

A
FLORA OF NORTHWEST AMERICA.

CONTAINING
BRIEF DESCRIPTIONS OF ALL THE KNOWN INDIGENOUS AND
NATURALIZED PLANTS GROWING WITHOUT CULTIVATION
NORTH OF CALIFORNIA, WEST OF UTAH, AND SOUTH OF
BRITISH COLUMBIA.

BY
THOMAS HOWELL.

VOL. I.

PHANEROGAMÆ.

FASCICLE 5, BORAGINACEÆ TO PLANTAGINACEÆ

Price Fifty Cents.

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Howell, in the office of the Librarian of Congress at Washington.

II Ovary 4-parted (rarely 2-parted) from above into 1-celled ovuled divisions surrounding the style. Stigma not annular, terminal. Nutlets attached to a central depressed or elevated receptacle or axis called the *gynobase*.

TRIBE III Mostly herbs with entire leaves. Flowers chiefly ar but not in the axils of bracts or leaves or bractless, in scorpi- spikes or racemes.

* Corolla and stamens regular: style entire or sometimes barely cleft at the apex.

+ 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.

Pectocarya Small annuals with minute white flowers: nutlets flat and thin, attached at the inner end underneath to a small depressed gynobase.

Cynoglossum Stout perennial or biennial herbs with blue flowers in bractless racemes: nutlets equally divergent, horizontal or obliquely ascending on a depressed or pyramidal gynobase.

* ++ Nutlets erect and parallel with the style or sometimes incurved.

= Nutlets attached obliquely by more or less of the ventral face or angle or by the base or prolongation of it to the more or less elevated gynobase, not stipitate and the scar not excavated.

a Nutlets armed with glochidiate prickles, forming burs.

Lappula Annual or perennial herbs: corolla short-salverform or somewhat funnelform, blue or white; the throat closed with prominent fornicate appendages.

b Nutlets very variable, from nearly smooth to glochidiate.

Eritrichium Nutlets obliquely ascending, with depressed or truncate-complanate back bordered by an acute margin or at length revolute, entire or dentate or spinulose wing.

Allocarya Mostly annuals with opposite leaves and white flowers: pedicels turbinate-thickened and more or less 5-angled, persistent: corolla salverform.

c Nutlets unarmed.

Piptocalyx Small annuals with alternate or scattered leaves and small white flowers on very short persistent pedicels: calyx circumscissile near the middle. the upper part soon falling away: nutlets straight, attached for nearly their whole length to a subulate gynobase.

Eremocarya Hirsute-canescant small annuals with most of the leaves in a radical tuft and small white flowers on persistent pedicels in geminate racemes; the root giving a deep purple stain.

Plagiobothrys Annual herbs with most of the leaves in rosulate radical tufts and small flowers on slender persistent pedicels: nutlets more or less incurved, attached in the middle of the concave ventral face to a globular gynobase.

Oreocarya Stout perennial or biennial herbs with scattered leaves and comparatively large flowers on filiform persistent pedicels: nutlets attached by the inner angle to a slender gynobase.

- 12 **Cryptanthus** Mostly slender annuals with alternate leaves and small flowers on slender deciduous pedicels; nutlets attached from the base upward to a pyramidal gynobase.
- 13 **Amsinckia** Coarse annuals with alternate leaves and yellow flowers; nutlets attached below the middle to an oblong pyramidal gynobase.
- 14 **Mertensia** Perennial herbs with alternate leaves and blue or white flowers on slender persistent pedicels; nutlets attached near the base to a convex gynobase, wrinkled when mature and dry.
- 15 **Pneumaria** Maritime fleshy branching herbs with alternate leaves and blue to nearly white flowers; nutlets attached just above the bases to a somewhat elevated gynobase, fleshy, smooth and shining when mature.
= = Nutlets sessile, attached by the very base to a plain gynobase.
- 16 **Myosotis** Annual or perennial herbs with white or blue flowers in bractless racemes; nutlets thin-crustaceous, smooth.
- 17 **Lithospermum** Perennial or annual herbs with white or yellow flowers in bracted racemes; nutlets bony.

Tribe 1 Ehretieæ DC. Prodr. ix, 502. Herbs shrubs or trees. Style once bifid or two-parted. Stigmas more or less capitate. Cotyledons plain.

1 COLDENIA L. Gen. n. 173.

Low herbaceous or suffrutescent plants with entire leaves and numerous small white sessile flowers usually in clusters. Calyx 5-parted, or in the original species 4-parted, the divisions narrow. Corolla short-funnelform or nearly salverform, seldom much spreading, passing the calyx, the lobes rounded, imbricated or sometimes partly convolute in the bud. Stamens included. Style 2-celled or 2-parted. Stigmas more or less capitate. Ovary entire or laterally 4-lobed, 4-celled. Ovules anatropous, pendulous. Fruit dry, separating at maturity into 4 one-seeded nutlets, or by abortion fewer. Seeds without albumen.

C. Nuttallii Hook. Kew Journ. Bot. iii, 296. Canescently pubescent and sparsely hispid prostrate annual, repeatedly and divergently dichotomous: leaves ovate or rhomboid-rotund, 2-4 lines long, on petioles longer than the blade, with 2 or at most 3 pairs of strong and somewhat curved veins, the 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 white corolla: filaments shorter than the anthers, inserted nearly in the throat of the corolla; the tube which bears 5 short obtuse scales near the base: fruit deeply 4-lobed; the thin-walled nutlets rounded and united only at the centre, smooth and shining, oblong-ovate, marked with a linear and raphe-like ventral scar: embryo straight: cotyledons very deeply horseshoe-form, their elongated bases almost enclosing the radical. Arid plains, eastern Washington, California, Utah and Arizona.

Tribe ii. Heliotropieæ Endl. Gen. 646. Leaves entire, rarely denticulate. Inflorescence more or less scorpioid. Style entire, sometimes wanting. Stigma peltate-annular, forming a complete ring, surmounted usually by an entire or 2-lobed hemispherical

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aves and small flowers from the base of the stem. *lobulate tip or appendage. Ovules pendulous. Seeds with a straight incurved embryo in sparing or copious albumen.*

2 HELIOTROPIUM Tourn. L. Gen, n. 179.

Low herbs or shrubs with entire or rarely denticulate leaves and small flowers in scorpioid cymes. Calyx deeply 5-parted, persistent. Corolla salverform or funnelform, plaited and mostly imbricated in the bud. Stamens included: filaments short or none: anthers connivent, sometimes cohering by pointed tips. Style entire, sometimes wanting: stigma peltate-annular, forming a complete ring surmounted by an entire or 2-lobed tip or appendage. Ovary 4-celled with a single pendulous ovule in each cell. Fruit dry, 2- or 4-lobed, separating into 2 indurated 2-celled and 2-seeded closed carpels, or more commonly into 4 1-seeded nutlets.

H. Curassavicum L. Sp. 130. Wholly glabrous and more or less succulent: stems diffusely spreading, 6-12 inches long from a perennial root: leaves succulent, obovate to oblanceolate or nearly linear, 1-2 inches long: flowers mostly in pairs or twice forked, densely flowered, bractless: corolla white with a yellow eye or changing to blue, with a rather ample 5-lobed limb and open throat, the lobes rounded-ovate, rather shorter than the tube: anthers free: style none: stigma umbrella-shaped, broad as the glabrous ovary: fruit 4-lobed, separating at maturity, into 4 1-seeded nutlets. Saline soil, interior of Oregon, and along the coast of most of the warmer parts of the World.

II Ovary 4-parted (rarely 2-parted) from above into 1-celled 4-ovuled divisions surrounding the style. Stigma not annular.

Tribe iii, *Boragæ* DC. Prodr. x. 1. Chiefly herbs with somewhat mucilaginous watery juice and entire leaves. Flowers mostly axillary but not in the axils of leaves or bracts, or bractless in so-called spikes or racemes. Style entire, with a depressed or elevated base from which the nutlets are attached (called the gynobase). Stigma uncinately or depressed-capitate. Ovules amphitropous or almost orthotropous and commonly ascending or erect, or anatropous and commonly pendulous. Nutlets 4, or by abortion fewer, distinct or base united into pairs. Seeds without albumen.

* Nutlets attached above the middle, wholly flat and thin, horizontally divergent in pairs or radiate: the margins pectinately and acinately setiferous.

3 PECTOCARYA DC. in Meisn. Gen. 279.

Small annuals with imperfectly opposite leaves and small flowers scattered along the whole length of the stem. Calyx deeply cleft or 5-parted, spreading or reflexed in fruit. Corolla-appendages with strong fornicate processes, almost closing the throat. Stamens short, included. Style short: with capitate stigma. Nutlets flat and thin, attached at the inner end underneath to the small depressed gynobase, either winged, laciniate-bordered or pectinately setose around the thin margins; the bristles or prickles simply uncinately at tip.

P. penicillata A. DC. Prodr. x, 120. Strigose-pubescent with minute white hairs: very diffuse or depressed; branches almost filiform, 2-6 inches long: leaves linear or filiform, an inch or less long: calyx-lobes linear, minutely hispid: nutlets geminately divergent, the oblong body surrounded by a merely undulate or pandurate wing that is incurved in age, its rounded apex thickly and the sides rarely or not at all beset with slender uncinately bristles: cotyledons oblong-ovate. Dry plains and hillsides Brit. Columbia to California and western Nevada.

P. setosa Gray Proc. Am. Acad. xii, 81. Hispid as well as minutely strigose-pubescent: stem rather stout, 2-6 inches high, paniculately branched: leaves linear: calyx-lobes linear, armed with stout white straight and divergent bristles: nutlets obovate, equally divergent, bordered by a broad thin scarious wing, the faces and margins beset with slender uncinately bristles: cotyledons broadly obovate. Eastern Washington to southeastern California.

P. pusilla Gray l. c. Strigulose-canescens: stem slender, diffusely branched from the base, 4-8 inches high: lower leaves opposite, linear-spatulate, 4-8 lines long, upper ones alternate and reduced to small lanceolate bracts. 1-2 lines long: calyx-lobes lanceolate, longer than the nutlets, beset with small uncinately bristles: nutlets equally divergent, cuneate-obovate, wingless and with a carinate midnerve on the upper face, the acute margins beset with a row of slender uncinately bristles: cotyledons broadly obovate. Eastern Washington to California.

* * Nutlets thicker, with ventral or introrse-basal attachment.

→ Corolla short, with fornicate appendages in the throat. Calyx spreading or reflexed. Nutlets glochidiately armed.

4 CYNOGLOSSUM Tourn. L. Gen. n. 183.

Coarse herbs with broad leaves and rather small flowers in panicles mostly bractless racemes. Calyx 5-parted, persistent, open in fruit. Corolla short salverform or funnelform, with conspicuous arching crests at the throat. Stamens and style included. Nutlets 4, turgid, wingless, clothed all over the back with short and stout glochidiate-tipped prickles, equally divergent, horizontal or obliquely ascending on a depressed or pyramidal gynobase, at maturity separating and carrying away an exterior portion of the indurated style from below upward, by which they are for a time suspended.

C. grande Dougl. Hook. Fl. ii, 82. Soft-villous, hardly hirsute below, becoming glabrate in age: stem stout, from a thick perennial root 1-3 feet high: lower leaves ovate or subcordate-oblong and acute or acuminate, the blade 4-8 inches long, on margined petioles of about the same length, the upper smaller, from ovate to lanceolate, abruptly contracted into a short winged petiole: corolla bright blue, its tube slightly exceeding the ovate calyx-lobes and hardly longer than the limb: style slender, thickened toward the base: nutlets ovoid, 4 lines in diameter, very rough-margined and covered with short glochidiate-tipped spines. In open woods Brit. Columbia to California.

C. occidentale Gray Proc. Am. Acad. x, 58. Hirsute-pubescent in age almost hispid: stems rather stout, 10-18 inches high, from a thick perennial root: lower leaves spatulate, tapering gradually into winged petioles; the upper from lanceolate to ovate, sessile or partly clasping

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be of the blue corolla longer than the lanceolate lobes of the calyx and
rice or thrice as long as its own roundish lobes: style wholly filiform:
nutlets almost globular, 4 lines long. In the mountains of southern Ore-
on and northern California.

5 LAPPULA Moench Meth. 416

ECHINOSPERMUM Sw, Lehm.

Pubescent or hispid herbs with narrow and entire alternate
aves and blue or white flowers in terminal racemes. Calyx 5-
arted, persistent, spreading or reflexed in fruit. Corolla short-
lverform and with conspicuous arching crests in the throat.
filaments short. Style short, with minute capitate stigma.
utlets laterally attached to a more or less elevated gynobase,
med either along a distinct margin or more or less over the
hole back with glochidiate prickles, forming burs.

L. floribunda Greene Pitt. ii, 182. *Echinospermum floribundum* Lehm.
Herbage soft-pubescent or the stem soft-hirsute: stems rather strict, 2-5
et high, from a biennial or perennial root: leaves from oblong to linear,
4 inches long, sessile or the lower tapering into margined petioles; ra-
cemes numerous, erect or nearly so, densely flowered: pedicels mostly
orter than the fruit, at length reflexed: corolla short-funnelform, blue or
hite, the limb 3-5 lines in diameter: nutlets keeled, papillose-tuberculate
the back, the margins armed with a single row of flat subulate prickles.
Eastern Washington to Brit. Columbia Minnesota and Ontario.

L. diffusa Greene Pitt. ii, 182 *Echinospermum diffusum* Lehm. Soft-
bescent or at most soft-hirsute: stems erect, 1-3 feet high, from a per-
ennial root: leaves usually lanceolate, the lower ones tapering below to a
argined petiole, the upper sessile and passing into small bracts: racemes
nicked, erect or merely spreading: pedicels longer than the fruit: corolla
om blue to nearly white or pinkish, rotate, its tube shorter than the calyx
d the lobes, the limb 4-6 lines in diameter: dorsal disk of the nutlets
angular-ovate, obscurely carinate, rough-tuberculate, and with a few
ort glochidiate prickles, the marginal prickles flat-subulate, as long as
e width of the disk. Rocky places and base of cliffs, Brit. Columbia to
alifornia and Utah.

L. hispida Greene l. c. *Echinospermum hispidum* Gray. Hispid with
reading papillose-based hairs: stems usually erect, 1-3 feet high, from
erennial root: leaves lanceolate, 3-5 inches long, the lowest long-petioled,
e upper sessile and gradually reduced upward to bracts; racemes lax, 10-
flowered: corolla rotate, greenish white 2-3 lines in diameter: marginal
ickles of the obcompressed nutlets small and narrow, much shorter than
e width of the oval or ovate and either sparsely or copiously glochidiate
rsal disk, their bases confluent into a thin margin or distinct wing which
ometimes reflexed or cup-shaped; inner face smooth and lucid, with
r almost central. Rocky hillsides, eastern Oregon to Idaho.

L. ciliata Greene l. c. *Cynoglossum ciliatum* Dougl. Cinereous with
much appressed pubescence, and bristly-hirsute, especially along the
argins of the linear or lanceolate leaves: stem strict, a foot or more high:
rolla rather large, blue or violet: fruit unknown. Banks of the Spokane
er Washington to Idaho.

L. myosotis Moench Meth. 417. Hispid or appressed-pubescent: stem
fy, branching, 1-2 feet high, from an annual root: leaves linear to ob-
eg or spatulate, sessile or the lower ones narrowed into petioles, erect or
ending, obtuse or obtusish at the apex, 9-18 lines long: racemes leafy.

bracted: pedicels very short, stout, not deflexed in fruit: calyx-lobes lanceolate, becoming unequal and spreading: corolla blue, about a line broad: nutlets rough-granulate or tuberculate on the back, the margins with double row of slender and distinct prickles or these irregularly over most of the back. In waste places, Idaho and eastward. Naturalized from Europe.

L. Texana Britton Mem. Torr. Club v, 275. *Echinosperrum Redowskii* var. *cupulatum* Gray. Hispid-hirsute annual: stem 2 inches to 1 foot high, diffusely branching from the base: leaves linear or linear-oblong, mostly obtuse, the lower narrowed into petioles: racemes loosely flowered: leafy-bracted; pedicels stout, a line long, not deflexed in fruit: corolla narrow-funnelform with rounded lobes, about a line broad, but little longer than the linear-lanceolate sepals: nutlets with acuminate ovate papillose tuberculate disk, the marginal prickles broadened and thickened below and usually united into a wing or border which indurates and enlarges forming a cup with the margin more or less incurved at maturity, sometimes only the tips of the prickles free. Eastern Oregon and Washington, Nevada, Texas, Nebraska and Brit. Columbia.

L. Fremontii. *Echinosperrum Fremontii* Torr. P. R. R. Rep. xii, 4. *E. Redowskii* var. *occidentale* Watson. Soft-pubescent with white hairs: stem erect, 6-18 inches high, from an annual root, at length diffusely many-branched: leaves linear to spatulate or lanceolate; those of the stem gradually reduced to subulate bracts of the open panicle: pedicels a line long, erect in fruit; sepals linear, longer than the nutlets: corolla inconspicuous but little if at all exceeding the calyx: disk of the nutlets acuminate-ovate beset with sharp white processes; prickles of the margin long and slender, not rarely confluent at their flat bases and more or less cupulate; scar long and narrow, occupying most of the ventral angle. Common throughout the dry interior from Brit. Columbia to California.

6 ERITRICHIUM Schrad. Diss. Asperif.

Low perennial or annual herbs with petioled radical leaves and small white or blue flowers. Calyx 5-parted or merely 5-lobed, open and but little enlarged in fruit. Corolla with a short tube and subrotate limb, the fornicate appendages almost closing the throat. Stamens 5, inserted on the tube of the corolla and included in its throat. Ovary 4-lobed: style short. Nutlets obliquely ascending, or depressed and nearly horizontal, with truncate-camplanate back, bordered by an acute winged or at length revolute entire, dentate or spinulose border.

E. Howardi Rydb. *Cynoglossum Howardi* Gray. Silky-canescens and silvery: depressed cespitose: lower leaves linear-spatulate, 6-10 lines long; those of the short flowering stems linear: flowers few in the sparse bracted cymes: calyx-lobes linear-lanceolate: corolla bright blue, 4-5 lines in diameter: nutlets very smooth, obliquely truncate on the back, winged but the margin of the ovate acutish and flat or slightly depressed dorsally: disk with a sharp edge, and its face either smooth or minutely papillose and pubescent. On the highest parts of the Cascade Mountains of Washington and the Rocky Mountains of Montana.

E. aretioides DC. Prodr. x, 125. Silky-sericeous with long white hairs: densely cespitose in depressed pulvinate tufts, 1-2 inches high: leaves from lanceolate to ovate, 4-6 lines long, mostly acute: flowers terminating short densely leafy stems, short-pedicelled: lobes of the calyx linear-lanceolate, about a line long, equalling the tube of the corolla: lobes of the corolla bright blue, 2-3 lines in diameter; nutlets with a crest-

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wing-like border that is usually cut into slender teeth lobes. On the highest mountains, eastern Oregon to the Rocky Mountains.

7 ALLOCARYA Greene Pitt. i, 12.

Low, mostly annual, herbs with entire leaves, the lowest always opposite, and rather small flowers in scorpioid racemes. Calyx 5-parted to the base; the segments spreading and somewhat enlarging in fruit. Corolla salverform, with a short tube, yellow throat and white limb. Pedicels turbinate thickened and more or less distinctly 5-angled under the calyx, persistent, more or less indurated in age. Nutlets ovate to lanceolate, crustaceous, opaque or vitreous-shining, smooth or variously tuberculate and rugose-muriculate, or even glochidiate, often carinate on one or both sides, attached by an inframedial or basal concave but sometimes raised and stipitate scar to a low gynobase.

* Small flowered annuals, usually diffuse, with corolla only a line or two broad and but little surpassing the calyx.

A. *echinoglochis* Greene Pitt. i, 15. *Echinosperrum Greenei* Gray: triglose-pubescent with whitish hairs: diffusely branched from the base. Branches 4-10 inches long, depressed: leaves linear, the lower 1-2 inches long, obtuse: racemes simple or forked, rather loose, leafy or bracteate at base, and sometimes above: calyx-segments oblong-linear, obtuse, but not reflexed in fruit, silky-hirsute with fulvous-yellow hairs: corolla about equalling the calyx, its dilated limb about 2 lines broad: nutlets shorter than the calyx, ovate-trigonal, obscurely carinate on the back, acutely so ventrally down to the low ovate scar, minutely tuberculate, glabrous throughout and with small terete barbed prickles interspersed. Wet places, southwestern Oregon and adjacent California.

A. *plebia* Greene l. c. 16. *Eritrichium Californicum* var. *plebium* Gray. Coarsely and minutely hirsute or glabrate: branches depressed, 6-10 inches long: leaves lax, the larger 2 inches long, linear-oblong: flowers scattered: pedicels shorter than the calyx: segments of the calyx enlarged and open in fruit: nutlets ovate-trigonal, a line long, glabrous, coarsely rugose-muriculate, sharply carinate ventrally down to the large ovate scar and usually only along the narrowish apex. Aleutian Islands Alaska, it has been reported from Humboldt Bay California.

A. *hispidula* Greene l. c. 17. Canescent with short setose-hispid pubescence: diffusely branched from the base, the branches more or less ascending, 2-6 inches long: racemes single or geminate, naked, or leafy-bracted below: pedicels about a line long: segments of the calyx linear, longer than the nutlets, very hispid, erect, not enlarged in fruit: nutlets ovate, opaque, $\frac{3}{4}$ of a line long, carinate on both sides, the back very slightly so and beset with minute muriculations, the transverse rugula few and not prominent: scar almost basal, ovate-oblong. In moist meadows, Washington and Oregon to California.

A. *Cusickii* Greene l. c. 17. Pubescence appressed: diffusely branching from the base, the branches 4-8 inches long: racemes open and leafy-bracted: nutlets vitreous-shining, ovate-oblong, carinate ventrally only, the back with crowded depressed rugae and few tuberculations: scar almost basal, narrowly linear and sharp-edged. Union Co. Oregon.

A. *bracteata*. Appressed-hirsute with minute setose hairs: diffusely branching from the base and depressed, the branches slender, 2-8 inches long: leaves linear, an inch or less long: racemes sparsely flowered and

* * * Perennial by creeping and rooting stems: flowers middle-sized.

A. mollis Greene l. c. 20. *Krynitzkia mollis* Gray. Copiously soft-pubescent, even to the calyx: stems rather stout, spreading or ascending, at length a foot or more long: leaves linear-lingulate, 2-3 inches long by 3-4 lines broad, obtuse: racemes at length elongated, bractless: limb of the corolla 3-4 lines broad: nutlets trigonous-ovate, slightly obcompressed, hardly at all carinate on the back, coarsely rugose-areolate, attached by a quarter or a third of their length to an oblong-pyramidal gynobase, the ovate-lanceolate. Borders of alkaline ponds, southeastern Oregon to California.

8 PIPTOCALYX Torrey Bot. Wilkes 414, t. 12.

Small dichotomously branched annuals with narrow leaves and small flowers sessile in the forks or in the axils of leaves or bracts. The root giving a deep purple stain. Calyx early circumscissile, the 5-cleft upper portion falling away, leaving the membranaceous base persistent around the fruit. Pedicels very short, persistent. Corolla with naked and open throat, the tube not surpassing the calyx. Anthers mucronate, included. Fruit 4 rather distinctly margined nutlets.

P. circumscissus Torrey l. c. *Krynitzkia circumscissa* Gray. Hispid-pubescent throughout: stem 1-4 inches high, densely branched from the base: leaves linear or the lowest spatulate, 3-6 lines long, crowded on the upper part of the branches: calyx hispid, its linear lobes foliaceous, about one long: limb of the white corolla about a line broad: nutlets oblong-ovate, not carinate, smooth or minutely tuberculate, attached for nearly their whole length to the pyramidal-subulate gynobase, the ventral groove narrow and divaricately forked at the base. On dry sandy plains, eastern Oregon to Brit. Columbia, California and Arizona.

9 EREMOCARYA Greene Pitt. i, 58.

Hirsute-canescens small annual herbs with chiefly radical leaves in rosulate tufts and small white flowers on persistent pedicels in dense leafy-bracted geminate racemes: the root giving a deep purple stain. Calyx 5-parted to the base, in fruit campanulate, persistent: the segments nerveless and not bristly-hispid. Style enlarged in fruit and persistent. Nutlets neither margined nor carinate, erect, attached for their whole length to a slender columnar gynobase by a groove that does not fork nor enlarge at base, smooth or papillose-scabrous.

E. micrantha Greene l. c. *Krynitzkia micrantha* Gray. Hirsute-pubescent: stem slender, 2-5 inches high, at length diffusely branched, the numerous racemous branches repeatedly dichotomous and copiously leafy-bracted: leaves linear, 2-4 lines long: racemes mostly geminate with a flower in the fork, 4-6 lines long, densely flowered: corolla barely a line long, and its lobes $\frac{1}{3}$ - $\frac{2}{3}$ of a line long, obscurely appendaged in the throat: the lobes becoming thicker than the gynobase, or even pyramidal; nutlets long-ovate, acute or acuminate, smooth and shining or dull and punctulate. Dry plains, southeastern Oregon to California, Utah and Arizona.

PLAGIOBOTHRYIS Fischer & Meyer Ind. Sem. Hort. Petrop. ii. 49.

Usually rather slender soft-pubescent annuals with most of their leaves in a close radical tuft, and rather small white flowers

on short persistent pedicels in elongating circinate racemes. Calyx 5-cleft or 5-parted, closed or campanulate or even spreading and more or less enlarged in fruit, persistent or irregularly circumscissal near the base. Corolla short, with more or less conspicuous appendages in its throat. Nutlets broadly ovate-trigonal, incurved, carinate on both sides toward the apex, the back irregularly transversely rugose, attached by the middle of the concave or seemingly hollowed ventral face to a globular or short conical gynobase, tardily detached, leaving a kind of caruncle at the insertion and corresponding depressed cavities on the gynobase, often only 1 or 2 maturing.

* Nutlets crustaceous or nearly so, usually only 1 or 2 maturing and then horizontally incumbent at maturity on the subglobose or merely convex gynobase: the caruncle short and broad, not stipiform, leaving orbicular depressions on the gynobase.

+ Caruncle annular, merely bordering a deep circular pit.

P. campestris Greene Pitt ii, 282. *P. rufescens* Gray, not F. & A. Pubescent with soft white hairs: stem slender, erect, 10-30 inches high, simple up to the 1-3 racemes: radical leaves numerous, 1-2 inches long, oblanceolate, usually withering at flowering time; cauline leaves smaller, linear-oblong to lanceolate, sessile, with a broad somewhat clasping base: racemes usually 3, the lower one smallest, the others geminate without a flower in the fork, sparsely flowered: calyx of linear-lanceolate nearly distinct sepals 3 lines long, rusty-hirsute when young: corolla but little longer than the calyx, the limb 2-3 lines broad: nutlets a line long, little incurved, nearly orbicular, abruptly short-beaked, sharply carinate on the back and the sides sharply angled and reticulate-rugose. On dry hillsides, southern Oregon and California.

+ + Caruncle forming a wen shaped or tongue-shaped process that fits into a corresponding cavity in the merely convex gynobase.

+ + Calyx persistent, not circumscissile near the base: mature nutlets abruptly contracted at base and apex so as to become cruciately 4-lobed, vitreous shining or enameled.

P. tenellus Gray Proc. Am. Acad. xx, 283. Pubescent with rather soft hairs: stem slender erect or ascending, 6-10 inches high, usually branching from the base: radical leaves numerous, in a dense rosulate tuft, broadly linear to lanceolate, 6-12 lines long; cauline leaves few, lanceolate to nearly ovate, sessile by a broad somewhat clasping base: racemes usually geminate without a flower in the fork, rather densely flowered: calyx 2 lines long, fulvous-hirsute, cleft to below the middle, the lobes acuminate-trigonal: corolla about a line broad: nutlets vitreous-shining, sharply carinate on the back, transversely rugose and sharply tuberculate. Common in open places, Brit. Columbia to California.

P. asper Greene Pitt. iii, 262. "Of the *P. tenellus* group, but larger than the others and rather diffusely branched or many-stemmed from the rosulate tuft of basal leaves, the branches hispid, floriferous almost throughout, many of the calyces subtended by a leafy bract; leaves rather roughly hirsute or almost hispid: calyx large and nutlets $\frac{3}{4}$ line long, vitreous and shining, lineately rugose transversely and with or without murications."

"Frequent from northern California to Washington. Easily distinguished at sight by its large size, its many stems, and its stiff harsh pubescence."

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** ** Calyx persistent, not circumscissile near the base: nutlets broadly ovate and not at all cruciform.

P. Shastensis Greene, Gray l. c. 284. Canescently silky-tomentose: stem very slender, 4-10 inches high, not branching from the base, simple to the 1-3 racemes: radical leaves linear to linear-spatulate, 4-8 lines long, appressed-silky above, hispid-ciliate; cauline leaves few linear-lanceolate, smaller: racemes few-flowered; calyx cylindraceous, 4 lines long silky-nate both sides, cleft to near the middle; the lobes lingular and acute, nutlets shining, strongly incurved. carinate on the back, obscurely transversely rugose but not muricate. On a gravelly plain near Grant's Pass Oregon, and Shasta Valley California.

P. colorans Greene Pitt. iii, 262. Canescently tomentose or the leaves and calyces appressed-silky: stem 2-8 inches high, erect, not branching from the base: radical leaves linear, an inch or more long, in a loose rosette tuft; cauline leaves numerous, linear to lanceolate: racemes long and slender, few- to many-flowered often leafy-bracted below: calyx almost globular, 2-3 lines in diameter, cleft to below the middle, the acuminate-lingular lobes connivent over the fruit, sparingly hispid: nutlets broadly bicular, abruptly stout-beaked, strongly carinate on the back, strongly transverse rugose, obscurely muricate on the ridge. On gravel-bars along the creek at Hornbrook California; so near the state line that it may be looked for in adjacent Oregon.

** ** ** Calyx at maturity more or less promptly deciduous circumscissile near the base.

P. canescens Benth. Pl. Hartw. 326. Villous-pubescent and somewhat cinereous or canescent especially the calyx, which when young may be fulvous or even somewhat rufescent: stem diffusely branched from the base, 10-12 inches high: leaves linear: calyx 2-3 lines long, in fruit loosely erect or sometimes more open and accrescent, rarely disposed to be circumscissile at base: nutlets opaque, not vitreous, slightly carinate on the back, rugose with sparse and somewhat reticulated obtuse wrinkles. Columbia Valley to California.

P. nothofulvus Gray Proc. Am. Acad. xx, 285. Soft-hirsute throughout: stems erect, 1-2 feet high, branching from the base: radical leaves long or lanceolate to linear, 1-2 inches long, numerous in a dense rosette tuft; cauline leaves lanceolate to linear, sometimes 1 or 2 pairs opposite: racemes usually geminate or in threes with a flower in the fork, at length long and slender and loosely-flowered: calyx cleft only to the middle, silky-fulvous, rufescent only when young, soon fulvous or whitish, 1-2 lines long, the acuminate lobes connivent over the nutlets, soon circumscissile, leaving a persistent base which surrounds the lower half of the nutlets: corolla 3 lines broad: nutlets abruptly stout-beaked, carinate on the back, transversely rugose and minutely granulate. Common on open hillsides, Brit. Columbia to California west of the Cascade Mountains.

** Coarse and rough-hispid much branched low annuals with oblong or lanceolate leaves, the upper subtending and equalling or exceeding the flower-clusters: nutlets inserted by a scar above the middle, ventrally carinate only above the round scar, which is attached to the depressed gynobase by a small and soft false caruncle.

P. hispidus Gray l. c. 286. Rough-hispid throughout: stem stout, 8 inches high, profusely branched: lower leaves linear-spatulate; upper leaves oblong, 6 lines long: calyx 5-parted, open in fruit, not circumscissile: nutlets turgid, ovoid, obliquely incumbent, acute at the apex, obscurely carinate on the back, opaque, papillose-granulate, the scar hardly above the middle. Southeastern Oregon to eastern California.

11 OREOCARYA Greene Pitt. i, 57.

KRYNITZKIA & *Pseudokrynitzkia* Gray.

Coarse perennial or biennial herbs with alternate leaves and mostly white flowers on persistent pedicels, in glomerate or paniculate, bracted racemes. Calyx 5-parted to the base, more or less spreading in fruit, not circumscissile nor deciduous. Corolla with prominent folds in the throat, and at base within 10-squamellae or annulate-glandular. Nutlets not carinate on the back, triangular or triquetrous, with acute but not winged lateral angles, attached for most of their length to a commonly subulate gynobase, the scar very slender and usually with transversely dilated base.

* Tube of the corolla not longer than the calyx and little if any longer than its lobes; with a ring of 10 small scales or glands near the base within: anthers oval or oblong: style rather short.

O. glomerata Greene Pitt. i, 58. *Cynoglossum glomeratum* Pursh. *Krynitzkia glomerata* Gray. Grayish-hirsute and hispid: stems stout, erect, 6-20 inches high, from the crown of a biennial or short-lived perennial root: leaves spatulate or linear-spatulate, 1-2 inches long: inflorescence thyriform, and usually dense the short and often forked lateral spikes of length commonly exceeding the subtending leaves: sepals very setose-hispid, linear, 2-3 lines long: limb of the corolla 3-5 lines in diameter, the crests in the throat truncate: nutlets forming an ovoid fruit, each triangular-ovate, sparsely more or less tuberculate-rugose on the back, with sharp lateral edges, the sulcate ventral angle extending into a broad basal scar. On dry hillsides, eastern Washington to New Mexico, Nebraska and Saskatchewan.

O. sericea Greene l. c. *Krynitzkia sericea* Gray. Canescent with dense silky pubescence and bristly-hirsute: stems stout, simple, 4-8 inches high, from a somewhat woody perennial caudex, leafy: leaves spatulate-oblongate, obtuse at the apex, narrowed below to a broad petiole, including the petiole 1-2 inches long: flowers numerous, in a short thyriform calyx cleft nearly to the base, the linear or lanceolate segments about equalling the tube of the corolla, bristly-hirsute: limb of the corolla 3-5 lines broad, the ovate lobes 2 lines long: nutlets oblong-ovate, obtuse, somewhat rugose-tuberculate on the back. Dry hillsides, eastern Washington and Oregon to Utah and Colorado.

* * Tube of the salverform corolla longer than the calyx and twice or thrice the length of the lobes; the ring within at the base of the tube inconspicuous and truncate: crests of the throat large, often elongated: anthers linear-oblong: style long and filiform.

O. leucophæa Greene l. c. *Myosotis leucophæa* Dougl. *Krynitzkia leucophæa* Gray. Silky-strigose and silvery-canescens: stems many or few from the lignescent base or root, 6-12 inches high: leaves lanceolate-linear, acute, 2-4 inches long: inflorescence glomerate-spicate hispid with whitish or yellowish hairs and slender bristles: calyx 5-cleft nearly to the base, the linear segments 3-4 lines long: corolla yellow: with tube longer than the calyx: nutlets ovate-triangular, very smooth and polished ivory-like, 1½-2 lines long; gynobase very slender. On sandy plains, Brit. Columbia to California and Utah. East of the Cascade Mountains.

12 CRYPTANTHE Lehm. Sem. Hort. Hamburg. 1832.

KRYNITZKIA F. & M. Ind. Sem. Hort. Petrop. vii, 52. 1841.

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aves and small, mostly white, flowers on very short pedicels in corpioid racemes. Calyx 5-parted or 5-cleft, the segments erect, usually closely embracing the fruit and deciduous, falling with the mature nutlets. Corolla rotate, its tube not surpassing the calyx; usually with 5 scales closing the throat. Stamens included. Style short. Nutlets attached by the ventral angle or groove from the base up at least one third or one half way, or for the whole length to an elevated gynobase, the back convex and not truncate nor transversely rugose.

§ Fruiting calyx closed over the nutlets and falling with them.

* Sepals lanceolate or linear, traversed by a rigid and stout midrib: nutlets thick-walled, opaque or dull.

Fendleri Greene Pitt. i, 120. Rough-hispid: stem erect, 10-12 inches high, paniculately branched, rigid: leaves linear, an inch or more long: segments of the mature calyx 2 lines long, linear, hispid with pungent bristles: nutlets usually all four maturing and alike, smooth, ovate-acuminate, hardly a line long, attached for nearly their whole length to the narrow subulate gynobase. Eastern Washington to the Saskatchewan and New Mexico.

* * Midrib of the narrow setose-hispid sepals not conspicuously if at all thickened: nutlets very smooth and mostly shining, acute or acuminate, with rounded sides and rather thin or brittle pericarp.

+ Nutlets conspicuously acuminate, only 1 or very rarely 2 maturing, attached for not more than the lower third to the short and narrow gynobase which it very much surpasses.

flaccida Greene Pitt. i, 115. *Myosotis flaccida* Lehm. Cinereous with short appressed pubescence: stem slender, 4-12 inches high, strictly paniculately branched: leaves numerous, linear-spatulate to almost filiform, erect, often appressed: spikes usually in pairs or 3 together, almost terminal, many-flowered: calyx in fruit erect appressed to the peduncle, 2 lines long or more; sepals filiform-linear, thickish below, their bases very broad with deflexed and strong but not pungent bristles: nutlets subterete, ovate-lanceolate and rostellate-acuminate, the groove of the attachment enlarged at base but not furcate. Common on the dry interior plains, Brit. Columbia to California.

multicaule. Densely hirsute with short erect but not appressed hairs: stems several from the crown of a rather stout root, strictly erect, 4-10 inches high, simple up to the short somewhat paniculate inflorescence: lower leaves numerous, linear-spatulate, 1-2 inches long; upper leaves almost filiform, erect, 12-18 lines long: spikes short and rather stout, densely hirsute with spreading hairs, an inch or less long, densely-flowered: segments of the calyx acuminate-lanceolate, barely 2 lines long, their bases broad with spreading white hairs: nutlets subterete, rostellate-ovate, light brown, the groove of the attachment not perceptibly enlarged at the base. Along the Des Chutes river at Sherar's Bridge Oregon.

rostellata Greene Pitt. i, 116. Canescent with a rather sparse appressed pubescence: stem slender, erect, paniculately branched, 4-8 inches high: leaves linear-spatulate to linear-lanceolate, less than an inch long, lower ones opposite with more or less connate-clasping base, the upper smaller and alternate: spikes solitary or geminate, slender, 1-2 inches long: calyx erect but not appressed to the rachis, about 2 lines long: sepals filiform-linear, hispid with short spreading but not reflexed somewhat pungent white bristles: nutlets triangular-ovate, flattish, rostellate-acuminate.

inate, a line long, the groove of the attachment divaricately forked and somewhat open at the base. On dry hillsides, southern Oregon and adjacent California.

— + Nutlets usually all 4 maturing and all alike, either flattish or angled ventrally, ovate in outline and acute or short acuminate, attached for half or nearly their whole length to the subulate gynobase, the slender groove not dilated at base into an open areola or scar.

C. leiocarpa Greene l. c. 17, *Krynitzkia leiocarpa* F. & M. Strigose pubescent: stem 6-18 inches high, diffusely branching: spikes single or sometimes in pairs, often leafy at base, bractless above: leaves spatulate linear 1-1½ inches long: calyx erect, a line long, densely strigose-hirsute and with some coarser spreading bristles: nutlets flattish, the slender ventral groove continuous to the very base of the nutlet and not at all furcate, attached nearly their whole length to the subulate gynobasium. Near the coast, Washington to California.

C. affinis Greene l. c. 119. *K. affinis* Gray Rough-pubescent: slender, 8-12 inches high, diffusely branched: leaves spatulate, 1-2 inches long: spikes solitary, or sometimes in pairs, often leafy at base: sepals linear lanceolate much longer than the nutlets, strigose-hirsute with few stout pungent spreading bristles: nutlets somewhat turgid, the grooves simple and continuous to the very base, attached only up to the middle of the slender pyramidal gynobase, the free apical portion a little divergent. Among pines on the edge of forests, eastern Washington to California, Idaho.

C. Torreyana Greene l. c. 118. *K. Torreyana* Gray. Hispid-hirsute stem rather stout, 9-12 inches high, paniculately branched from the base; leaves linear-oblong, 1-2 inches long: spikes solitary or often in pairs, 1-2 inches long: sepals lanceolate, in fruit attenuate upward, twice as long as the nutlets, setose-hispid with stout spreading bristles: nutlets obovate, acute, attached barely to the middle to the subulate-pyramidal gynobasis; the ventral groove divergently forked at base but without an open area. Oregon to California and Idaho.

* * * Nutlets muriculate or rough-papillose, all 4 alike, sometime only 1 or 2 maturing, ovate-trigonous, attached from the base to nearly to the apex: the ventral groove with or without an areola.

C. barbiger Greene l. c. 114. *Eritrichium barbigerum* Gray. **P**
pid and hirsute: stem 4-12 inches high, freely branching; leaves linear
an inch or less long: spikes solitary or paniculate: sepals narrowly linear
3-5 lines long thickly beset with long shaggy bristles, loose above: nutlets
acuminate-ovate, very rough-muricate, ashy-gray, the open groove a little
dilated at base. On dry plains, southeastern Oregon to California and
Arizona.

C. ambigua Greene l. c. 113. *K. ambigua* Gray. Rough-hirsute the stem strigose-pubescent also: stem stoutish, 1-2 feet high, panicle branched; leaves oblong to linear or linear-lanceolate, 6-20 lines long; spikes usually in pairs with a flower in the fork, naked, slender, sparse to rather densely flowered: sepals lanceolate, but little more than a line long, somewhat connivent over the fruit, setose-hispid: nutlets ovate-gonous, barely convex on the back, minutely papillose-scabrous, the ventral groove closed above but moderately or barely open at the basal articulation. On dry stony hillsides, Oregon and Washington to California.

C. muriculata Greene l. c. 113. *K. muriculata* Gray. Hispid suture with spreading hairs: stem stoutish, 6-12 inches high: leaves spatulate or the upper ones linear, about an inch long: spikes often in pairs or collected in a 3-5-radiate paniculate cyme: sepals in fruit 2 lines long, lanceolate.

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hispid, somewhat connivent over the fruit: nutlets deltoid-ovate in line, half the length of the sepals, sharply muricate over the back, which is hardly convex except by a slight dorsal ridge, and with distinct thickish but acutish lateral angles these muricate-papillose like the back, attached for $\frac{3}{4}$ of their length to the subulate gynobase, the ventral edge open and abruptly dilated at the bifurcate base. On dry hillsides, western Washington to California and Arizona.

& M. Strigose-hispid: stem slender, rather strictly branching, 6-12 inches high: leaves linear or the lowest spatulate, 6-12 lines long: spikes usually in pairs, sessile: sepals in fruit 2 lines long, ovate, rusty-hirsute and the midrib hispid: nutlets oblong-ovate, rough or granulate-tuberculate on the rounded back, attached for nearly the whole length to the filiform-subulate gynobase by a narrow groove which widens gradually to the base, 2 of them commonly wingless and rounded at the sides, the others with lateral angles extended into a broad radiately striate wing with ciliate or toothed or even pectinate margins. Dry sandy plains, eastern Washington to California, New Mexico and Arizona.

C. pterocarya Greene l. c 120. *K. pterocarya* Gray. Papillose-hispid: stem slender, rather strictly branching, 6-12 inches high: leaves linear or the lowest spatulate, 6-12 lines long: spikes usually in pairs, sessile: sepals in fruit 2 lines long, ovate, rusty-hirsute and the midrib hispid: nutlets oblong-ovate, rough or granulate-tuberculate on the rounded back, attached for nearly the whole length to the filiform-subulate gynobase by a narrow groove which widens gradually to the base, 2 of them commonly wingless and rounded at the sides, the others with lateral angles extended into a broad radiately striate wing with ciliate or toothed or even pectinate margins. Dry sandy plains, eastern Washington to California, New Mexico and Arizona.

13 AMSINCKIA Lehm. Del. Sem. Hamb. 1831: 7.

Coarse hispid annuals with alternate oblong-ovate to linear leaves and small yellow flowers in at length loose spikes or racemes without bracts except sometimes to the lowest. Calyx 2-parted, persistent. Corolla salverform or at the throat somewhat funnelform, more or less plaited in bud at the sinuses, with lobes exceeding the calyx and rounded lobes, the throat naked, or with minute hairy tufts opposite the lobes. Filaments short. Style filiform; with capitate 2-lobed stigma. Nutlets ovate-triangular or triquetrous, coriaceous or crustaceous, attached above the middle to an oblong-pyramidal gynobase, the scar ovate or elongate. Cotyledons each 2-parted thus apparently four.

intermedia F. & M. Ind Sem. Petrop. 26. Rough-hispid through-
stem erect, usually 1-2 feet high and sparingly branched above; the
lobes even of the calyx white or merely yellowish: leaves linear or the
er ones lanceolate, 1-4 inches long: spikes solitary or in pairs: sepals
linearly lanceolate, obtuse, at length $\frac{1}{2}$ inch long: corolla bright yellow,
4 lines long, its tube equalling the calyx, the limb with very short
rounded lobes and no appendages in the throat: nutlets not half as long
as the sepals, trigonous, carinate on the back and strongly muricate,
attached near the base to the short conical gynobase. Dry plains, Brit.
Columbia to California.

lycopsoidea Lehm. Del. Sem. Hamb. 1831, 7. Rather sparingly
hispid with pungent bristles: stem rather weak, 1-4 feet high with
erous loose straggling branches: leaves lanceolate to ovate-lanceolate, 1-4
lines long, acute at the apex, hispid-ciliate: spikes usually in pairs, at length
and sparsely-flowered: sepals linear-lanceolate, at length spreading and
4 times longer than the nutlets, papillose-hispid: corolla almost 2 lines
in diameter, somewhat funnelform, the tube but little longer than the calyx:
nutlets oblong-ovate, about a line long, very rough muricate. In rich alluvial
land, western Oregon and Washington to California.

Var. bracteosa Gray Syn. Fl. ii, 198. Smaller-flowered and more decumbent, with most of the flowers subtended by a foliaceous bract. Near the Coast, Puget Sound to California.

14 **MERTENSIA** Roth Catal. Bot. i, 34: 1797.

Perennial herbs with alternate leaves and rather large blue-purple or white flowers in panicles, cymes, or racemes. Calyx 4-parted, herbaceous, the lobes lanceolate or linear, little enlarged in fruit. Corolla tubular-funnelform, crested or unappendaged at the throat, its lobes imbricated in the bud. Stamens inserted at the tube of the corolla, included or scarcely exserted. Filaments flattened or filiform. Anthers oblong or linear, obtuse. Style filiform with entire stigma. Nutlets erect, coriaceous, wrinkled when mature, attached by a small or short scar just above the bases to a flat strongly convex gynobase.

M. oblongifolia Don Syst. iv, 320. Stem slender, 4-8 inches high, usually solitary from the short and thick corm-like root: leaves oblong spatulate-lanceolate, obtuse, 6-20 lines long, the lowest ones small, the larger ones in the middle, smooth or the upper face scabrous with minute hairs: flowers rather numerous, in a somewhat close terminal cluster: lobes of the calyx lanceolate little more than a line long, minutely ciliate: corolla funnelform, with a broad purple tube, 6 lines or more long, and ample blue limb, the throat rather abruptly dilated and open with pubescent crests at the base on a line with the stamens: filaments as broad and not longer than the anthers: style long and capillary, not exserted: nutlets dull and with obtuse angles. In moist places, Blue Mountains of Oregon to Nevada, Utah and the borders of Brit. Columbia.

M. longiflora Greene Pitt. iii, 261. Glabrous except the setulose-scabrous upper face of the leaves: lowest leaves elliptic-lanceolate, on long slender petioles, the upper ones obovate oval or ovate, rounded or even cordate at base and closely sessile, all very obtuse, the largest 2 inches long, an inch broad: floral bracts acutish: flowers in a rather dense strictly terminal and subcorymbose panicle: calyx rather large, cleft to near the base, the lobes lanceolate: corolla about an inch long, with long slender tube and short erect narrow-campanulate limb: the almost capillary style nearly equal to the corolla. Eastern Washington. Perhaps only a form of *M. oblongifolia*.

M. Sibirica Don Syst. iv, 320. Glabrous and smooth or nearly pale and glaucescent: stems erect 1-3 feet high from a thick branching root: very leafy: leaves oblong to lanceolate and acute, or the lowest ones sometimes obovate and obtuse, hirsute-ciliate, all petioled, 1-4 inches long: racemes short, somewhat panicled: floral bracts like the leaves, 9-10 lines long: lobes of the calyx lanceolate, about 2 lines long, commonly ciliate: corolla blue-funnelform, 8-10 lines long, the broad tube nearly twice as long as the calyx, shorter than the ample limb, sparingly pubescent within: filaments as broad and much shorter than the anthers: style slightly exserted. Along mountain streams: California to the Arctic regions and the Rocky Mountains.

M. paniculata Don Syst. iv, 318. Roughish-pubescent: stem erect 1-3 feet high, branched above: leaves thin, pinnately veined, the lower ovate, rounded or cordate at base, 2-5 inches long, long-petioled, upper ovate or ovate-lanceolate, acuminate at the apex, narrowed at the base: mostly slender petioles: racemes several-flowered, in loose terminal panicles: flowers purple-blue, 6-8 lines long, on filiform pedicels 4-10 lines long: calyx lobes lanceolate, acute, about 2 lines long: corolla funnelform, crested

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the throat, the tube about twice as long as the calyx, and longer than the limb: filaments flattened, slightly longer than the anthers: style filiform, usually somewhat exserted: nutlets rounded. In damp woods, California to Alaska, and Hudson Bay to Michigan, Nebraska and the Rocky Mountains.

M. platyphylla Heller Bull. Torr. Bot. Club xxvi, 548. Stems weak, 3-30 inches high, branched above, the branches slender and spreading: leaves all thin, light green, papillately roughened above; radical leaves usually about a foot long including the petiole, of about 8 inches, which is rough on the margins; blade broadly ovate, 3-4 inches broad, abruptly acuminate, usually cordate at base; lower stem-leaves broadly ovate, abruptly acuminate, petioles about an inch long; upper ones ovate-lanceolate, gradually acuminate, sessile or nearly so, contracted at base: flowers in loose terminal panicles: pedicels slender, 3-7 lines long, pubescent with short appressed hairs: sepals linear-lanceolate, 3-4 lines long, ciliate: corolla bright blue, or turning blue-color 6-8 lines long, broad funnelform, the tube about 2 lines long, the acute lobes with broad sinuses at base: anthers oblong: style slightly exserted. In rich moist ground, western Washington and Oregon.

M. nutans. Stems simple, 1-8 from the crown of a thick branching root, 1-10 inches high, very leafy to the top: leaves oblong to lanceolate or the lowest sometimes spatulate, the largest ones in the middle of the stem 1-3 inches long, mostly sessile by a broad base or the lowest sometimes petioled, all papillose-granulate above, not at all pubescent: flowers in a dense terminal drooping panicle, sessile or on short pedicels: sepals lanceolate, barely 2 lines long, obscurely ciliate: corolla 6-8 lines long, funnelform, with a broad purple or pinkish tube twice or thrice as long as the calyx: filaments as broad and fully as long as the anthers: style slender, often slightly exserted. On the north side of high ridges, eastern Oregon and Washington.

15 PNEUMARIA Hill Veg. Syst. vii, 40, t. 36.

Glabrous fleshy perennials with alternate leaves and small blue pinkish or white flowers in loose terminal leafy-bracted racemes. Calyx-lobes somewhat enlarged in fruit. Corolla tubular-campanulate, crested in the throat, 5-lobed, the lobes imbricated in the bud, slightly spreading. Filaments scarcely exserted. Ovary 4-divided; style slender. Nutlets erect, fleshy, attached just above their bases to the somewhat elevated gynobase, smooth and shining, bluish-margined, becoming utricular-like when mature.

P. maritima Hill l. c. 40, t. 37, fig. 3. Very smooth, pale and glaucous, much branched and spreading; leaves fleshy, ovate, obovate, or spatulate-oblong, an inch or two long, upper surface 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, the crests in the throat evident: filaments rather narrower and much longer than the anthers: nutlets acute, fleshy-herbaceous, in age becoming utricular, the scar small. Along the Coast, Puget Sound to Alaska, and Hudson Bay to New England also Europe.

16 MYOSOTIS. L. Gen. n. 180.

Low annual biennial or perennial herbs with alternate leaves and small blue pink or white flowers in so called spikes or racemes. Calyx 5-parted or 5-cleft. Corolla salverform or rotate, the tube rarely surpassing the calyx, the throat with small and blunt crests at the base of the small and rounded lobes: these convolute in the

bud. Stamens included, inserted on the tube of the corolla, with filiform filaments and obtuse anthers. Style filiform, included. Nutlets smooth, somewhat compressed, thin-crustaceous in texture, attached to the flat gynobase at the very base, the scar minute.

M. PALUSTRIS Lam. Fl. Fr. ii. 283. Appressed-pubescent: stems slender, soon decumbent, rooting at the lower nodes, 6-18 inches long: leaves oblong to lanceolate or oblong-lanceolate, obtuse, narrowed at the base, 1-3 inches long, the lower ones petioled, the others sessile: racemes loosely many-flowered: pedicels longer than the calyx: calyx-lobes triangular, shorter than the tube, spreading in fruit, beset with fine and short appressed hairs, none of them hooked or gland-tipped: corolla blue with yellow throat, 3-4 lines in diameter: nutlets somewhat angled or carinate on the ventral face. In wet places, western Oregon. Escaped from gardens.

M. alpestris Schmidt Fl. Bohem. Cent. iii, Nr. 225. Stems tufted, erect, 3-9 inches high, from a perennial root: leaves oblong, linear, or lanceolate: flowers in rather dense racemes: pedicels short, and thick, ascending, seldom longer than the calyx: calyx almost 5-parted, hirsute with erect hairs, mixed near the base with some more spreading and hooked ones, erect in fruit: corolla blue, the flat limb 3-4 lines in diameter: nutlets more or less margined and carinate ventrally at the apex. In the mountains of Oregon to Kotzebue Sound and the northern Rocky Mountains.

M. macrosperma Engelm. Am. Jour. Sci. xvi, 98. Roughish-hirsute or hispid: stem erect, 3-12 inches high from an annual or biennial root, simple or branched: leaves from spatulate-oblong to oblanceolate or oblong, obtuse, 3-12 lines long, the largest ones in the middle: racemes strictly erect: pedicels erect or appressed to the rachis below but spreading above, less than a line long: calyx unequally 5-cleft, the lobes lanceolate, acute, longer than the tube, sometimes the lower ones twice as long as the upper: corolla white, the limb 2-3 lines broad nutlets convex on the back, carinate and margined on the ventral face. In prairies, Brit Columbia to Oregon, Idaho, Texas and Florida.

17 LITHOSPERMUM Tourn. L. Gen. n, 181.

Annual or perennial pubescent or hairy herbs with sessile alternate leaves and small or rather large white, yellow or blue flowers axillary or subaxillary in leafy-bracted spikes. Calyx 5-parted or 5-cleft the lobes or sepals narrow. Corolla salverform or funnelform; its lobes rounded, imbricated in the bud; the throat pubescent or crested. Filaments short, inserted on the tube of the corolla. Style slender: stigma capitate, 2-lobed or sometimes truncate. Ovary of 4 distinct lobes. Nutlets 4 or by abortion fewer, ovate, usually white and smooth, erect, attached by the base to the flat gynobase; the scar flat and rather small.

L. Californicum Gray Proc. Am. Acad. x, 51. Canescently pubescent and papillose-hispid throughout: stems ascending, 4-14 inches long, several from the crown of a thick perennial root, very leafy, simple, or sparingly branched above: leaves bract-like below, gradually enlarged upward, the largest ones in the middle, linear to broadly lanceolate, or the upper ones not rarely ovate, sessile or nearly so 1-3 inches long: peduncles 1-2 lines long: sepals linear, 4-8 lines long: corolla bright yellow, hardly an inch long, narrow-funnelform, its proper tube about equalling the calyx, its ample throat much longer than the very short lobes, pubescent outside almost destitute of crests, the glandular ring at the base of the tube naked

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L. pilosum bescent, pale or biennial root, 6- linear-lanceolate apex, often sm. thyrsus: sepals form, about twice the lobes equally puberulent and ovate, acute, sm on dry hillsides

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anthers oblong, sessile: style 2-lobed at the apex: nutlets white, smooth and polished, the inner face rather conspicuously carinate. On dry rocky hillsides, southwestern Oregon to California.

L. pilosum Nutt. Journ. Phil. Acad. vii, 43. Soft-hirsute and pubescent, pale or canescent stems numerous from the crown of a thick perennial root, 6-18 inches high, mostly simple, very leafy: leaves linear to linear-lanceolate, 2-4 inches long, mostly tapering from near the base to apex, often small and bract-like below: flowers densely crowded in a leafy thyrus: sepals linear 3-4 lines long, hispid: corolla campanulate-funnel-form, about twice the length of the calyx, silky outside, dull greenish-yellow, the lobes equalling the throat, nearly naked at the throat but obscurely puberulent and thickened under each lobe: style slender: nutlets broadly ovate, acute, smooth and polished, 2-3 lines long white and bony. Common on dry hillsides and plains, Brit. Columbia to California, and Nebraska.

ORDER LXVI CONVULVULACEÆ Vent. Tabl. ii, 394.

Herbs, or some tropical species shrubs or trees, with generally twining or trailing stems, usually milky juice, alternate leaves without stipules, or leafless, truly axillary regular 5-merous, or rarely 4-merous flowers, except as to the pistil which is almost always 2-carpellary. Calyx mostly of distinct and imbricated sepals, persistent. Corolla either plicate and the pleats convolute or induplicate-valvate or sometimes imbricate in the bud, the limb either lobed or entire. Stamens as many as lobes of the corolla and alternate with them, usually inserted low down on the tube of the corolla; hypogynous disk usually annular and manifest. Ovary 2-celled or rarely 3-celled, with a pair of anatropous ovules in each cell, or spuriously 4- or 6-celled, each cell being more or less divided into a pair of 1-ovuled half-cells by a false partition, or rarely 2- or 4-parted from above around the style. Style single or once or twice divided: stigma terminal or introrse. Fruit capsular or sometimes fleshy. Seeds comparatively large, filled by a crumpled or pleated embryo involving or partly surrounding a little mucilaginous or fleshy albumen, its cotyledons ample and foliaceous, or in *Cuscuta* a spiral embryo without cotyledons.

TRIBE 1 Plants with ordinary foliage, not parasitic. Ovary entire.

1 **Convolvulus** Corolla plicate at the sinuses pleats twisted in the bud: style undivided or cleft only at the apex.

TRIBE II Leafless parasitic twining herbs without green color.

Tribe 1 *Convolvuleae* Choisy in DC. Prodr. ix, 335 Plants with mostly twining or trailing stems, mostly milky juice and ordinary foliage, not parasitic. Ovary entire.

2 **Cuscuta** Corolla with mostly spreading lobes, between convolute and imbricate in the bud.

1 CONVULVULUS L. Gen. n. 215.

Herbs with trailing twining or erect stems, broad leaves and