prodr. xiii. 695 (*P. minima*, DC.), with scapes 2 to 5 inches high, and leaves proportionally small. (Cosmop.)

Var. Asiática, Decaisne. Capsule usually more broadly ovoid, circumscissile near the base and much within the calyx. — *P. Asiatica*, L. Spec. i. 113; Franchet & Savatier, Enum. Pl. Jap. 384. (Includes perhaps *P. Kamtschatica*, Cham. and Link, or plants cultivated as such, with 4, 5, or 6 seeds). — A very large indigenous form, coast of California near San Francisco (capsule globose-ovoid) to the borders of British Columbia; Saskatchewan to the Arctic Sea. Perhaps a distinct species. (N. Asia, Himalaya.)

P. Rugélii, Decaisne. Leaves paler, commonly thinner: spikes long and thin, attenuate at the apex: sepals oblong, all as well as the similar bract acutely carinate: capsules erect in the spike, cylindraceous-oblong (somewhat over 2 lines long, one-sixteenth

inch in diameter), about twice the length of the calyx, circumscissile much below the middle: ovules 6 to 10: seeds 4 to 9, oval-oblong (about a line long), opaque and dull brown, not reticulated. — Prodr. l. c. 700, founded on a small and slender 4-seeded form: but the species is often large, with its spike a foot or more long, and seeds more than 4. — *P. major*, Ell. Sk. i. 201; Torr. Fl. 183, & Fl. N. Y. ii. 14; Darlingt. Fl. Cest. ed. 2, 110. *P. Kamtschatica*, Hook. Comp. Bot. Mag. ii. 61; Gray, Man. ed. 5, 311, not Cham. — Canada, Vermont to Illinois, and south to Georgia and Texas: probably truly indigenous, as no trace of it is found in the Old World.

= = Leaves mostly narrower, fewer-ribbed, entire or obscurely denticulate, tapering at base into more or less of a petiole: ovules and seeds never over 2 in each cell.

P. sparsiflora, Michx. Leaves oblong-lanceolate, acute, thinnish (4 to 7 inches long), tapering into a slender petiole, villous-pubescent or glabrous, 3-5-nerved: scape with the filiform sparsely-flowered spike 8 to 20 inches long: bracts ovate, shorter than the oval rather rigid coriaceous sepals: corolla-lobes oblong-ovate, acute: capsule oblong, umbilicate, fully twice the length of the calyx: seeds (also ovules) solitary in each cell, oblong, narrowly shallow-concave on the face. — Fl. i. 94; Decaisne, l. c. 721. *P. Virginica*, Walt. Car. 85? *P. interrupta*, Poir. Dict. v. 375. *P. Caroliniana*, Pursh, Fl. i. 98, not Walt. — Low pine barrens, S. Carolina and Georgia.

P. eriopoda, Torr. Usually a mass of yellowish wool at the crown: leaves oblanceolate to oval-obovate, fleshy-coriaceous, 3-7-nerved, 3 to 5 inches long and with short or stout petiole, mostly glabrous: scapes pubescent or glabrate, and with the cylindrical and dense or sometimes sparsely-flowered spike a span to a foot high; bracts broadly ovate or roundish, convex, scarious-margined, sometimes pubescent-ciliate: sepals roundish-obovate, scarious except the fuscous or greenish midrib: corolla-lobes broadly oval or ovate: capsule ovoid, slightly exceeding the calyx: ovules a pair in each cell: seeds as many or fewer, oval, flat on the face. — Ann. Lye. N. Y. ii. 237; Watson, Bot. King, 212. *P. attenuata*, James in Long Exped. i. 445, not Wall. *P. lanceolata*, var. γ & β in part, Hook. Fl. ii. 123. *P. virescens*, Barneoud, Monogr. 33; Decaisne in DC. l. c. 721. *P. Richardsonii*, Decaisne, l. c. 698. — Moist and saline soil, Colorado (*James, &c.*) to Nevada (*Watson*), and N. California (*Greene*), north to Wyoming, Saskatchewan, and Mackenzie River.

P. macrocarpa, Cham. & Schl. Leaves thinner, lanceolate, acute, 5-7-nerved, 4 to 15 inches long, 4 to 12 lines wide, gradually tapering into long margined petioles: scapes equalling or surpassing the leaves, bearing an oblong dense spike (in fruit 2 inches long); the rhachis, &c., tomentose or pubescent: bracts round-ovate or oval, fleshy-herbaceous and scarious-margined: sepals similar but almost wholly scarious: corolla-lobes oval: mature capsule ovoid-oblong (3 or 4 lines long), separating from the base and then fissile, 2-ovuled, 1-2-seeded: seeds narrowly oblong, flat or slightly concave on the face. — Linn. i. 106; Bong. Veg. Sitk. 42. *P. macrocarpa* & *P. longifolia*, Decaisne, l. c. — Coast of Washington Terr. to Alaska, and the Aleutian Islands.

+ + Corolla with tube externally pubescent: capsule 2-4-seeded (in ours seldom incompletely 3-4-celled): seeds not excavated nor concave on the face: leaves linear or filiform, fleshy; ribs usually indistinct or obsolete in the fresh plant: commonly some wool among the bases of the leaves. (Maritime species.)

P. maritima, L. Root perennial: leaves mostly obtuse: spike dense, oblong or cylindrical: bracts mostly rotund and shorter than the calyx: sepals oval, more or less acutely carinate: corolla-lobes obtuse or hardly acute. — *P. juncooides*, Lam. Ill. i. 342 (Magellan); Decaisne in DC. l. c. 731, partly. *P. pauciflora*, Pursh, Fl. i. 99; a dwarf form, with short and few-flowered spike, from Labrador; therefore *P. oliganthos*, Rœm. & Sch. Syst. iii. 122. *P. borealis*, Lange in Bot. Not. 1873, 129 & Fl. Dan. t. 2707, a similar few-flowered form. — Atlantic coast north of the Gulf of St. Lawrence; the abbreviated form. Pacific coast from California to the Aleutian Islands and Behring Straits. (Eu., Asia, Patagonia.)

P. decipiens, Barneoud. Root annual (perhaps sometimes biennial): leaves from filiform to rather broadly linear and plane, attenuate-acute: spike slender, with flowers either sparse or dense (with the scape from 3 to 15 inches high): lower bracts commonly ovate-subulate and equalling or exceeding the calyx: sepals ovate-orbicular: corolla-lobes very acute. — Monogr. 16, poorly characterized on a specimen from Labrador, but marked as an annual. *P. juncooides*, Decaisne, l. c. in part. *P. maritima*, of U. S. authors generally. *P. pauciflora*, Pursh, l. c. in part. *P. maritima*, var. *juncooides*, Gray, Man. ed. 5, 311. — Salt marshes, Atlantic coast from Labrador and New Brunswick to New Jersey; flowering late.

+ + + Corolla glabrous, nearly rotate: ovules and seeds 2, solitary in each cell; the latter hollowed on the face: leaves strongly 3-5-ribbed, not fleshy.

P. lanceolata, L. (RIPPLE- or RIBGRASS, ENGLISH PLANTAIN.) Root biennial or short-lived perennial: herbage villous or glabrate: leaves oblong-lanceolate, tapering into a slender petiole, usually much shorter than the (foot or two long) slender deeply sinuate and angled scape: spike at first capitate, in age cylindrical, dense: bract and sepals broadly ovate, scarious, brownish; two of the latter usually united into one. — Commonly naturalized in fields, from Eu. (Varieties said in Hook. Fl. ii. 123, to be indigenous far northward; but some of these plants belong to *P. eriopoda*, others perhaps to *P. macrocarpa*.)

* * Flowers heterogonous, in the greater number of individuals cleistogamous, but with normal corolla: this with broad cordate or ovate widely expanding lobes nearly equalling the tube: ovules solitary in the two cells: seed cymbiform, deeply excavated on the face: inflorescence and commonly the narrow leaves silky-pubescent or lanate.

P. Patagónica, Jacq. Annual, silky-lanate or glabrate: leaves from narrowly linear to oblanceolate, acute or callous-pointed, tapering below into a petiole, entire or sparingly denticulate, 1-3-nerved: scape terete, 3-12 inches high including the dense cylindrical or oblong spike: sepals very obtuse, scariously margined from a thickish and firm central herbaceous portion; the anterior oblong, posterior oval: lobes of the corolla usually a line long, roundish: seeds oblong-oval. (Filaments in the long-stamened individuals capillary and much exerted, and the anthers of usual ample size; style less exerted; apparently not proterogynous. Stamens and style in the other and more fruitful form short, included, or the effete anthers barely protruded from the throat; these very small, in the cleistogamous manner.) — Gray, Man. ed. 2, 269, Pacif. R. Rep. iv. 117, & Bot. Calif. i. 661. *P. Patagónica*, Jacq. Ic. Rar. t. 306, & Coll. Suppl. 35; Barneoud, Monogr. 38; Decaisne in DC. l. c. 713; to which add most of the dozen species of the same subdivision in the Prodrômus, and their synonymys. — Prairies and dry plains, from Kentucky, Illinois and Wisconsin north to Saskatchewan, south to Texas, and west to California and Brit. Columbia. (Mex., S. Am.)

Var. gnaphalioides, Gray, may be taken as the commoner N. American type, canescently villous; but the wool often floccose and deciduous: leaves from oblong-linear or spatulate-lanceolate to nearly filiform: spike very dense, 1 to 4 inches long, varying to capitate and few-flowered, lanate: bracts oblong or linear-lanceolate, or the lowest deltoid-ovate, hardly surpassing the calyx. — *P. Lagopus*, Pursh, Fl. i. 99, not L. *P. Purshii*, Rœm. & Sch. Syst. iii. 120. *P. gnaphalioides*, Nutt. Gen. i. 100. *P. Hookeriana*, Fisch. & Meyer, Ind. Sem. Petrop. 1838, 39. — Runs through

Var. spinulosa, Gray, l. c. (*P. spinulosa*, Decaisne, l. c.), a canescent form with aristately prolonged and rigid bracts, and

Var. nuda, Gray, l. c. (*P. Wrightiana*, Decaisne, l. c.), with sparse and loose pubescence, green and soon glabrate rigid leaves, and short bracts, to

Var. aristata, Gray, l. c. Loosely villous and glabrate: leaves green: bracts attenuate-prolonged to twice or thrice the length of the flowers. — *P. aristata*, Michx. Fl. i. 95. *P. gnaphalioides*, var. *aristata*, Hook. Fl. l. c. A slender and depauperate form is *P. squarrosa*, Nutt. in Trans. Am. Phil. Soc. n. ser. v. 178, and *P. Nuttallii*, Rapin ex Barneoud, l. c., also *P. filiformis*, Decaisne, l. c. — All the forms most abound west of the Mississippi, from Nebraska to Texas.

§ 2. Stamens 4 or 2: flowers subdiœcious or diœcio-cleistogamous; the corolla in the fertile or mainly fertile plant remaining closed or closing over the maturing capsule and forming a kind of beak, and anthers not exerted: seeds flat or barely concave on the face. (American species.)

* Leaves comparatively broad: stamens 4: ovules and seeds 1 or 2 in each cell.

P. Virgínica, L. Small winter-annual or fibrous-rooted biennial, soft-pubescent or more villous with spreading articulated hairs: leaves spatulate or obovate-oblong, little if at all petioled, entire or repand-denticulate, thin, an inch or so long, obscurely 3-5-nerved: scapes 2 to 6 inches high, slender: spike mostly dense, and an inch or two long: bracts equalling or shorter than the calyx: sepals ovate or oblong, more or less hairy on the back: corolla-lobes subcordate-ovate: substerile flowers widely open, with capillary filaments, style long-exserted (the style commonly earlier), and large oval anthers: flowers of the fully fertile spikes with corolla remaining closed, small anthers on short filaments,

and short style not protruded. — Spec. i. 113 (Gronov. Virg. 16; Moris. Hist. iii. 259, sect. 8, t. 15, fig. 8); Michx. Fl. i. 94; Gray in Pacif. R. Rep. iv. 117. *P. Caroliniana*, Walt. Car. 84. *P. purpurascens*, Nutt. in Trans. Am. Phil. Soc. 1. c.; the staminate and substerile plant. — Sandy fields, &c., S. New England to S. Illinois, Florida, and Texas. A depauperate form (*perpusilla*) has a filiform scape an inch high, from an annual root, much exceeding the leaves, and 2-5-flowered: Florida, Chapman.

Var. longifolia. A coarser plant: leaves oblong-spatulate, 3 to 5 inches long and tapering into a margined petiole, often with some coarse salient teeth: scapes with the spike 5 to 12 inches long: flowers rather larger. — *P. purpurascens*, Nutt. 1. c. *P. occidentalis*, Decaisne in DC. 1. c. — Arkansas and Texas to S. Arizona. (Adjacent Mex.)

P. hirtella, HBK. Root perennial, thick: leaves oblong-ovate or oblong-spatulate, glabrate, rather fleshy, entire or sparsely denticulate, 5-7-nerved, 4-10 inches long, narrowed into a short and broad base or a broad-margined petiole: scape and long dense spike a foot or two high, stout, hirsute: flowers longer than in the preceding (3 lines long), with corollalobes ovate, acute; those of the fertile closed form with apex of slender style commonly protruding and the anthers perhaps sterile. (Staminate and open-flowered form as in *P. Virginica* or more fertile, but not yet seen from California). — Nov. Gen. & Spec. ii. 229, t. 127; Decaisne, in DC. 1. c. 723. *P. Hartwegi*, Decaisne, 1. c. 724. *P. Urvillei*, Delile, Cat. Hort. Monsp.? & *P. Candollei*, Rapin? *P. Durvillei*, var. *Californica*, Fisch. & Meyer, Infl. Sen. Petrop. *P. Kamtschatica*, Hook. & Arn. Bot. Beech. 156? *P. Virginica*, var. *maxima*, Gray, Bot. Calif. i. 611. — Coast of California, from San Francisco Bay southward: usually in a remarkably large form. (Mex., Chili.)

* * Leaves linear or filiform: flowers very small: stamens only 2: small and slender annuals, minutely pubescent or nearly glabrous: the individuals having exerted stamens and style and open corolla not rarely fully fruitful.

+ Spike short, thick, and dense, in fruit an inch long: mature capsule 2 lines long.

P. Bigelovii, Gray. Mostly glabrous and green: leaves $1\frac{1}{2}$ to 4 inches long, rather fleshy, obtuse, entire, shorter than the scapes: mature capsule ovoid-oblong, half longer than the calyx, 4-seeded: only form known fully fertile, with style conspicuously and the two stamens slightly exerted from the open corolla. — Pacif. R. Rep. iv. 117, & Bot. Calif. i. 612. — Brackish marshes, Bay of San Francisco, California, at Benicia and Oakland, *Bigelow*, *Greene*, *Bolander*. Vancouver Island, a smaller form, *Macoun*.

+ + Spike filiform or slender, at length sparse-flowered, and half inch to three inches long: capsule about a line long: leaves occasionally with a few denticulations or divergent lobes.

P. pusilla, Nutt. Somewhat cinereous-puberulent: leaves about an inch long and half line wide: capsule short-ovoid, little exceeding the bract and calyx, 4-seeded: seeds elongated-oblong. — Gen. i. 110, & Trans. Am. Phil. Soc. 1. c. (excl. syn.); Torr. Fl. 184, & Fl. N. Y. ii. 16. *P. linearifolia*, Muhl. Cat. 15? *P. hybrida*, Bart. Fl. Philad., & Fl. Am. Sept. iii. t. 98, fig. 1. *P. Bigelovii*, Watson, Bot. King, 212, not Gray, a rather larger-flowered form. — Sandy or gravelly soil, S. New York to Virginia and Louisiana, Illinois, Nebraska; also Salt Lake, Utah, and interior of Oregon.

P. heterophylla, Nutt. Greener or nearly glabrous, often taller, and with spikes 2 to 5 inches long: leaves sometimes 4 inches long and 1 or 2 lines wide: capsule conoidal-oblong and at length considerably surpassing the bract and calyx, 10-28-seeded: seeds oblong, usually angled by mutual pressure, obscurely rugose-pitted. — Trans. Am. Phil. Soc. n. ser. v. 177 (char. imperfect); Gray, Man. 1. c.; Chapm. Fl. 278. *P. Caroliniana*, Pursh, Fl. i. 98? not Walt. *P. perpusilla*, Decaisne in DC. 1. c. 697. — Low sandy ground, Penn. to Florida, Texas, and Arkansas.

P. MÉDIA, L., enumerated by Muhlenberg as of the United States, is not met with in this country.

P. CUCULLATA, Lam., which is *P. maxima*, Jacq., another Old-World species, said by Pursh to inhabit Canada and Maine, is not found. Pursh may have taken a large *P. Rugelii* for it.

P. ELONGATA, Pursh, Fl. ii. 729, of Bradbury's collection on the Missouri, is unknown; probably a glabrate form of *P. Patagonica*.

P. GLABRA, Nutt. Gen. i. 100, on arid soil near Fort Mandan, on the Upper Missouri, is not identified; perhaps a form of *P. eriopoda*, Torr., with loose spike.

ADDITIONS AND CORRECTIONS.

Page 5. **LOBELIA.** To *L. paludosa*, add:

Var. Floridána. The larger form, 2 to 5 feet high: tube of corolla 3 or 4 lines long. — *L. Floridana*, Chapm. in Bot. Gazette, iii. 9, Feb. 1878. — Common in Florida, also Louisiana, Drummond.

Page 19. **GAYLUSSACIA.** To *G. frondosa*, add:

Var. nána. Stems lower and strict, only a foot or so high: leaves more reticulated in age and smaller than in the northern plant: racemes and their pedicels shorter. — Pine barrens of Florida, &c. Apparently there the common form, of which the var. *tomentosa* is a downy-leaved state.

Page 59. **PRIMULA.** To *P. angustifolia*, add:

Var. Cusickiána. Larger: scape 3 or 4 inches high, surpassing the leaves, 2-flowered, and with more conspicuous involucre of a pair of unequal lanceolate bracts: calyx more campanulate, a farinose white line below each sinus; lobes ovate-lanceolate, about the length of the tube: corolla-lobes only retuse or emarginate. — Rocky hills, Union Co., eastern border of Oregon, *W. C. Cusick*, 1877.

Page 64. **CENTUNCULUS.** After *C. minimus*, add:

C. pentándrus, **R. Br.** Pedicels equalling or surpassing the ovate leaves: flowers commonly 5-merous. — Prodr. 427; Griseb. Fl. W. Ind. 390. *C. tenellus*, Duby in DC. Prodr. viii. 72; Chapm. in Bot. Gazette, iii. 10. *Anagallis pumila*, Swartz. Fl. Ind. Occ. i. 345. *Micropyxis pumila*, Duby, l. c. — S. Florida, *Chapman*, &c. (Trop. Am., E. Ind., Australia.)

Page 84. **ECHITES.** After *E. Andrewsii*, add:

E. paludósa, **Vahl.** Habit of the preceding: peduncle elongated, 1-3-flowered: corolla white, 2 inches long or more; tube slender, as long as the obconical-campanulate throat, about thrice the length of the oblong and mucronate spreading calyx-lobes: anthers oblong-lanceolate, acuminate, not appendaged: beak of the seeds plumose to the base. — Ecl. Am. ii. 19, & Ic. t. 5; Griseb. Fl. W. Ind. 415. *Rhabdadenia paludosa*, Mull. Arg. — Muddy islets of Caloosa River, S. Florida, *Chapman*, published in Bot. Gazette, l. c., as *E. biflora*. (W. Ind. to Isthmus.)

Page 102. **VINCETOXICUM.**

V. palústre. Add syn. *Cynoctonum maritimum*, Maxim. in Bull. Acad. Petrop. ix. 800.

Page 104. **GONOLOBUS.**

G. hirsútus. Add: Corolla from straw-color or greenish to dull and dark purple in the same cluster. *Dr. Mellichamp*.

G. Carolinénsis. This has the fleshy crown considerably surpassing the stigma: flowers with a cimicine odor, according to Engelmann, who finds it in S. Missouri.

*G. Baldwiniánu*s has a clear white corolla, according to Chapman. — After *G. Carolinensis*, add:

G. flavidulus, Chapm. Corolla sordid yellow, ovate in bud; lobes broadly oblong, reticulated, 3 or 4 lines long: crown thinnish, equalling the stigma, 15-dentate; teeth of about equal length; 5 broad, obtuse or retuse, alternate with 5 pairs of narrower subulate ones; the sinuses deeper between those of each pair, which are accordingly rather distant. — Bot. Gazette, iii. 12, Feb. 1878. *G. macrophyllus*, Ell. Sk. i. 327? *G. hirsutus*, Chapm. Fl. 368, not Michx. — Light clay soil, Gadsden Co., Florida, Chapman.

Page 136. (See also p. 145.) **COLLOMIA.**

C. aggregata, T. C. Porter, in Wheeler Rep. ined. The character which appeared well to distinguish *Collomia* from *Gilia*, namely the unequal insertion of the stamens, unfortunately fails in *Gilia aggregata*, Spreng. (*Cantua aggregata*, Pursh), which on p. 145 is associated with *G. coronopifolia*, the type of the section *Ipomopsis*, and is in other respects also a most polymorphous species. In many specimens, and we believe in the original, the anthers are all of the same height and the insertion of the filaments equal, or not obviously unequal: in others from all localities (but especially in the southern ranges of the species), the insertion varies from obviously to excessively unequal, as much so as in any *Phlox*. It seems impossible to divide the specimens into two or more species. As the inequality prevails, and as the nearest relatives of the species have been already placed in *Collomia*, it seems necessary to transfer *Gilia aggregata* also to that genus, as has been done by Professor Porter in the still unpublished Report of the Botany of Wheeler's Surveys.

Page 138. **GILIA.** After *G. aurea*, add:

G. Lemmóni. Of § *Dactylophyllum*, with foliage of *G. pusilla*, var. *Californica*, and corolla of the same, but more funnelform and tube rather longer: stem erect, simple, 2 or 3 inches high: leaves very much shorter than the internodes: flowers sessile in the manner of *Leptosiphon*, but few: calyx turbinate-prismatic, strongly 5-costate; lobes acerose-subulate, rigid, equalling the yellow throat of the corolla: anthers oval. capsule narrowly cylindrical, many-seeded. — S. E. California, in San Bernardino Co., Parry & Lemmon. Proper tube of corolla, the yellowish throat, and the (apparently white) rounded-obovate lobes each a line long.

Page 160. **PHACELIA.** After *P. crenulata*, add:

- P. Arizónica.** Much smaller than *P. crenulata*, (with depauperate forms of which it has been confounded), depressed instead of erect, lighter green: leaves oblong-linear or narrowly oblong in outline, all but the lower sessile, deeply pinnatifid (6 to 15 lines long), appressed-pubescent; lobes oval or short-oblong, entire or crenulate: corolla only 2 lines long, white, with some purple lines, rotate-campanulate; the lobes quite entire: stamens and style much exserted: capsule globular: seeds oval. — S. Arizona, Thurber, Greene, &c.
- P. Menziésii**, p. 166, add: appendages of the corolla connivent in pairs over the base of the midnerve of each petal, forming 5 nectariferous grooves alternate with the stamens.

Page 193-196. **ERITRICHIMUM.**

To the character of the subsection *Eukryptisia*, on p. 193, *E. pusillum* forms an exception, having acute-angled nutlets, as rightly described under the species.

E. Texánum, p. 195, has been collected in Colorado, at the base of the Rocky Mountains, by J. D. Hooker & A. Gray, 1877.

E. holópterum, p. 196. The wing of the nutlets appears to be sometimes reduced to a narrow border: but mature fruit is still unknown. The root is annual.

Var. submólle, Gray. Low: inflorescence and obtuse calyx more canescently pubescent, nearly destitute of hispid hairs: immature nutlets merely wing-margined. Proc. Am. Acad. xiii. 374. — St. George, S. Utah, Palmer, 1877.

E. setosíssimum. Nutlets flattish or barely convex and not carinate on the back. Those of *E. glomeratum* are distinctly carinate.

Page 216. **CONVOLVULUS:** add:

C. Havanénsis, Jacq. Suffruticose, prostrate, canescent and glabrate: leaves oblong or elliptical, obtuse or retuse and mucronate, entire (6 to 12 lines long), abruptly contracted or sometimes tapering into a short petiole: peduncle few-several-flowered: pedicels longer

than the calyx: corolla white, half inch long: lobes acute: stigmas oblong: capsule splitting into several valves. — Obs. ii. 25, t. 45, fig. 3 (flower and leaf); Griseb. Cat. Cub. 207. *C. ruderarius*, HBK. *C. Garberi*, Chapm. in Bot. Gazette, l. c. 8. *Ipomœa Havanensis*, Choisy in DC. Prodr. ix. 368, referred to that genus at a venture. — Sandy coast, Cape Sable, S. Florida, *Garber*. (Cuba.)

Page 225. **CHAMÆSARACHA.**

To the character should be added: Corolla with roundish tomentose twin appendages or elevations at the throat, alternate with the stamens. These in

C. Corónopus are large and very protuberant, densely tomentose, and the corolla is greenish-white, not "yellowish." In the two other species they are smaller and less conspicuous.

Page 236. **PHYSALIS.** To **P. Fendleri**, add:

Var. cordifolia. Leaves larger; all the lower ones subcordate, or the lowest reniform. — St. George, S. Utah, *Palmer*.

Page 255. **MOHAVEA viscida**: add syn.

Antirrhinum confertiflorum, Benth. in DC. Prodr. x. 592.

Page 329, under **DIANTHERA**, add:

JACOBÍNIA NEGLÉCTA, *Sericographis neglecta*, Oersted, a native of the Mexican coast-region, has been received, through P. J. Berckmans, in living specimens from Florida, where it is said to be spontaneous. It is somewhat shrubby, with oblong-lanceolate or broader and acuminate leaves, flowers (inch and a half long) secund, in naked triple spikes on a slender axillary peduncle: calyx and bracts short: corolla light brick-red and narrowly tubular: connective of the anthers broad enough to refer the plant to *Dianthera*, the slightly higher and larger cell (or rather the connective) apiculate.

Page 334. **STACHYTARPHETA.**

As to the derivation of the name, Lemaire, in Flore des Serres, June, 1846, has happily suggested that Vahl formed the latter part of the word from *ταρφεύς*, crowded or dense, and wrote *Stachytarphœia*, and that the *i* was mistaken for a *t* by the printer.

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