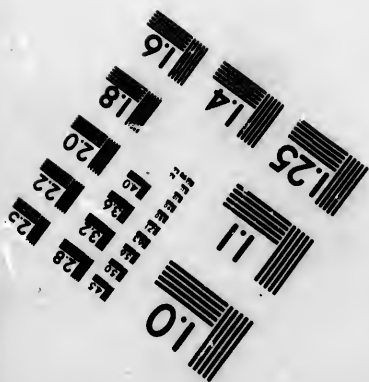
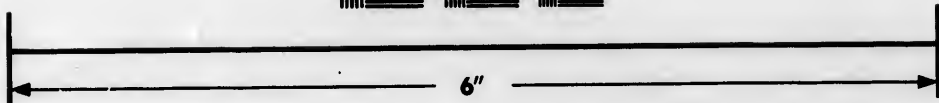
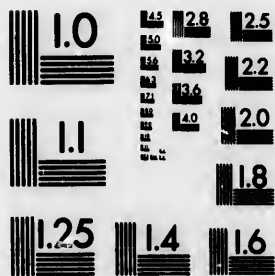


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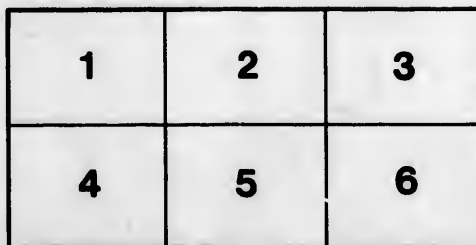
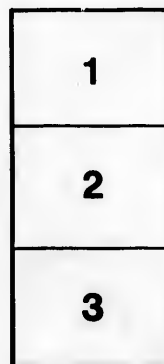
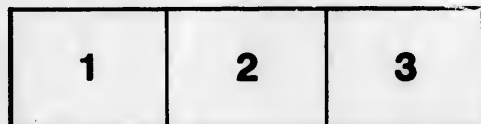
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CONTAINING
 BRIEF DESCRIPTIONS OF ALL THE KNOWN INDIGENOUS AND
 NATURALIZED PLANTS GROWING WITHOUT CULTIVATION
 NORTH OF CALIFORNIA, WEST OF UTAH, AND SOUTH OF
 BRITISH COLUMBIA.

BY
THOMAS HOWELL

VOL. I.

PHANEROGAMÆ.

FASCICLE 6, NYCTAGINACEÆ TO PONTEDERIACEÆ.

Price Fifty Cents.

PORTLAND OREGON,
 July 20th, 1902.

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PLANTS

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triangular, in villous forms top-shaped, cylindrical, 2-5 inches long: bracts aristate to foliaceous, often 10 times as long as the flowers, linear-subulate to linear, acute: flowers perfect: calyx lobes villous to glabrate herbaceous, spatulate-oblong: corolla-lobes spreading, round-ovate: stamens 4, barely exerted from the tube: capsule oblong, obtuse, circumscissile at about the middle: seeds 2, brown, oblong, finely pitted. In fields and plains, Oregon to the Eastern and Southern States.

P. tetrantha E. L. Morris Bull. Torr. Bot. Club xxvii 119. A low green and purplish acaulescent glabrous to pubescent or villous annual: leaves linear, entire, 2-3 inches long, about a line wide, truncate callous-tipped, sessile and with a somewhat clasping base scapes 4-6 inches high: spikes oblong, 3-12 lines long, rather few-flowered: bracts scarious, with rigid callous-tipped apex, $\frac{1}{2}$ as long as the calyx: flowers perfect: calyx pubescent, the ovate or oblong obtuse lobes with or without scarious margins, 1-2 lines long: corolla-lobes rounded-ovate, obtuse, about 2 lines long, white with dark brown base, spreading or somewhat reflexed: stamens 4, long-exserted: capsule ovoid, 2 lines long, 2-seeded, circumscissile much below the middle: seeds dark brown, deeply channelled on the face. On dry hillsides near Grant's Pass, Oregon to California.

P. Bigelovii Gray Pacif. R. Rep. iv, 217. Mostly glabrous and green, annual: leaves linear, $1\frac{1}{2}$ -4 inches long, rather fleshy obtuse, entire: scapes 4-6 inches high: spikes oblong or linear, densely few to many-flowered, about an inch long: bracts carinate, about an inch long: flowers perfect, calyx-lobes ovate, obtuse, about equalling the bracts: corolla-lobes ovate, remaining open: stamens 2, slightly exerted: capsule ovoid-oblong, one half longer than the calyx, 4-seeded: seeds oblong, not hollowed on the face. In brackish marshes along the coast, San Francisco Bay California to Vancouver Island.

P. elongata Pursh Fl. 729. *P. pusilla* Nutt. Somewhat cinereous-puberulent annual: leaves linear-spatulate, 1-2 inches long, entire: scapes 1-6 inches high: spikes 3-18 lines long, loosely flowered: flowers imperfectly dioecious or polygamous: bracts ovate, keeled, about a line long: sepals oblong, obtuse, about equalling the bracts, with broad scarious margins: corolla-lobes triangular-ovate, acute, becoming erect and closed over the capsule: stamens 2: capsule short-ovoid, a little longer than the calyx, circumscissile below the middle, 4-seeded: seeds elongated-oblong, dark brown. In wet places, Oregon to the Eastern States.

DIVISION III. APETALÆ.

Floral envelopes consisting of a calyx only which is often petal-like or wholly wanting. Very rarely some petals present.

SYNOPTICAL KEY TO THE APETALOUS ORDERS

A. Flowers not in aments.

* Ovary superior, 1-celled and mostly 1-ovuled, or carpels distinct if more than one.

74 *Nyctaginaceæ* Herbs with simple opposite leaves without stipules:

flowers involucrate: calyx corolla-like: fruit an achene, enclosed in the tube of the calyx and thus apparently inferior.

- 75 **Polygonaceæ** Herbs or woody plants with alternate simple leaves with sheathing or on stipules: flowers perfect, on jointed pedicels, often involucrate: fruit a more or less triangular achene.
- 76 **Phytolaccæ** Herbs or shrubs with alternate leaves: flowers perfect, polygamous or monœcious: fruit a berry, or capsular or samaroid.
- 77 **Amaranthaceæ** Herbs or low shrubs with alternate leaves: flowers with petal-like scarious persistent sepals and bracts: fruit a utricle: seed lenticular.
- 78 **Chenopodiaceæ** Herbs or shrubs with opposite or alternate simple leaves without stipules sometimes leafless: bracts herbaceous: flowers usually with herbaceous persistent sepals: fruit a utricle or achene.
- 79 **Lauraceæ** Trees or shrubs with simple entire leaves without stipules: flowers perfect: fruit a drupe.
- 80 **Elaeagnaceæ** Shrubs or small trees with simple opposite leaves: flowers dioecious: fruit drupe-like, enclosed in the calyx-tube and thus apparently inferior.
- 81 **Ulmaceæ** Trees or shrubs with alternate stipulate leaves and small mostly monœcious or polygamous flowers: fruit a drupe, samara or nut.
- 82 **Urticaceæ** Herbs, rarely shrubs or trees with alternate or opposite mostly stipulate simple leaves: often armed with stinging hairs: flowers monœcious or dioecious: fruit an achene.
- * * Ovary and fruit superior, of 2 or more carpels.
- 83 **Euphorbiaceæ** Herbs or shrubs or trees with milky juice, mostly alternate leaves with or without stipules: flowers monœcious or dioecious: fruit usually a 3-celled 3-seeded capsule.
- 84 **Empetraceæ** Low evergreen shrubs with simple leaves without stipules: flowers dioecious or polygamous: fruit berry-like containing 1-several 1-seeded nutlets.
- * * * Ovary and fruit inferior.
- 85 **Aristolochiaceæ** Perennial herbs or shrubs with alternate entire petioled leaves: flowers perfect with 3-lobed valvate calyx; fruit a 6-celled many seeded capsule.
- 86 **Santalaceæ** Perennial herbs or shrubs with alternate entire simple sessile leaves: flowers perfect, with 3-5-cleft calyx: fruit a 1-seeded nutlet or drupe.
- 87 **Loranthaceæ** Parasitic perennial plants with jointed stems and opposite entire leaves: flowers dioecious: fruit a 1-seeded drupe with glutinous pulp.
- B. Trees or shrubs with alternate leaves. Flowers monœcious, at least the staminate in aments.
- * Flowers monœcious; staminate numerous, in aments; pistillate few, with naked ovary.
- 88 **Fagaceæ** Trees or shrubs with entire or lobed leaves with caducous stipules: flowers monœcious in aments, fruit a cup like or closed and spiny involucre enclosing several nuts.
- 89 **Corylaceæ** Shrubs or small trees with simple leaves: flowers monœcious, staminate in aments, pistillate few in separate scaly buds fruit a

1-seeded

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90 **Betulacæ**
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91 **Myricacæ**
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92 **Salicaceæ**
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ORDER I.

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2 **Alltonia**
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1-seeded nut contained in a foliaceous tubular involucre.

* * Flowers monœcious or diœcious, all in aments: ovary superior.

- 90 **Betulaceæ** Trees or shrubs with simple leaves with distinct deciduous stipules: staminate flowers in long aments; pistillate in shorter or head-like aments: fruit a many-seeded cone with thickened and rigid scales.
- 91 **Myricaceæ** Shrubs with simple leaves mostly without stipules: flowers monœcious or diœcious, without calyx: fruit small, often waxy-coated, drupelets.
- 92 **Salicaceæ** Trees or shrubs with simple leaves with scaly and deciduous or foliaceous and persistent stipules: fruit many-seeded capsules.

ORDER LXXIV NYCTAGINACEÆ Lindl. Nat. Syst. 231.

Herbs, some tropical genera trees or shrubs with fragile stems and tumid joints, watery juice, entire petiolate mostly opposite leaves without stipules and perfect flowers in terminal or axillary clusters often subtended by an involucre. Calyx corolla-like, tubular to campanulate, the persistent base indurated and constricted over the ovary. Stamens few, hypogynous, with slender filaments and rounded 2-celled anthers. Ovary 1-celled, with a solitary campylotropous ovule. Style short or elongated. Stigma capitate. Fruit consisting of the hardened base of the calyx, enclosing the free achene.

- 1 **Mirabilis** Involucre 5-lobed, not changed in fruit: stamens usually 5: fruit not angled or winged.
- 2 **Allonia** Involucre calyx-like, deeply 5-lobed, 3-5 flowered: stamens 3-5: fruit with a double row of tubercles on the back surrounded by a winged margin.
- 3 **Abronia** Involucre of 5 or more distinct bracts surrounding a many-flowered head: calyx salverform, including the stamens and style: fruit wing-angled.

1 MIRABILIS L.

Perennial herbs with opposite leaves and showy flowers in involucrate terminal clusters. Involucre calyx-like, 5-cleft or 5-parted 1-12-flowered, not changed in fruit. Calyx corolla-like, tubular or more or less broadly funnelform with a spreading limb. Stamens usually 5, as long as the calyx: filaments united at base. Stigma capitate, granulate. Fruit globose to ovoid-oblong, smooth, obscurely or not at all ribbed or angled.

M. Greenel Watson Proc. Am. Acad. xii, 253. Somewhat glandular-suberulent: stems very stout and branching 2-3 feet high: leaves rather thick ovate, acute, 2-3 inches long, attenuate to a short stout petiole: involucre acutely lobed, 1-1½ inches long, 7-10-flowered: calyx dull red, or whitish, nearly 1 inch long, funnelform: fruit ovate-oblong 3-4 lines long, usually abruptly contracted near the base, rather strongly 5-angled. On barren clayey hillsides near the Klamath river in California, perhaps in Oregon farther east.

2 ALLIONIA Lœfl. Inter. Hisp. 181 (1758.)

Annual or perennial herbs with opposite equal leaves and rather small flowers, involucre in loose terminal panicles. Involucre 5-lobed, 3-5-flowered, becoming enlarged and reticulate-veined after flowering. Calyx campanulate, its tube constricted above the ovary, stamens 3-5, usually 3, unequal, hypogynous. Fruit obovoid or clavate, strongly ribbed, pubescent in our species.

A. linearis Pursh Fl. 728. *Oxybaphus angustifolia* Sweet. Stems slender terete or somewhat 4-angled below glabrous and glaucous, 1-4 feet high, erect, the branches and peduncles sometimes puberulent; leaves thick, linear, 1-nerved, 1-3 inches long, 2-4 lines wide, obtuse or acute sessile, or the lower ones sometimes short-petioled; involucre about 3-flowered, green before flowering; calyx purple longer than the involucre; stamens and style exserted; fruit commonly roughened between the 5 prominent ribs. In dry soil Idaho to Nevada, Texas and Minnesota.

3 ABRONIA Juss. Gen. 448. (1774.)

Annual or perennial herbs with thick opposite unequal leaves and rather small usually fragrant flowers on axillary and terminal peduncles. Involucre of 5-15 distinct somewhat scarious bracts enclosing the numerous sessile flowers. Calyx salverform, the limb of 4 or 5 obcordate or emarginate lobes. Stamens usually 5, unequal, included in the tube and adnate to it. Style included; stigma linear-clavate. Fruit coriaceous or indurated, 3-5-winged, mostly reticulate-veined enclosing a smooth cylindrical achene; embryo with only 1 cotyledon, the other rudimentary or wanting.

* Wings of the fruit coriaceous, not completely encircling the body, consisting of a single lamina: the body more or less woody.

A. umbellata Lam. Ill. i, 469. A viscidly puberulent slender prostrate perennial, the stems often elongated, 1-3 feet long; leaves nearly glabrous, ovate to narrowly oblong, 1-1½ inches long obtuse, the margin often somewhat sinuate, attenuate into a slender petiole; peduncle 2-6 inches long; involucre bracts small narrowly lanceolate 2-3 lines long, 10-15-flowered; calyx rose-colored: 6-8-lines long with emarginate lobes; fruit 4-5 lines long, nearly glabrous, the body oblong attenuate at each end, the thin wings nearly as long, rounded, broadest above and often truncate, narrowing downward to the base of the fruit. On sands along the coast, Washington to California.

A. mellifera Dougl. Hook. Bot. Mag. t. 2879. Minutely viscid-glandular: stems stout, prostrate, 1-2 feet long from a stout perennial root; leaves mostly oblong, obtuse, the blade 1-2 inches long, abruptly and more or less obliquely contracted at base to a slender petiole often longer than the blade; peduncles stout, 4-8 inches long; involucre bracts usually 5, scarious, broadly lanceolate, acute or acuminate, 6 lines long or more, flowers pure white, about an inch long, the limb 4-5 lines in diameter; wings of the fruit narrow, often laterally elongated. On sandy banks along the Columbia river, eastern Oregon and Washington.

** Fruit wholly coriaceous and the central cavity extending through the wings.

A. latifolia Eschschaltz Mem. Acad. Petersb. x, 281. Stems stout

and fleshy perennial on short the involucre 5-6 lines 4-6 lines developed, to California

A. frag cid-puberu high, erect inches long mostly soli ous 4-9 lin long, open wings whic to Iowa.

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- 2 **Oxythe** or awn achene
- 3 **Choriz** angled cuspid 3, 6 or
- 4 **Pteros** involu

TRIBE stipules.

- 5 **Polygo** lar ac

and fleshy, prostrate very viscid-pubescent 1-3 feet long, from a long fleshy perennial root: leaves thick, broadly ovate to reniform 6-18 lines long, obtuse, on short thick petioles: peduncles usually exceeding the leaves: bracts of the involucre 5, rounded to ovate or oblong 2-4 inches long: flowers numerous 5-6 lines long bright yellow, very fragrant, the lobes emarginate: fruit 4-6 lines long, coriaceous, acute at each end, the wings more or less unequally developed, usually narrow. On sand-banks along the coast, Vancouver Island to California,

A. fragrans Nutt. Hook. Kew Journ. Bot. v, 261. More or less viscid-puberulent: stems several, from a perennial root, herbaceous, 6-20 inches high, erect or ascending, usually much branched: leaves oblong or ovate, 1-3 inches long, truncate, more or less cuneate at base, obtuse to acute: peduncles mostly solitary: bracts of the involucre large, broadly ovate, white and scarious 4-9 lines long: flowers white, very numerous in the involucre, 5-10 lines long, opening at night: fruit 3-6 lines long, coriaceous, with narrow undulate wings which do not close over the ovary; In dry soil eastern Washington to Iowa.

ORDER LXXV POLYGONACEÆ Lindl, Nat. Syst. 211.

Herbs shrubs or trees with jointed stems, watery, often acid or acrid, juice, alternate, opposite or whorled simple mostly entire leaves with sheathing united stipules and regular perfect, dioecious, monœcious or polygamous flowers. Calyx free from the ovary, 2-6-cleft or 2-6-parted, the segments or sepals more or less imbricated, often petal-like stamens 2-9, inserted near the base of the calyx, or in staminate flowers crowded toward the center. Ovary superior, 1-celled, with a solitary erect or pendulous orthotropous ovule. Style 2-3-cleft or 2-4-parted, sometimes very short stigma, capitate or tufted, rarely 2-cleft. Fruit a lenticular 3-angled or rarely 4-angled achene, usually invested by the persistent calyx. Embryo straight or curved in mealy albumen.

TRIBE I Herbs or somewhat shrubby plants. Flowers involucrate.

- 1 **Eriogonum** Involucre several-flowered with 4-8, pointless teeth: flowers exserted: stamens 9: achenes mostly 3-angled.
- 2 **Oxytheca** Involucre few-flowered, herbaceous, with 3-5 straight acute or awned lobes: flowers on exserted pedicels, pubescent: stamens 9: achenes lenticular.
- 3 **Chorizanthe** Involucre 1-3-flowered, coriaceous or chartaceous, 3-6 angled, with 3-6 cuspidate often hooked teeth and sometimes as many cuspidate divaricate spurs at base: flowers usually included: stamens 3, 6 or 9: achenes 3-angled.
- 4 **Pterostegia** Slender annuals with opposite toothed or lobed leaves: involucre bract-like, with a solitary included flower.

TRIBE II Herbs with alternate leaves and scarious sheathing stipules. Flowers not involucrate.

- 5 **Polygonum** Sepals 4-6, equal, appressed to the triangular or lenticular achene: styles 2 or 3: stigmas capitate.

- 6 **Rumex** Sepals 6, the outer spreading, the inner enlarged and appressed to the triangular achene: stigmas 3, tufted.
- 7 **Oxyria** Sepals 4, the outer smaller and spreading: stigmas 2, tufted: achenes orbicular, winged.

Tribe 1 Eriogonæ Meisner Pl. Vas. Gen. 229, as Order. Herbs or shrubby plants with alternate or verticillate leaves without stipules. Flowers involucre, 3-6-parted or 3-6-lobed. Stamens 9. Styles 3, with capitate stigmas. Juice nearly tasteless.

1 ERIOGONUM Michx. Fl. 1246. (1803.)

Annual or perennial acaulescent or leafy-stemmed herbs or shrubs with entire alternate opposite or whorled leaves and small, perfect flowers on jointed pedicels subtended by an involucre in panicles racemes heads or umbels. Involucre campanulate top-shaped or almost cylindrical, 5-8-toothed or 5-8-cleft, the teeth pointless. Calyx 5-cleft or 5-parted, usually colored, the segments equal or the outer ones larger. Stamens 9, with filiform filaments and oblong anther. Style 3-parted, stigmas capitate. Fruit a 3-angled pyramidal achene invested by the calyx-segments, or winged.

§ 1 Involucre not nerved or angled, 4-8-toothed or lobed, more or less broadly turbinate: bracts foliaceous, indefinite in number.

* Perennials, more or less tomentose or rarely glabrous, with peduncles naked and scape-like, or verticillate-bracteate in the middle: bracts mostly conspicuous: involucre 5-8-toothed or 5-8-cleft, in a simple or compound umbel or solitary: flowers mostly attenuate to a stipe-like base: achenes glabrous or nearly so.

E. flavum Nutt. Fras. Cat. (1813.) White-tomentose throughout: stems very short and thick, simple and solitary to tufted and creeping, woody: scapes 2-12 inches high: leaves crowded on the short stems, linear-oblong to lanceolate, 1-3 inches long, narrowed into petioles with dilated and imbricated base inflorescence regularly umbellate: involucre top-shaped, 2-2½ lines long: bracts spatulate, foliaceous: calyx yellow 3 lines high, top-shaped, very villous, the segments obovate: stamens and style-branches exerted achenes constricted at the middle, 2 lines long, villous at the summit the angles undulate, the faces swollen, Dry plains eastern Washington to Arizona and Nebraska.

E. Piperi Greene. "Densely tufted on a stout woody caudex: stems erect, leafless tomentose, 5-10 inches tall: leaves all basal, lanceolate or oblanceolate, acute or obtuse, densely hairy beneath, green and less hairy above, 1-2 inches long, attenuate into a usually shorter petiole: umbels several-rayed, simple, or contracted into a dense cluster: bracts 3-3, oblanceolate, 1-1½ inches long: involucre short-toothed, villous: flowers yellow, 2-3 lines long. Summit of Cedar Mountain, Washington. Hardly distinct from *E. flavum* [Nutt.]" Piper & Kent in Palouse Flora, 50.

E. androsaceum Benth. Dwarf, perennial: tomentose throughout or smoother above: caudex branching: leaves oblanceolate or spatulate, white-woolly beneath, glabrate above: scapes 2-3 inches high, simple: umbel simple or subcapitate, 4-7-rayed: rays short and slender: teeth of the involucre short, erect or nearly so: flowers sparingly villous, yellow, 2-3 lines long, short attenuate. On the high mountains of eastern Washington to Brit. Columbia.

E. pyro and thick, sp 3-9 lines broad villous at base of 1-4 very flowers yellow Washington

Var. c and smaller

E. thym high: leaves woolly: peduncles below the middle involucre 3-4 tip: calyx 5 segments glabrous In sterile root

E. caesp branched umbel branches usually 3-4 lines long, dense scape-like 1-2 involucre: lobes becoming reflexed lines long, the eastern Oregon

E. Dougl ly branched and alternate below 3-4 lines long; petioles alternate leaves in low pubescence to California.

E. sphaer ched below, tapering below white-woolly with a whorl of flowers in the involucre yellow or tin the oblong lobes Washington

E. tenue ching, 3-5 inches ends of the bracts oblong, thinly whorl of leaves involucre linear spreading or narrowed below oblong-obovate apex. In dry Oregon and V

E. umbel

E. pyrolæfolium Hook. New Journ. Bot. v, 395, t. 10. Caudex short and thick, sparingly branched: leaves thick, glabrous, round-ovate to oblong, 3-9 lines broad, mostly abruptly attenuate into a short petiole, broad and villous at base: scapes smooth, 2-3 inches high, bearing a 2-bracteat umbel of 1-4 very shortly pedicellate sinuately-toothed and villous involucre; flowers yellow, slightly villous at base, short-attenuate. On the high mountains Washington to California.

Var. coryphæum T. & G. More tomentose, with narrower leaves and smaller flowers. On the high peaks of the Cascade Mountains.

E. thymoides Benth. A much branched undershrub 3-10 inches high: leaves linear to spatulate with revolute margins, 2-5 lines long, white-woolly: peduncles slender, 1-2 inches high, bearing a whorl of linear bracts below the middle and a solitary, several-flowered involucre at the summit: involucre 3-4 lines high deeply cleft, the lobes spreading or recurved at the tip: calyx attenuate and densely retrorse villous at base, 2-3 lines long, the segments glabrous above, pink to purplish, broad and rounded at the apex. In sterile rocky places on top of high hills, eastern Oregon and Washington.

E. cæspitosum Nutt. Journ. Acad. Philad. vii, 50, t. 8. A densely branched undershrub: stems 2-4 inches long depressed or ascending, the branches usually crowded with leaves: leaves ovate-spatulate to oblong, 2-6 lines long, densely white-woolly, crowded on the short branchlets: peduncles scape-like 1-3 inches long, slender naked: bearing a single several-flowered involucre: lobes of the involucre linear-oblong, as long as the turbinate tube, becoming reflexed: flowers yellow, often tinged with purple, pubescent, 1½-2 lines long, the base stipe-like, the lobes oblong-oval. On dry ridges, southeastern Oregon to Nevada.

E. Douglasii Benth. in DC. Prodr. xiv, 9. Shrubby and rather loosely branched at base; 4-10 inches high: leaves spatulate to linear-lanceolate alternate below to a petiole white-tomentose below, pubescent above, 6-14 lines long; peduncles rather stout, 2-6 inches long, with a whorl of oblanceolate leaves in the middle and a single many-flowered involucre: flowers yellow pubescent outside, about 3 lines long. In the Blue Mountains of Oregon to California.

E. sphærocephalum Dougl. Benth. l. c. Shrubby and loosely branched below, 6-10 inches high; leaves lanceolate to spatulate 6-14 lines long tapering below to a distinct petiole, often with revolute margins, densely white-woolly below, pubescent but green above; peduncles 2-6 inches long with a whorl of lanceolate leaves usually above the middle and a single many-flowered involucre; outer flowers reflexed, thus forming a dense round head, yellow or tinged with red or purple, pubescent outside, about 3 lines long the oblong lobes longer than the stipe-like base. On barren ridges, eastern Washington to California.

E. tenue Small Bull. Torr. Bot. Club xxv, 41. Stems loosely branching, 3-5 inches long, slender, shrubby at base: leaves crowded at the ends of the branches, linear or nearly so, 6-12 lines long, the margins revolute, thinly tomentose: peduncles erect, 3-5 inches high, bearing a whorl of leaves in the middle and a single terminal involucre: lobes of the involucre linear oblanceolate, obtuse, shorter than the turbinate tube, spreading or reflexed: flowers pale yellow, glabrous, about 5 lines long narrowed below to a stipe-like base, its segments unequal, the outer ones oblong-ovate, notched at the apex, the inner ones spatulate, erose at the apex. In dry sterile, rocky places along the Columbia river, eastern Oregon and Washington.

E. umbellatum Torr. Ann. Lyc. N. Y. 241. Stems depressed and

shrubby below, much branched: leaves oblong- to obovate-spatulate, 1-2 inches long, on slender petioles, white-tomentose below, green and glabrate above: peduncles 6-15 inches high, naked, bearing a simple umbel of 3-10 naked rays subtended by a whorl of leaves: involucre deeply lobed, the lobes shorter than the turbinate tube: flowers yellow or yellowish, 2-3 lines long, glabrous. Dry ridges, Oregon to California and the Rocky Mountains.

E. Tolmieanum Hook. Fl. 134. *E. umbellatum* var. *monocephalum* T. & G. Branches short and depressed, shrubby below, densely caespitose: leaves ovate, 3 lines long, narrowed to short petioles, glabrate above: peduncles 2-4 inches high, bearing a whorl of leaves above the middle and a single large globose head of one or more small involucre: flowers yellow, the base abruptly narrowed and stipiform. High mountains, Washington to California.

E. montanum. Stems depressed and diffusely much branching, 6-10 inches long shrubby and rooting at the nodes: leaves obovate to oblong, often acute, short-petioled, 3-6 lines long, whiter tomentose beneath, green and glabrate above: peduncles 1-3 inches long, naked bearing a simple umbel of 3-10 short naked rays subtended by a whorl of leaves: involucre loosely woolly the linear lobes longer than the turbinate tube: flowers yellow, about 2 lines long, gradually attenuate to a stipe-like base, glabrous. On the highest peaks of the Cascade Mountains.

E. croceum Small Bull. Torr. Bot. Club xxv, 43. Shrubby and spreading below 4-12 inches long, the branches often tufted leaves clustered at the ends of the shoots, oval or orbicular-oval, 6-9 lines long obtuse tomentose or glabrate above, abruptly narrowed to a stout petiole shorter or longer than the blade: peduncles erect, 4-8 inches high, usually naked except a bract near the middle, bearing a compound umbel subtended by a whorl of leaves: involucre thinly tomentose, the somewhat lanceolate acute lobes longer than the broadly turbinate tube: flowers golden yellow, about 3 lines long, narrowed into a long stipe-like base. In the mountains of eastern Oregon and Idaho.

E. ternatum. Stems short and densely caespitose, woody, 1-2 inches long, densely leafy: leaves obovate to spatulate or oblong, obtuse, narrowed below to a short winged petiole, densely white-tomentose both sides when young, becoming green and glabrous above, 6-10 lines long: scapes 4-12 inches high, densely floccose with white wool when young, becoming glabrate in age, bearing a 4-rayed umbel subtended by a whorl of linear bracts otherwise naked: central ray short, with a single naked involucre, the other 3 longer, with 1-3 involucre subtended by linear bracts: involucre somewhat funnelform, about 6 lines high, tomentose, few-flowered, the short erect teeth less than a line long: sepals yellow, a line long, oval to obovate. On gravelly bars along streams near Waldo, southern Oregon.

E. stellatum Benth. Tans. Linn. Soc. xvii, 469. More or less tomentose: stems diffuse and leafy: leaves ovate-spatulate to oblanceolate: peduncle naked, 6-12 inches high, bearing an umbel of 2-4 mostly elongated rays which are usually and often repeatedly divided in a cymose manner, the nodes and lateral rays all leafy-bracted: flowers yellow, about 3 lines long, the base attenuate and stipe-like. In the mountains, Oregon to California.

Var. *bahieforme* Watson Proc. Am. Acad. xii, 257. Leaves mostly small, often densely tomentose both sides: umbel very compound. With the type.

E. heracleoides Nutt. Stems short and woody at base: leaves narrowly oblanceolate with revolute margins densely tomentose beneath somewhat

glabrate a near the m or all of th glabrous, a and Utah.

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glabrate above: peduncles stout 6-12 inches high with a whorl of leaves near the middle umbel 1-11-rayed, sometimes simple, usually with some or all of the rays once or rarely twice divided: flowers yellow or whitish, glabrous, about 3 lines long. On dry plains, eastern Washington to Nevada and Utah.

E. compositum Benth. Trans. Linn. Soc. xvii. 409. Stems decumbent or ascending, 4-10 inches long, somewhat woody: leaves oblong-ovate, acute or acutish, 1-3 inches long, cordate at base on petioles 2-8 inches long, densely white-tomentose beneath, green and flocculent above: peduncles stout, naked, 6-18 inches high, nearly glabrous: umbel of 6-10 more or less elongated rays, each bearing a short several-rayed umbellet, subtended by whorls of linear-oblancoolate leaflets: flowers yellow to whitish or rose-color, 2-4 lines long, the stipe-like base short. On rocky banks, Brit. Columbia to California and Idaho.

* * Densely tomentose perennials with naked peduncles: involucre with 5 short erect teeth: flowers small abruptly narrowed at base, pubescent: achenes densely villous.

E. acule Nutt. T & G. Proc. Am. Acad. viii, 163. White-tomentose and matted caespitose: leaves densely crowded upon the closely branched caudex, oblong to linear with revolute margins, sessile, 2-3 lines long, spreading from the imbricated base: involucre in heads of 1-5, among the uppermost leaves, nearly sessile short, 3-5-toothed: flowers with broad sessile base, hardly 2 lines long, the oblong segments equal: filaments pilose at base: ovary very tomentose with long wool. Sandy hills, Idaho to the Rocky Mountains.

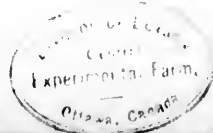
E. minimum Small Bull. Torr. Bot. Club xxv, 47. Gray-canescens: branches densely tufted, about 6 lines long: leaves densely imbricated and crowded, the persistent ones of previous years black, the fresh ones gray, spatulate, or almost terete by the strongly revolute margins, obtuse, dilated at base: peduncles erect, 1-3 lines high, simple: involucre solitary, turbinate-campanulate a little more than a line high: flowers 1-2 lines long, the segments unequal, the 3 outer oval, the 3 inner obovate, all obtuse: filaments villous at base. At high elevations in the Cascade Mountains of Washington.

E. pendulum Watson Proc. Am. Acad. xxiii, 265. White-tomentose throughout: stems woody at base 1-2 feet high profusely branched: leaves scattered, oblong-oblancoolate, 1-3 inches long, obtuse, subglabrate above: inflorescence several times di- or trichotomous upon naked peduncles: pedicels mostly elongated and naked: involucre at first nodding, campanulate, about 2 lines long, its deltoid teeth erect: flowers very small, densely tomentose, slightly exserted. On dry rocky plains, eastern base of the Coast Mountains near Waldo, Oregon.

§ 2 Involucre campanulate or short turbinate, not angled or nerved, with 5 rounded erect teeth, pedunculate in diffuse repeatedly di- or trichotomous panicles: bracts not foliaceous, all ternate, small, mostly triangular and rigid: flowers not alternate at base: ovary glabrous.

* Annuals: leaves all radical or nearly so: involucre flowers and achenes small.

E. cernuum Nutt. Journ. Acad. Phila. Ser. 2, 1 162. Stem very short: scape erect, usually much branched. 6-12 inches high: leaves orbicular or oblong-orbicular, less than an inch long obtuse or slightly apiculate, flat, floccose-tomentose, especially beneath, petioled: inflorescence paniculate: involucre campanulate, slightly more than half a line high solitary on



slender deflexed pedicels an inch long or less, 5-cleft to near the middle: flowers whitish, campanulate, half a line long, fiddle-shape. On dry plains, eastern Oregon to Nebraska and New Mexico.

* * * Annuals, branching from the base, with leaves developed at the nodes in the axils of ordinary triangular bracts: flowers minutely glandular.

E. angulosum Benth. Trans. Linn. Soc. xvii, 406, t. 18. Floccose-woolly, or at length glabrate: stem erect, 4-12 inches high, leafy, branching into a repeatedly di- or trichotomous panicle; the branches acutely 4-6 angled: radical leaves spatulate or rounded, the cauline oblong-linear to lanceolate: pedicels 6-12 lines long, widely spreading: involucre short-campanulate or hemispherical, minutely glandular or almost smooth, solitary, many-flowered, 6-toothed becoming dilated in fruit: flowers very obtuse at base, a line long, or short pedicels, rose-color or white, deeply 5-parted, the outer segments ovate, the inner at length longer, lanceolate-oblong. Eastern Oregon to California, and Utah.

* * * Tall stout white-tomentose annuals, with leafy simple stems, naked above: inflorescence cymose: involucre turbinate-campanulate, shortly pedicelled: flowers white, nearly glabrous: sepals very unequal.

E. annuum Nutt. Trans. Am. Phil. Soc. Ser. 2, v, 164. Flowers tomentose throughout: stem 1-3 feet high, leafy below: leaves oblong-lanceolate or oblanceolate, narrowed at base to a petiole, the margins somewhat revolute or crisped: involucre turbinate 1-1½ lines long, erect, 5-toothed: calyx ½-1 line long, the segments obovate. On dry plains Idaho to Nebraska and Texas.

§ 3 Involucre cylindrical-turbinate, more or less strongly 5-6 nerved, often becoming costate or angled, with as many short erect teeth, mostly sessile in heads or clusters, scattered in cymes or along virgate paniced branches, always erect, 1-3 lines long: bracts ternate, connate at base, usually short, acute and more or less rigid: flowers not attenuate at base: achenes usually glabrous.

* Cespitose densely tomentose perennials with short closely branched caudex: involucre a single head or short cymose umbel on the naked peduncle: outer sepals broad and somewhat cordate, the inner much narrower: ovary scabrous above.

E. ovalifolium Nutt. Journ. Philad. Acad. vii, 50, t. 8. Densely white-tomentose and silvery: stems very short and depressed-cespitose, perennial; leaves broadly oval or oblong, the blade 3-10 lines long, acutish, abruptly narrowed to a long slender petiole, crowded upon the numerous short branches: scapes 3-9 inches high simple, naked, bearing a single head of 3-8 closely sessile 5-8 toothed involucre: calyx very glabrous, yellow or rose-color, becoming thin and scarious, after flowering, the segments very unequal, the outer very broadly oval, cordate at base: the inner spatulate, emarginate. On dry hillsides, eastern Brit. Columbia to California and the Rocky Mountains.

Var. proliferum Watson Proc. Am. Acad. xii, 63. Larger than the type, the involucre loosely cymose-umbellate. With the type.

E. vineum. Small Bull. Torr. Bot. Club xxv, 45. Closely white-tomentose up to the inflorescence: perennial from a stout tap-root: stems branching, the branches tufted, clothed with the persistent leaf bases: leaves crowded, the blades suborbicular or broadly oval, 3-5 lines long obtuse or rounded at the apex, abruptly narrowed or truncate at base: on petioles often as long as the blade: scapes erect, 1-4 inches long, simple: involucre s

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4-6, in terminal heads, 3-4 lines high, angled, contracted, near the top: flowers wine-red, at length 3-lines long: its segments very unequal, the outer ovate with cordate base; the inner spatulate. Eastern Oregon to California.

E. dichotomum Dougl. Benth. in DC. Prodr. xiv, 14. Densely white-tomentose below: stems short but somewhat diffuse and depressed, leafy: leaves oblong or oblanceolate, acute at each end, an inch or two long, on slender petioles: peduncles rather short 6-18 inches high, bearing a 3-rayed umbel the somewhat erect rays sparingly di- or trichotomous: involucre usually solitary tomentose, about 3 lines long, strongly toothed: flowers white to rose-red $1\frac{1}{2}$ -2 lines long, the outer segments broadly elliptical, the inner linear-spatulate. On dry rocky hills eastern Washington to California.

E. niveum Dougl. Densely white-tomentose below: stems rather few, short and depressed: leaves oblong 6-12 lines long, petioled: scapes 4-10 inches high, bearing a 3-rayed umbel: involucre usually solitary, tomentose, about 2 lines high, with some or all of the teeth produced and often recurved: flowers white or rose color, its outer segments round-oval, the inner obovate-spatulate. On dry rocky hillsides, eastern Oregon and Washington to Idaho.

** Flowers narrower at base, the sepals similar and nearly equal: achenes smooth or nearly so.

+ Perennials with short branched caudex, naked peduncles and capitate involucre.

** Densely white-tomentose, dwarf and caespitose, alpine or subalpine: heads solitary.

E. pauciflorum Pursh Fl. 735. Stems very short, loosely tufted, covered with the dilated bases of the petioles: leaves linear or linear-spatulate, 1-3 inches long, with revolute margins, glabrous, or sparingly pubescent above, white-tomentose or cottony beneath, narrowed into slender petioles: peduncles 2-6 inches high: involucre 4-10, in a capitate cluster, 5-toothed, the teeth obtuse, more or less reflexed: flower white, campanulate, $1\frac{1}{2}$ lines long, its segments ovate. On dry plains, eastern Oregon to Neb

E. multiceps Nees Max. Reis. N. A. ii, 446. Stems short, tufted, much branched, sometimes several inches long: leaves spatulate 6-20 lines long, numerous, obtuse at the apex, narrowed below into petioles: peduncles 1-5 inches high: involucre 3-12, in a capitate cluster, sessile, $1\frac{1}{2}$ lines long, 5-6 toothed, the teeth acute: flowers white or rose-color, $1\frac{1}{2}$ -2 lines long, campanulate, somewhat villous, the segments cuneate, obtuse or emarginate. On dry plains, Idaho to Nebraska.

** Peduncles mostly tall and stout, from a sparingly branched caudex: heads solitary or few, in a long-jointed subumbellate cyme.

E. nudum Dougl. Benth. Trans. Linn. Soc. xvii, 413. ? Stems short and loosely branched 1-2 inches long: leaves ovate or oblong-ovate, the blade 1-3 inches long, obtuse or acutish at the apex, rounded, truncate or cordate at base, green and glabrate above, densely white-tomentose beneath, on petioles 2-6 inches long: peduncles rather slender 1-2 feet high, somewhat tomentose: inflorescence a compound umbel: involucre tomentose, campanulate about 2 lines long its triangular teeth erect: flowers yellow to reddish, glabrous about $1\frac{1}{2}$ lines long, its segments elliptical, rounded at the apex. On dry hillsides, southwestern Oregon to California.

E. elatum Dougl. Acaulescent: leaves all in a rosulate tuft, ovate-oblong or sub lanceolate, narrowed into petioles, rarely subhastate or subcordate at base, the margins usually undulate, green and glabrate above very softly villous-pubescent, or almost velvety beneath, on long slender pet

oles: peduncles 1-4 feet high, rigid and rush-like: inflorescence a very diffuse panicle: involucre glabrate, or glabrous, few, cylindrical or turbinate-campanulate, repandly 5-toothed many-flowered, gathered in heads or clusters, sometimes only in pairs, or solitary in the forks: flowers white or rose-color a little hairy at base the segments ovate-oblong, nearly equal. On barren rocky places, eastern Washington to California.

+ + Leaves not fascicled: bracts small very rarely foliaceous below: involucre mostly solitary in a repeatedly di- or trichotomous corymb-like cyme.

** Perennials, woody and diffusely much branched, leafy below.

E. microthecum Nutt. Jour. Acad. Phila. ser. 2, i, 172. More or less floccose-tomentose throughout: stems erect or ascending, branching, especially from the base, 6-12 inches high: leaves oblong or oblanceolate, obtuse at the apex, narrowed into short petioles, 6-12 lines long, the upper bract-like: inflorescence compoundly cymose: involucre turbinate $1\frac{1}{2}$ lines long: flowers yellow, pink or white, campanulate, at length constricted near the middle. Eastern Washington to California and Nebraska.

E. corymbosum Benth. in DC. Prodr. xiv, 17. Densely floccose-tomentose throughout: stems erect, branched 6-12 inches high: leaves oblong, obtuse at the apex, narrowed at base, petioled, 6-18 lines long, their margins more or less crisp: inflorescence compoundly cymose: involucre short-campanulate, 5-toothed, about $1\frac{1}{2}$ lines long, the teeth subacute flowers broadly campanulate, 1- $1\frac{1}{2}$ lines long, constricted near the middle, the segments fiddle-shaped, emarginate, the 5 inner ones shorter than the outer ones. Eastern Washington to Nevada and Kansas.

** Perennial: less woody and more shortly branched at base: leaves mostly narrow: sepals nearly equal.

E. campanulatum Nutt. l. c. 163. Stems short, thick and woody more or less tomentose: leaves crowded, narrowly oblanceolate, spatulate or nearly linear, 1-3 inches long, obtuse at the apex, narrowed into long petioles, white-tomentose on both sides, the margins sometimes revolute: peduncles erect or nearly so, glabrous, 4-12 inches high: inflorescences compoundly cymose: involucre oblong-turbinate, about a line long, with 5 obtuse teeth: flowers yellow, ovoid-campanulate, about a line long, the segments oblong or fiddle-shaped, emarginate. Eastern Oregon to Nebraska

+ + + Involucre sessile and solitary along the ascending and usually long-irrigate branches of the open naked panicle: flowers glabrous.

** White-tomentose perennials, leafy below: panicles sparingly branched, usually virgate: involucre tomentose, the teeth not margined.

E. strictum Benth. Branches very short: leaves small, ovate to oblanceolate, on long slender petioles: peduncles very slender, glabrate above: panicle twice or thrice divided, with 1-3 involucre on the short branches: involucre glabrate, $1\frac{1}{2}$ lines long: flowers white to rose-color, $1\frac{1}{2}$ lines long. In the Blue Mountains of Oregon.

** Annuals: leaves usually rosulate at the base, sometimes occurring at the nodes.

E. virgatum Benth. in DC. Prodr. xiv, 16. Usually white-tomentose throughout: leaves oblong, an inch long, on slender petioles: peduncles simple, or with a few erect virgate branches, 1-2 feet high: involucre remote, 2 lines long, tomentose, the 5 teeth very short: flowers a line long rose-color to white or yellow, glabrous, outer segments broadly ovate, cuneately narrowed at base, the inner about as long, spatulate-oblong. In

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gravelly bars along rivers Southern Oregon to California.

E. vimineum Dougl. Benth. Trans. Linn. Soc. xvii, 416. Leaves orbicular to broadly ovate, 3-10 lines broad, the margins often undulate, loosely floccose-woolly above, densely white-tomentose beneath, on slender petioles about as long as the blade: peduncles usually diffusely and repeatedly branching from near the base, 6-20 inches high: involucre narrow and rather prismatic, $1\frac{1}{2}$ lines long, the teeth very short: flowers rose-color or yellowish, about a line long, outer segments obovate, the inner only half as broad. On dry plains, Brit. Columbia to California east of the Cascade Mountains.

E. Baileyi Watson Proc. Am. Acad. x, 348. Leaves orbicular to broadly ovate, 3-6 lines broad, white-tomentose both sides, petioled: peduncles diffusely branched 6-12 inches high, wholly glabrous: involucre narrow, a line or less long, open at the throat, the teeth obtuse: flowers pinkish-white, less than a line long. Dry plains eastern Washington to Nevada and California.

2 OXYTHECA Nutt. Pl. Gamb. 169.

Slender repeatedly dichotomously branched annuals with the leaves all in a rosulate tuft and small involucre flowers. Involucres few-flowered, more or less pedicellate, campanulate or turbinate, herbaceous and not reticulated, 3-5-cleft, the erect or spreading lobes mostly terminated by straight slender awns. Flowers perfect; calyx 6-parted, colored, enclosing the achene: the more or less exserted pedicels intermixed with bracts or bractlets: Achene, so far as known, ovate-lenticular, the elongated radical accumbent upon the rounded cotyledons.

O. dendroidea Nutt. l. c. Leaves linear-oblancoale, hirsute, 6-18 lines long acute: scape-like stem usually 6-12 inches high very slender diffuse and much branched from near the base, or stouter and less branched: bracts unequal, without awns, linear-oblong to linear, or oblong-ovate in the stouter forms, the lower half-inch long or less, the upper much smaller, all more or less united at base: involucre turbinate, 1-3 lines long, unequally 3-4-lobed, rather fleshy, acutely awned, those in the forks on slender pedicels 1-4 lines long, the others more nearly sessile flowers light rose-color, half a line long, outer segments obovate, the inner narrower and shorter. On dry hillsides, southeastern Oregon to Wyoming and Nevada.

3 CHORIZANTHE R. Br.

Low dichotomously branched plants with the leaves mostly in a rosulate radical tuft, and small flowers in small involucre heads. Involucres tubular or funnelform, sessile, 2-6-angled or costate, and 2-6-toothed or cleft, the divisions more or less divaricate and terminating in cusps or rigid, often uncinatc, awns. Flowers 1-3 in the involucre more or less exserted. Calyx 6-parted or 6-cleft. Stamens 3, or 2, inserted on the base or more or less adnate to the tube of the calyx, rarely on its throat. Styles linear, with capitate stigmas. Achenes triangular beaked. Embryo with inflexed or straight radicle. Ours all annuals.

C. membranacea Benth. Trans. Linn. Soc. xvii, 416, t. 17. Lanosely pubescent when young, glabrate in age: stems erect, 6-18 inches high, sparingly branched above: radical and lower cauline leaves linear, obtuse,

forming irregular whorls at the lower joints: involucre in the lower axils few, without scarious margins, the upper in condensed capitate heads, with equal broadly expanded scarious winged divisions, reflexed, rotate and tipped with a slender uncinat awn, the tube ribbed and protuberant below flowers 2-3, one with long pedicel partly exerted, the others undeveloped: flowers short tubular, hairy outside, the segments oblong, equal: stamens at the base. On rocky foothills southern Oregon to California.

C. Watson T. & G. Proc. Am. Acad. viii, 190. Canescently pubescent throughout: stem erect or ascending, 1-4 inches long, branching from the base: radical leaves narrowly oblanceolate to spatulate, 6-10 lines long, narrowed to a petiole with dilated base, the margins revolute, densely tomentose beneath; lower cauline similar, but smaller and uncinately awned, passing above into opposite uncinat-tipped bracts: involucre clustered on the upper branches, narrow, inconspicuously costate, unequally 5-lobed, one 3-4 times as long as the others, all uncinat tipped: flowers solitary, slender-pedicelled, included or partly exerted, the segments oblong, acute, pubescent outside: stamens inserted on the throat of the calyx: achenes oblong-triangular. On desert districts, southeastern Oregon to Nevada and California.

4 PTEROSTEGIA F. & M. Ind. Sem. Petr. ii, 48.

Very slender and weak diffusely and dichotomously branched annuals with opposite entire or 2-lobed leaves and small flowers solitary in foliaceous sessile involucre in the forks of the branches. Involucre of a single bract, subtending and shorter than the sessile flower, rounded and more or less 2-lobed, at length becoming enlarged, scarious and reticulated, loosely enveloping the achene, and gibbously 2-saccate on the back. Calyx 5-6-parted, the segments equal. Stamens inserted at the base of the segments, as many or fewer. Achene triangular, glabrous. Cotyledons rounded, accumbent upon the radicle.

P. drymaroides F. & M. l. c. Sparingly hirsute: stems decumbent, often 1-2 feet long: lower leaves petioled, 2-6 lines broad, fan-shaped, 2-lobed, the lobes crenately toothed or again lobed; upper leaves obovate to spatulate, entire or toothed: bracts similar, a line long: involucre very small, becoming 1-1½ lines long in fruit, somewhat 2-lobed, the margins toothed or lacinate: flowers yellowish the segments oblong-lanceolate. Hillsides and dry places, from the Columbia river to Lower California.

Tribe 2 Polygonaceæ Endl. Gen. 301. Herbs with alternate leaves and scarious sheathing stipules. Flowers without involucre. 3-6-parted. Stamens mostly 4-8. Styles 2 or 3. Juice usually pungent, acid or acid.

5 POLYGONUM L. Sp. 359.

Annual or perennial plants with jointed stems, alternate leaves scarious sheathing stipules, called ocreæ, and small normally perfect flowers in spikes, racemes or panicles. Calyx 4-6-parted, or 4-6-cleft, the outer sepals or segments somewhat longer than the inner. Stamens 3-9, included or exerted; filaments filiform, or dilated at base, glabrous. Style 2-3-cleft or 2-3-parted, with capitate stigmas. Achenes lenticular or 3-angled, rarely 4-angled, invested by or exceeding the persistent calyx. Embryo near the

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SUBGENUS I BISTORTA Meisn. Polygon. 50. Perennial by a bulb-like creeping or horizontal rootstock. Leaves radical and cauline: ocreæ membranaceous, cylindrical, naked, open, oblique at the summit. Inflorescence a single terminal spicate raceme. Flowers subtended by usually toothed bract-like ocreolæ. Calyx 5-parted. Stamens 8. Style 3-cleft. Achenes 3-angled. Cotyledons accumbent.

P. bistortoides Pursh Fl. 271. Glabrous or sometimes with a fine hispidulous pubescence on the under surface of the leaves, more or less glaucous throughout: stems erect or assurgent, 10-25 inches long, slender, simple: radical leaves oblong to oblong-lanceolate, 5-10 inches long, 3-18 lines broad, attenuate at base to a petiole 1-10 inches long, the midrib rather broad and conspicuous on both sides; cauline leaves mostly lanceolate, sessile or nearly so, subcordate, arising from near the summit of the ocreæ, all often with revolute margins and conspicuously nerved: ocreæ entire or somewhat broken about the oblique-open summit, closely clasping the stem: raceme oblong, 6-30 lines long, densely flowered, not bulblet-bearing below: calyx about 2 lines long, light rose to white, 5-parted, the segments oblong, faintly nerved. Subalpine and alpine parts of the Cascade and Rocky Mountains, California to the Arctic regions.

P. viviparum L. Sp. 360. Glabrous and more or less glaucous except the under surface of the leaves: stems rather slender, erect, 6-18 inches high, simple: radical leaves ovate or oblong and subcordate to linear-lanceolate and attenuate at base, the blade 1-3 inches long, on petioles as long or longer; cauline leaves lanceolate to linear: ocreæ $\frac{1}{2}$ -3 inches long, slightly enlarged at the obliquely opened summit: raceme narrowly cylindrical, 1-3 inches long, rather densely flowered above, bearing a number of ovoid-conic bulblets at base: calyx about a line long, rose-color to white, 5-parted to near the base, the ovate or obovate segments 3-nerved. Southern Oregon to Alaska and the Atlantic States.

SUBGENUS II ACONOGONON Meisn. Monogr. 53. Perennial by a more or less elongated creeping or horizontal rootstock. Leaves somewhat fleshy or coriaceous. Ocreæ funnelform, membranaceous, oblique, naked. Inflorescence consisting of terminal clusters, racemes or paniculate racemes: flowers subtended by ocreolæ. Calyx 5-parted. Stamens 8. Style 3-cleft. Achenes triangular. Cotyledons accumbent.

P. alpinum Allioni Fl. Pedim. ii, 206, t. 68. Bright green and glabrous or slightly pubescent throughout: stems stout, erect, 3-6 feet high, channeled, more or less branched: leaves lanceolate, 1-9 inches long, acute or acuminate, mostly tapering at base into short petioles, coriaceous: ocreæ funnelform, 6-18 lines long, oblique and 2-cleft, the segments acute mostly glabrous, large and loose, brittle and early falling away: inflorescence consisting of compound or paniculate loosely-flowered racemes 1-2 inches long: ocreolæ funnelform, oblique and shallow: calyx greenish or whitish, 1-1 $\frac{1}{2}$ lines long, 5-parted to near the base the segments obovate or oblong, rounded. In wet places, alpine and subalpine, Washington to California and Idaho.

Var. foliosum Small Bull. Torr Bot. Club xix, 360. Pubescent throughout: stems stout, sparingly branched, hispid: leaves ovate-lanceo-

late, acute, petioled, more or less tomentose beneath, ciliate, numerous near the ends of the branches: ocreae funnelliform, loose, hispid: flowers fewer: achenes broadly oblong. On the high mountains of Washington.

Var. Alaskanum Small Monogr. Polyg. 33. Stem stout, arising from a large rootstock, erect, 20-36 inches high, fleshy above: leaves ovate-lanceolate, 4-10 inches long, acuminate, obtuse or cordate at base, thin, pubescent both sides, or sometimes glabrous, ciliate, undulate, much crisped, on petioles 6-30 lines long: ocreae funnelliform, 1-2 inches long, thin, striate, more or less hispid. On the high mountains of Washington to Alaska.

P. phytolaccifolium Meisn. Small Bull. Torr. Bot. Club xix. 360. Herbage glabrous or very sparingly pubescent with slender hairs, light green, turning dark in drying: stems erect, 16-30 inches high, somewhat branched, channeled: leaves ovate or ovate-lanceolate, 1-7 inches long, acute or acuminate, thin, undulate and somewhat crisped, sometimes coriaceous: ocreae 6-12 lines long, more or less pubescent, brittle, early falling away: inflorescence consisting of axillary and terminal or panicle few loosely-flowered racemes: calyx white or pinkish, about a line long, not much enlarged in fruit, 5-parted to below the middle, the segments obovate, 2 of them often much smaller than the others. In the mountains of Washington, Oregon and California.

P. Newberryi Small Bull. Torr. Bot. Club xxi, 170. Herbage dull green, more or less pubescent and scurfy throughout, or somewhat glabrous: stems ascending or erect, 4-17 inches high, stout and more or less fleshy, simple or branched: leaves ovate to broadly oblong-ovate, one-half to 2 inches long, rather fleshy, truncate, obtuse or acute at base, short-petioled or the upper ones sessile: ocreae funnelliform, about a line long: flowers in few-flowered axillary racemes: calyx greenish, 1-2 lines long, 5-parted to near the base, its segments oblong or oblong-elliptic, the outer ones longer than the inner ones. Alpine and subalpine regions of Oregon and Washington.

P. Davisii Brewer Gray Proc. Am. Acad. viii, 399. Glabrous and glaucous or inconspicuously pubescent: stems usually slender, from an enlarged and woody rootstock, erect or ascending, 2-17 inches long, flexuous striate, simple or sparingly branched above, leafy throughout: leaves from ovate to oblong or almost lanceolate, 1-4 inches long, obtuse or acutish, subcordate to acuminate at base, undulate and ciliate: ocreae funnelliform, 3-8 lines long, more or less oblique: flowers in axillary and terminal 2-4-flowered loose clusters: calyx purplish-green or yellowish, about a line long, 5-cleft to the middle, much narrowed toward the base. On the highest slopes of the Cascade and Sierra Nevada Mountains.

SUBGENUS III PERSICARIA Meisn. Monogr. 66. Herbaceous or more or less woody perennial or annual plants with the leaves all cauline. Ocreae mostly membranaceous, cylindrical, truncate, naked or variously fringed. Flowers in terminal spicate racemes, usually geminate or paniculate, subtended by ocreolae. Calyx 3-5-parted. Stamens 4-8. Style 2-3-parted or 2-3-cleft. Achenes lenticular or triquetrous. Cotyledons accumbent.

P. amphibium L. Sp. 361. Perennial: glabrous when mature: stems emerged or floating on the surface of the water and rooting at the nodes, 1-10 feet long, simple or branched: leaves oblong, elliptic or elliptic-lanceolate, 1-6 inches long, thickish and somewhat coriaceous, glossy above, rounded or narrowed at base, long-petioled to sessile: ocreae cylindrical, those of the stem 8-15 lines long, those of the branches surpassing the internodes, with or without a few bristles: flowers in a dense oblong or

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ovate spiculate raceme: calyx rose-color, about 2 lines long, 5-parted to below the middle: stamens 5, exserted: style about 2 lines long 2-cleft: achenes lenticular, orbicular-oblong or obovoid. In ponds and wet places, Alaska to California and the Atlantic States: also Europe and Asia.

P. Hartwrightii Gray Proc. Am. Acad. viii, 294 Perennial: more or less hispid throughout, except when growing in water: stems creeping and ascending, or suberect, 1-3 feet long, leafy: leaves oblong to narrowly lanceolate, 3-9 inches long, obtuse or acutish at both ends, short-petioled or sessile: ocreae cylindric, 6-9 lines long, with a more or less spreading rim, fringed at the summit with short bristles: flowers numerous, in a dense oblong to conic spicate raceme: calyx rose-color, about 2 lines long, 5-parted to below the middle: stamens 5, exserted: achenes lenticular, oblong. In moist places, Alaska to California and the Atlantic States.

P. Muhlenbergii Watson Proc. Am. Acad. xiv, 245. Perennial: glabrous or strigose throughout: stems more or less creeping in wet places, the distal end erect, 12-30 inches long, mostly simple, leafy, enlarged at the joints: leaves narrowly to broadly lanceolate, 2-10 inches long, acute or acuminate, rounded or narrowed to cordate at base, all petioled: ocreae cylindric, 12-18 lines long, when young clasping the stem, becoming loose and inflated near the base in age: flowers in 1-3 terminal linear densely-flowered racemes 2-5 inches long: calyx dark rose-color to pink, 2 lines long, 5-parted to the middle: stamens 5, exserted: style 2-cleft, exserted: achenes lenticular, broadly obovoid. In water or wet places, throughout North America.

P. LAPATHIFOLIUM L. Sp. 360. Annual: glabrous or more or less pubescent throughout: stem stout, mostly erect, 1-2 feet high, branched above or throughout, sometimes nearly simple, thickened at the joints: leaves broadly to narrowly lanceolate, 2-10 inches long, attenuate toward the apex from the broadest part, acuminate at base, ciliate, inconspicuously punctate, short-petioled: ocreae cylindric, 6-12 lines long, loose, striate or ribbed, slightly ciliate when young: peduncles and pedicels more or less glandular: racemes 1-5, in a terminal panicle, densely flowered, 1-4 inches long, mostly drooping: calyx flesh-color to white, 5-parted to below the middle: stamens 6, included: achenes lenticular or trigonous, oblong or ovoid. In moist places, throughout temperate North America: introduced from Europe.

Var. incanum Koch Syn. Fl. Germ. 711. Small and slender: stem erect, 2-12 inches high, simple or branched: leaves lanceolate to ovate or oblong, glabrous above, white-tomentose beneath, short-petioled or sessile: racemes oblong, 6-12 lines long, erect: achenes lenticular, ovoid. In damp places, Oregon and Washington to the Atlantic States.

P. nodosum Persoon Syn. i, 440. Annual: stem stout, erect, 1-4 feet high, red or reddish with purple spots and dark rings, naked, branched: leaves rather narrowly lanceolate, attenuate upward from near the base and acuminate, cuneate at base and shortly petioled, somewhat scabrous with short prickly hairs on the midribs and margins: ocreae cylindric, 8-12 lines long, strongly ribbed: racemes axillary and terminal, oblong and erect or often linear and nodding, an inch long or more: flowers white to light rose-color, about a line long: stamens 6, included: style 2-parted, included: achenes lenticular, broadly oblong or ovoid. Throughout North America.

P. Pennsylvanicum L. Sp. 362. Annual: glabrous below, pubescent and glandular above: stem erect, 1-3 feet high, simple to much branched: leaves from narrowly to broadly lanceolate, 2-10 inches long, ciliate, the midrib prominent on the lower side, acuminate at base, short-petioled: ocreae cylindric or funnelliform, 6-9 lines long: racemes paniced, oblong-cylindric, 1-3 inches long, erect, dense: calyx pink or light purple, 1-2

lines long, 5-parted to the middle: stamens 8 or fewer, included: style 2-parted to about the middle: achenes lenticular, flat, broader than high. Idaho to the Eastern States.

P. PERSICARIA L. Sp. 531. Annual: stem erect or sometimes spreading, 8-20 inches high, simple or branched: leaves lanceolate to linear-lanceolate, 1-8 inches long, acuminate at both ends, entire or sometimes erose, conspicuously punctate, nearly smooth except the more or less hispid midrib and nerves, short-petioled or nearly sessile, generally with a dark triangular or lunate spot in the middle: ocreae cylindrical or funnelform, 6-9 lines long, conspicuously fringed with short bristles: racemes 1-5, in terminal panicles, oblong or ovoid, 6-18 lines long, mostly erect, densely flowered: calyx pink to purple or greenish, 5-cleft to the middle, the segments obtuse: stamens generally included: style 2- or 3-parted, included: achenes broadly ovoid, pointed. In waste places throughout North and South America: naturalized from Europe.

P. hydropteroides Michx. Fl. i, 236. Perennial, often tinged with red throughout: stems erect, or the base decumbent and creeping, 1-3 feet high, simple or branched above, enlarged at the joints: leaves lanceolate to linear-lanceolate, 2-6 inches long, glabrous or strigillose, acute at both ends, ciliate, short-petioled: ocreae cylindrical or funnelform, 6-12 lines long, loose, fringed with long bristles: racemes almost linear, 1-3 inches long, erect, more or less interrupted: calyx about a line long, flesh-color, or greenish, 5-parted to below the middle, the segments oblong or obovate: stamens 8, included style short, 3-parted, at length exerted: achenes triquetrous, ovoid or broadly oblong. In ponds and wet places, Washington to California and the Atlantic States.

P. Hydropiper L. Sp. 361. Annual: glabrous: stems erect or ascending, 8-24 inches high, simple, or branched throughout: leaves ovate to lanceolate, 1-5 inches long, acute or acuminate at both ends, ciliate, undulate or slightly crisped, short-petioled: ocreae cylindrical, 3-6 lines long, becoming somewhat funnelform and oblique fringed with long bristles, often bearing 1 or 2 flowers within, racemes numerous, axillary and terminal, 1-3 inches long rather loosely flowered and much interrupted, usually drooping: calyx greenish to red or white, 3-5 parted, the segments rather narrowly oblong: stamens 4, sometimes 6, included: style 2-3-cleft to near the base: achene lenticular or triquetrous, broadly oblong to orbicular. In damp places, throughout temperate North America and Europe.

SUBGENUS IV, AVICULARIA Meisn. Monog. Polyg. 85. Annual or perennial plants with the leaves all cauline, the petioles articulated at the junction of the ocreae; the upper ones reduced to foliaceous bracts. Ocreae membranaceous and usually hyaline, funnelform, oblique, 2-parted, at length lacerate. Inflorescence consisting of axillary clusters either widely separated or crowded into a terminal raceme. Calyx 5-parted. Stamens mostly 8. Style 3-parted or wanting. Achenes triquetrous. Cotyledons incumbent.

* Suffruticose smooth perennials with brown stems and loose scaly bark.

P. paronychia Cham. & Schlecht. Linn. iii, 51. Bright green and glabrous throughout: stems prostrate or ascending, 6-18 inches long, diffusely branched: leaves oblong to oblong-lanceolate, apparently linear or linear-lanceolate on account of the strongly revolute margins, 3-5 lines long, scattered along the branches and crowded in subsperate clusters at

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the branches, sessile, pitted on the upper surface, acute or acuminate at base, with a broad 2-winged midrib ocreae 6-10 lines long, silvery, early lacerate into hair-like segments: flowers crowded into subspicate clusters near the ends of the branches: calyx white to pink, about 3 lines long, 5-parted to below the middle, the segments obovate or oblong: stamens 8, included: style a line or more long, 3 cleft at the apex. On sandy banks along the coast, Vancouver Island to California.

P. Shastensis Brewer *Proc. Am. Acad.* viii., 400. Glabrous throughout: stems prostrate or ascending, 4-12 inches long, much branched: oblong to oblanceolate, 3-6 lines long, longer than the internodes, sessile, acute at base: ocreae 2-3 lines long, 2-parted, the segments very thin and silvery: flowers 2 or 3 together in the axils of the leaves: calyx 2 lines long, rose-color or red, 5-parted to near the base, the segments obovate, each with a dark rib: stamens 8, included; filaments strongly dilated at base: style 3-parted, apparently formed by the splitting of the apex of the narrowly oblong achene. Mount Mazama Oregon to the high peaks of the Sierra Nevada Mountains.

* * * Annuals, rarely perennials, with striate stems, leafy throughout: calyx colored upon the margins, becoming closely appressed to the achene: style short.

P. littorale Link in *Shrad. Journ.* i, 54. Annual or perennial, glabrous, bright green and glaucous: stems prostrate, 1-4 feet long, diffusely branched: leaves oblong to oblanceolate, 3-12 lines long, generally acuminate at base, conspicuously nerved, often crisped, short-petioled: ocreae oblique, 2-3 lines long, 2 parted and silvery when young, at length lacerate and brownish: flowers in clusters of 1-6 in the axils of the upper leaves: calyx mostly green, 5-parted to below the middle, the segments oblong: stamens 8, included: style a line long, 3-parted to the base, included. Brit. Columbia to California and across the continent.

P. aviculare L. Sp. 362. Glabrous throughout and dull or bluish-green: stems prostrate or ascending, 4-24 inches long, simple or branched: leaves oblong to oblanceolate, 5-12 lines long, acuminate at base, not conspicuously nerved, subsessile or short-petioled: ocreae oblique, 2 lines long, silvery, becoming lacerate in age: flowers in clusters of 2-5 in the axils of the leaves: calyx mostly green, 5-parted to below the middle, the segments oblong: stamens 5-8, included: style very short, 3-parted. Common in yards and roadsides.

P. erectum L. Sp. 363. Glabrous throughout: stem stout, erect or ascending and somewhat spreading, 8-24 inches high, nearly simple to much branched: leaves oval, oblong or obovate, 6-30 lines long, mostly acuminate at base, sessile to short-petioled: ocreae 3-12 lines long: flowers in clusters of several in the axils of the middle leaves: calyx greenish, over a line long, 5-parted to below the middle, the segments oblong: stamens 6 or 7, included: style less than a line long, 3-parted. In sandy fields, eastern Oregon to Texas and Georgia.

P. minimum Watson *Bot. King* 315. Somewhat scurfy but glabrous: stem erect or spreading, 1-3 inches long, slender, simple or branching from the base: leaves obovate to ovate or oblong, 3-8 lines long, acute or apiculate at the apex, acuminate at base, subsessile, not much reduced above: ocreae about a line long, dentate-lacerate: flowers in clusters of several in axils of all the leaves: calyx greenish, about a line long, 5-parted to near the base, the segments oblong, the margins pale rose-color: stamens 5-8, included. On the high mountain tops, Washington and Oregon to California and Utah.

* * * Annuals with striate stems, the branches slender and virgate, angular: leaves diminishing upward and becoming bract-like; the

spike-like inflorescence more or less interrupted.

P. Douglasii Greene Bull. Cal. Acad. i, 125. Glabrous and more or less glaucescent except the more or less scabrous nodes: stem slender, 8-16 inches high erect usually somewhat strictly branched: leaves oblong to lanceolate, 6-30 lines long, mostly acute, often cuspidate, acuminate at base, sessile or nearly so, the margins often revolute: ocreae 5-6 lines long: flowers one to several in the axils of the upper leaves, on reflexed pedicels: calyx greenish, 1-2 lines long, 5-parted to near the base, the segments oblong with whitish or rose-colored margins: stamens 8, included: style very short, 3-parted. In dry places in the mountains of Brit. Columbia to California and Nebraska.

P. montanum Greene Pl. Baker. 13. *P. Douglasii* var. *latifolium* Greene Bull. Cal. Acad. 125. "Low, fastigiately branched from the base, 3 to 6 inches high, the branches floriferous from the base, but the flowers few among the proper leaves, most of them forming a mere bracted spike beyond the foliage, all the angles of stem and branches denticulate-scaberrulous, and other parts also more or less scabro-puberulent: leaves oblong-lanceolate, very acute, often an inch long, 1-nerved, the nerve sharply carinate beneath the leaf: perianth subsessile but nodding, its segments dark green or purplish except marginally and completely enclosing the achene, this black, smooth and shining, the faces obtusely rhomboidal, the cross-section 3-lobed rather than triangular." On high mountains, Brit. Columbia to California and the Rocky Mountains.

P. Howellii Greene Pl. Baker. 14. Stem erect, 4-12 inches high, sparingly branched from the base, the branches erect: leaves elliptic-oblong to lanceolate, very acute and apiculate, attenuate at base, 6-12 lines long, the thin margins serrulate-scabrous: ocreae scarious, 2-4 lines long, 2-parted: flowers 1-3 in the axils of all the leaves, erect on erect pedicels: calyx whitish, about a line long, 5-parted to near the base, the segments oblong: achenes wholly invested by the calyx, very black and highly polished, the faces rhombic-ovate. On top of the Siskiyou Mountains along the Happy Camp trail in California, perhaps in Oregon farther east.

P. Sawatchense Small Bull. Torr. Bot. Club xx, 213. Glabrous and more or less scurfy or papillose throughout: stem erect, 2-8 inches high: leaves oblanceolate or obovate to almost linear, 3-12 lines long, acute at the apex, acuminate below, sessile, flat or revolute: ocreae at length lacerate to the middle: flowers in clusters of 2-4 in the axils of all the leaves: calyx green, on erect pedicels, a line or less long, 5-parted to near the base, the segments oblong, obtuse: stamens 6-8: style almost none. In the mountains, Washington to Colorado and Dakota.

P. ramosissimum Michx. Fl. i, 237. Glabrous throughout: stem erect or ascending, 4-12 inches high, nearly simple or diffusely branched: leaves lanceolate to oblong, 4-20 lines long, acuminate at both ends, short-petioled, persistent: ocreae 3-9 lines long, early becoming lacerate: flowers in small clusters in the axils of the upper leaves: calyx greenish or yellow, about a line long, erect, on erect pedicels, 5-parted or 6-parted to near the base, the segments narrowly oblong: stamens 6 or fewer, included: style very short, 3 parted to the base. In the mountains, eastern Washington to California and the Atlantic States.

P. Engelmanni Greene Bull. Cal. Acad. i, 126. Glabrous: stem very slender and wiry, 2-8 inches long, nearly simple or diffusely branched from the base: leaves linear-lanceolate, 1-6 lines long, light green or glaucous, beneath, acute, sessile: ocreae funnelform, about 2 lines long, at length slightly lanceolate: flowers in small fascicles in the axils of all the leaves, nodding on reflexed pedicels: calyx dark green, a line long, 5-parted to near the base, the segments oblong, obtuse, with whitish border: sta-

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ments 5-8 included: style very short, 3-parted. High mountains, Washington to Colorado.

P. Austine Greene l. c. Glabrous and scurfy throughout: stems mostly erect, 2-6 inches high, branched from the base: leaves ovate-lanceolate to oblanceolate. 3-6 lines long, acute, sessile, revolute or flat, bright green beneath: ocreae about 2 lines long, at length slightly lacerate: flowers in clusters of 2-3 in the axils of the leaves, drooping, on reflexed pedicels: calyx green, a line long, 5-parted to near the base, the segments narrowly oblong obtuse, with whitish borders: stamens 5-8, included: style very short, 3-parted to the base. In the high mountains, eastern Washington to California.

P. majus Piper Fl. Palouse Reg. 63. Stem wiry, terete, erect or nearly so, much branched from the base, 6-18 inches high; leaves linear-lanceolate, 1-3 inches long, sessile: ocreae scarious, 6-12 lines long, at length lacerate: flowers few, in the axils of the upper leaves, spreading or ascending on short pedicels: calyx broadly campanulate, 1-2 lines long, 5-cleft to below the middle, the segments oblong, rounded at the apex, white with green midveins: stamens 5, included: style 3-parted to the middle: fruit reflexed. Common in stony soil, eastern Washington.

P. spergulariiforme Meisn. Small Bull. Torr. Bot. Club xix, 366. *P. coarctatum* Dougl. not Willd. Glabrous throughout: stem slender and wiry, erect, 4-20 inches high, branched, the branches usually erect: leaves linear-oblong to linear lanceolate, $\frac{1}{2}$ -1 $\frac{1}{2}$ inches long, acute, sessile, the margins usually revolute: ocreae 4-6 lines long, soon finely lacerate: flowers numerous, in small clusters in the axils of the upper leaves, erect or spreading: calyx 2 lines long 5-parted to near the base, the segments obovate, obtuse, pink with green midveins: stamens 5, included: style about a line long, 3-parted. On dry stony or sandy places, Brit. Columbia to California and Colorado. Flowering from Spring until Autumn.

P. lineare Hook. Fl. ii, 137. ? Minutely puberulent throughout: stem slender, prostrate or ascending, diffusely branched, 4-10 inches long, leaves linear to linear-lanceolate, $\frac{1}{2}$ -1 inch long acute, sessile, the margins strongly revolute, dark green above, white beneath: ocreae about 4 lines long, soon lacerate: flowers in small clusters in the axils of subulate bracts at the ends of the branches: crowded and apparently spicate, erect or spreading, on short pedicels: calyx about 2 lines long, broadly campanulate, 5-cleft to near the base, the 3 outer segments obovate, rounded at the apex, the 2 inner ones narrower and barely obtuse, all pink or rose-color with green midveins: stamens 8, included. On mossy banks along the lower Columbia and Willamette rivers. Not flowering until Autumn.

P. Nuttallii Small Monog. Polyg. 132. *P. intermedium* Nutt. not Ehrh. Glabrous throughout: stem slender and wiry, erect 3-9 inches high simple irregularly and divergently branched, dark red: leaves linear-lanceolate, 4-18 lines long, acute, sessile, glaucescent beneath more or less revolute: ocreae 1-2 lines long, at length lacerate: flowers in the axils of the upper leaves, crowded and racemose, erect: calyx greenish, about a line long, 5-parted to near the base, the segments oblong, with pinkish margins: stamens 8 or fewer, the filaments dilated at base. On grassy banks, Brit. Columbia to Oregon.

P. Kelloggii Greene Fl. Fr. 134. Glabrous throughout: stem slender, mostly erect, 1-3 inches high, divergently branched from near the base: leaves linear or linear-lanceolate 2-6 lines long, acute, sessile, crowded on the branches but spreading and not imbricated, much the same size throughout: ocreae funnelform a line or less long, thin and early lacerate: flowers in small clusters in the axils of the upper leaves, contiguous on account of the very short internodes making the branches appear like leafy

racemes: calyx green, a line long 5-parted to near the base, the segments oblong, obtuse, with whitish or cream-colored margins: stamens about 5, included. Washington to California and Colorado.

P. Watsoni Small Monog. Polyg. 138. *P. imbricatum* Nutt. not Raf. Glabrous throughout, stem slender and wiry, usually simple, 1-6 inches high: 2-4 of the lower leaves filiform, 6-12 lines long, the upper or floral bracts lanceolate to oblong 2-4 lines long, acute or shortly acuminate, sessile, green with very narrow scarious margins: ocreae silvery, 2-parted but early lacerate, 1-2 lines long: flowers white or pinkish, mostly solitary, in the axils of the upper leaves, the lower one remote, the others crowded and racemose: calyx about a line long, 5-parted to below the middle, the outer segments longest, ovate, obtusish: stamens 5 or fewer. In wet places, Washington to California and the Rocky Mountains.

P. polygaloides Meisn. in DC. Prodr. xiv, 101. Glabrous and light green, 4-8 inches high mostly somewhat corymbosely branched, slightly flexuous: leaves linear, 3-18 lines long, acute, sessile: ocreae funnelliform, 2 lines long or more, 2-parted, soon lacerate: flowers in small clusters in the axils of oblong scarious-margined more or less imbricated bracts at the ends of the branchlets: calyx a line long, 5-parted to near the base, white or pinkish, the segments with a dark midrib, the outer ones longer than the inner: stamens 8, included: style evident, 3-parted to the middle. In moist places on open plains, Brit. Columbia to California and the Rocky Mountains.

SUBGENUS V DURAVIA Watson Am. Nat. vii, 665. Slender wiry little annuals. Leaves linear, not jointed upon the scarious lacerate ocreae. Flowers in slender many jointed interrupted spikes, mostly solitary and nearly sessile in the sheaths. Sepals 5, colored, becoming somewhat appressed to the achene. Stamens 8, the 3 inner filaments but slightly dilated at base. Achenes membranaceous, linear, nearly terete, obscurely 3-angled. Cotyledons accumbent.

P. Californicum Meisn. in DC. Prodr. xiv, 100. Glabrous: stem very slender and wiry, erect, diffusely and loosely branched to nearly simple: leaves narrowly linear, to filiform 6-18 lines long, subulate-tipped, 3 ribbed, the upper reduced to subulate bracts: flowers solitary in the axils of the bracts forming slender terminal spikes: calyx a line or less long, 5-cleft to the middle at length exceeding the ocreae. On dry plains Southern Oregon to California.

P. Greenii Watson Proc. Am. Acad. xix, 294. Glabrous: stem slender, erect, 4-7 inches high, generally branched throughout, compact: leaves linear to linear-lanceolate, 2-6 lines long, almost bract-like, reduced bracts above more or less imbricated and often of much the same size throughout, 3-ribbed, the margins revolute: ocreae 3-4 lines long conspicuously lacerate, the segments subulate, numerous, rigid: flowers solitary in the axils of bracts and thus apparently in terminal leafy-bracted racemes: calyx sessile, a line long, rose-color, 5-cleft, not exceeding the ocreae: stamens 8, included: style a line long 3-parted. Eastern Washington to California.

P. Parryi Greene Bull. Torr. Bot. Club viii, 99. Glabrous: stem erect, 1-4 inches high, simple to densely much branched, very leafy and bearing flowers to the base: leaves linear, 3-12 lines long, of much the same size throughout, subulate-tipped, 3-nerved: ocreae a little more than a line long, extremely lacerate, usually hiding the calyx and giving the whole plant a woolly appearance: flowers solitary in the axils of all the

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leaves: calyx nearly a line long, sessile, 5-cleft. In moist places, eastern Washington to southern Oregon and California.

SUBGENUS VI TINIARIA Meisn. Monog. 62. Annual or perennial more or less twining plants with usually cordate or truncate leaves. Ocreae membranaceous, funnellform, oblique, naked at the summit. Flowers in axillary or terminal clusters or racemes. Calyx 5-parted, the outer segments keeled or winged. Stamens 8. Style 3-parted or wanting. Achenes triquetrous. Cotyledons accumbent.

P. CONVOLVULUS L. Sp. 364. Annual: Glabrous: stem slender prostrate or twining, 1-4 feet long, branched: leaves broadly to narrowly ovate or ovate-sagittate, 1-3 inches long, acuminate, somewhat undulate and crisped, on slender petioles: flowers in small axillary clusters and terminal racemes on slender reflexed pedicels: calyx green or whitish, about 2 lines long, the segments oblong, obtuse, closely investing the triquetrous achene. Common in cultivated fields and gardens. Naturalized from Europe.

P. DUMETORUM L. Sp. ed. 2, 522. Perennial: bright green and glabrous throughout: stems weak and slender, extensively twining 2-20 feet long: leaves ovate-cordate, 1-4 inches long, acuminate, petioled or nearly sessile: flowers in axillary racemes 2 inches long: calyx yellowish-green, drooping, nearly 3 lines long. Said to grow in our region but I have not seen it. Missouri to Tennessee and Europe.

6 RUMEX L. Sp. 333.

Coarse perennial, biennial or annual herbs, some tropical species shrubs or trees, with more or less acid juice, alternate leaves with sheathing stipules and small flowers fascicled or verticillate in paniculate racemes. Flowers perfect, polygamous or dioecious, on jointed pedicels. Calyx 5-parted or of 6 distinct sepals the outer 3 herbaceous, spreading or reflexed, the inner larger and more or less colored, usually becoming enlarged and reticulated in fruit, appressed to the 3-angled achene. Stamens 6: filaments very short. Style 3-parted, with peltate tufted stigma. Embryo curved or nearly straight, borne in one of the faces of the achene.

§ 1 **ACETOSELLA** Trelease Rev. Rum. 76. Dioecious perennials with acid juice. Outer segments of the calyx without dorsal callosities, not reticulated nor larger than the achene.

R. ACETOSELLA L. Sp. 338. (SORREL.) Glabrous throughout stems slender, 6-12 inches high, tufted, propagating by creeping rootstocks: leaves oblanceolate, acute, the lower mostly hastate with a large decurrent, rarely toothed auricle on each side, petioled, 2-5 inches long, the upper gradually reduced and entire: panicle more or less compound, usually reddish, the filiform ascending branches, leafless: pedicels capillary, articulated at the summit: flowers about a line long. Common in fields and waste places throughout most of North America and Europe.

§ 2 **ACETOSA** Campd. Monog. Rumex. Dioecious perennials, the leaves with acid juice. Inflorescence with slender leafless branches. Inner segments of the calyx rather finely reticulated becoming round-cordate and much larger than the achene.

R. paucifolius Nutt. Mss. Watson Bot. King, 314. Stems somewha

tufted, about a foot high: leaves spatulate to lanceolate, or the shortest somewhat elliptical-ovate, very gradually narrowed at base, neither auricled nor hastate, 2-6 inches long: inflorescence rather simple, with suberect branches: pedicels about as long as the fruit, jointed toward the base, inner segment of the calyx about 2 lines in diameter, achenes about a line long. In mountain parks, Brit. Columbia to California and the Rocky Mountains.

R. acetosa L. Sp. 337. Stems simple, mostly solitary, 1-4 feet high, rather slender: leaves ovate or oblong-ovate 2-6 inches long, mostly obtuse, deeply cordate with commonly acute auricles or subsagittate, a small tooth sometimes present on each auricle: inflorescence a rather simple strict panicle: pedicels about as long as the fruit conspicuously jointed in the middle: outer sepals of pistillate relatively large, reflexed in flower orbicular, 2-3 lines in diameter clawless usually with a delicate callosity at base: achene about 3 lines long. In open places in woods, Alaska to Oregon and across the continent.

§ 2 **LAPATHIA** Campd. l. c. Leaves never hastate, with or without acid juice. Inflorescence with stout: r, sometimes leafy branches: hermaphrodite or andro-mono-ious. Inner sepals commonly reticulated, becoming round or elongated and much larger than the achene.

* Sepals at most very minutely erose or low denticulate.

+ Inner sepals very large, mostly red, round or broadly ovate deeply cordate, without callosities, outer sepals at length reflexed.

R. venosus Pursh Fl. 733. Glabrous throughout: stems stout, 8-18 inches high from long running perennial roots, branching from most of the axils: leaves thick and somewhat coriaceous, elliptical to nearly ovate, abruptly acute at both ends, 2-6 inches long: inflorescence nearly simple, leafless, the short zigzag branches divergent: pedicels rather stout about as long as the fruit tumidly jointed below the middle: inner sepals firm, bright rosy-red, orbicular or broader than long, 8-12 lines in diameter, the sinuses often closed, emarginate to shortly blunt acuminate: achenes about 4 lines long. On sandy plains east of the Cascade Mountains, Brit. Columbia to Nevada and Kansas.

+ Inner sepals not over 6 lines long, only moderately if at all cordate.

++ Inner sepals round or very broadly ovate, low reticulate pedicels slender or capillary.

R. occidentalis Watson Proc. Am. Acad. xii, 253. Glabrous: stems stout, 1-3 feet high, from thick perennial roots: leaves ovate to lanceolate, 6-12 inches long wavy-margined, truncately cordate, the apex rounded to acute, with acid juice: inflorescence strict and dense, rosy-red in fruit, naked or with a few small leaves below pedicels 2-3 times as long as the fruit, very obscurely jointed below the middle: inner sepals at length rosy-red, 3-5 lines long, deltoid-ovate, often only slightly cordate, remotely erose or denticulate, rounded or obtuse at the apex, without callosities: achenes 2 lines long. In wet or moist alluvial soil, California to Alaska and Colorado.

R. confinis Greene Pitt. iv, 306. Stems stout, often 6-8 feet high: blade of the lowest leaves often 1½ feet long, commonly 6 inches wide toward the deeply subhastate-cordate base, lanceolate, on petioles nearly as long as the blade: panicle ample, 1-2 feet long: pedicels slender, 3-6 lines long, jointed well above the base: valves suborbicular, with subtruncate base, green and of thin texture, the margins more or less crenate or dentate toward the base. In wet meadows, in the lake region of northern Idaho.

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R. crispus L. Sp. 335. Glabrous to slightly papillate: stems stout, 2-3 feet high, simple: leaves bluish-green, the lowest ample, elliptical to mostly oblong-lanceolate, rounded or decurrently acute at base, often a foot long: branches of the panicle rather strict, somewhat leafy: pedicels about one-half longer than the fruit, tumidly jointed near the base: inner sepals 2-3 lines long, rounded ovate, barely cordate, rounded at the apex or with a broad blunt acumination, minutely erose to broadly dentate below, each with a smooth ovoid often rosy callosity reaching to the middle of the valve: achene 1-2 lines long. Common throughout temperate North America and Europe.

* * Inner sepals triangular-ovate to oblong, sometimes with a contracted apex.

R. hesperius Greene Pitt. iv, 234. "Allied to *R. altissimus* but low and slender, very leafy, the panicle small, small-fruited: leaves elliptic-lanceolate, very acute or acuminate, wavy-margined or even almost crisped: pedicels jointed at the very base: valves of the fruiting calyx from quite exactly and sharply deltoid to subreniform-deltoid, as broad at base as long, none grain-bearing, all distinctly though not strongly venulose, seldom obviously reticulate.

Bottom lands near Bingen Washington, 31 Oct. 1893, W. N. Suksdorf; the specimens distributed for *R. altissimus*, but the species very distinct."

R. salicifolius Wein. Fl. iv, 28. Glabrous, pale green: stems spreading to erect, 1-3 feet high simple or branched, flexuous: from thick perennial roots, leaves lanceolate to linear, or the lower oblong, acute or acuminate at both ends, or rarely obtuse at the apex, often falcate, 2-7 inches long: panicles simple: pedicels arcuately curved, scarcely as long as the fruit, or a few in each cluster longer, jointed near the base: inner sepals triangular-ovate, acute, 2-3 lines long, delicately veined: callosities variable in number smooth or pitted, often nearly as long as the valve: achenes 1-2 lines long. In rich moist soil, Alaska to California and the Atlantic States and Canada: also Europe.

R. conglomeratus Murray Prodr. Fl. Goett. 52. Glabrous perennial: stems slender, mostly clustered, 1-3 feet high: leaves ovate to oblong or lanceolate, 1-5 inches long, some of them somewhat fiddle-shaped, crenulate and slightly crisped: flowering branches slender, at length elongated, not zigzag bearing a broadly lanceolate leaf at nearly every node: pedicels slender, about as long as the fruit, tumidly jointed near the base: inner sepals about 3 lines long, nearly oblong, obtuse: callosities mostly 3, round to ovoid, very prominent, smooth, half as broad and nearly as long as the valves: achenes about a line long. In waste places, western Washington to California: also in the Atlantic States: adventive from Europe.

* * Valves very prominently toothed.

R. pulcher L. Sp. 336. Stems slender, zigzag above, branching at nearly every node, at length dichotomous above, mostly glabrous: leaves oblong or some of the lower ones fiddle shaped, 1-6 inches long, obtuse, cordate at base, upper ones oblong or oblong-lanceolate, usually narrowed at both ends: panicle loose: racemes long, divergent, rather leafy: pedicels very short, scarcely longer than the fruit, tumidly jointed near the middle: inner sepals rigid, one commonly longer than the others, prominently veined, nearly 3 lines long, ovate, obtuse, with 5-10 short teeth on each side, one or all of them with a wrinkled callosity half as long as the valve: achenes about a line long. In waste places: naturalized from Europe.

R. obtusifolius L. l. c. Glabrous perennial: stems stout, erect, simple or sparingly branched, 2-4 feet high: leaves ample, broadly ovate, 4-14 inches long cordate, the veins often red or purplish, the upper ones lanceolate or oblong-lanceolate, the margins somewhat undulate or crisped.

flowering branches suberect, sparingly leafy below: pedicels slender, about twice as long as the fruit, tumidly jointed toward the base: inner sepals not very conspicuously veined, about 3 lines long, ovate-oblong, with 3-5 thin triangular teeth on each side, mostly confined to the lower half, the triangular entire apex mostly acute: callosities smooth, one usually larger than the others. Common along roadsides and in pastures: naturalized from Europe.

R. persicarioides L. l. c. Pubescent and pale green annual: stems rather stout, erect and simple or diffusely branched, 1-3 feet high, sometimes spreading or creeping, very leafy: leaves lanceolate or oblong, narrowed or sometimes cordate or sagittate at base, acute, the margins more or less undulate or crisped, 1-12 inches long: panicle simple or compound: racemes erect, leafy-bracted, usually interrupted: pedicels capillary, twice as long as the fruit, tumidly jointed at the base: inner sepals oblong, a line long with 1-3 bristles on each margin, each bearing an oblong callosity. Brit. Columbia to California, and the Eastern States and Canada

7 OXYRIA Hill Veg. Syst. x, 24. (1765)

Low perennial herbs with acid juice, mostly radical leaves and small perfect flowers in naked paniced racemes. Calyx unequally 4-parted, the outer segments smaller than the inner. Stamens 6, included: filaments short, subulate, glabrous: anthers oblong. Ovary 1-celled: ovule solitary. Style short, 2-parted, its branches divergent: stigmas fimbriate, persistent. Achenes compressed and thin, broadly winged.

O. digyna Campd. Monog. Rum. 155 t, 5. fig. 3. Rootstock large, chaffy: stem slender, scape-like, simple or sparingly branched, leafless or nearly so, 2-12 inches high: leaves reniform or orbicular-reniform, 6-18 lines broad, undulate, sometimes emarginate, long-petioled: ocreae oblique, loose, those of the stems bearing flowers: racemes many-flowered; flowers slender-pedicelled: calyx segments oblong, the inner erect, the outer reflexed in fruit: achenes pointed, smooth, surrounded by a broad membranous wing. On high mountains, California to the Arctic Circle and across the continent: also northern Europe and Asia.

ORDER LXXVI PHYTOLACCACEÆ Lindl. Nat. Syst. 231.

Herbs shrubs or trees with alternate leaves and perfect regular polygamous or monœcious usually racemose flowers. Calyx 4-5-parted or of 4 or 5 distinct sepals, imbricated in the bud. Stamens as many as divisions of the calyx and alternate with them, or more numerous, hypogynous: filaments subulate or filiform: anthers 2-celled, the cells longitudinally dehiscent, often nearly separated. Ovary superior, several-celled, with a solitary amphitropous ovule in each cell. Styles as many as carpels, short or none: stigmas linear or filiform. Fruit a berry, capsule or samara.

1 PHYTOLACCA L. Sp. 41.

Tall perennial herbs with simple entire leaves without stipules and small flowers in terminal racemes which by the farther growth of the stem become opposite the leaves. Pedicels bracted at the base. Calyx of 4 or 5 persistent rounded sepals. Stamens 4-15,

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inserted at the base of the calyx. Ovary globose, of 5-15 distinct or somewhat united carpels. Fruit a depressed-globose berry. Seeds erect, compressed. Embryo annular, in mealy albumen.

P. decandra L. Sp. ed. 2, 631. (POKE-BERRY) Glabrous and succulent: stems 4-12 feet high, stout, erect, branched: leaves oblong-lanceolate or ovate-lanceolate, pinnately veined, acute or acuminate at both ends, 8-12 inches long, petioled: racemes peduncled, 2-8 inches long: pedicels divergent, 2-6 lines long, each with a subulate-lanceolate branchlet at its base, and usually 2 linear ones above: flowers perfect: calyx white, 2-3 lines broad, its sepals suborbicular or oval: stamens 10, slightly shorter than the sepals: berry dark purple, 5-6 lines in diameter, 10-celled. In waste places in southern Oregon: introduced from the Eastern States.

ORDER LXXVII AMARANTHACEÆ J. St. Hil. Expos.
Fam. 204. (1805.)

Herbs or low shrubs with simple leaves without stipules and small monœcious, polygamous or diœcious flowers usually in terminal spikes or axillary heads. calyx herbaceous or membranaceous, 2-5-parted, the segments distinct or united at base. Stamens 1-5, mostly opposite the segments of the calyx, hypogynous. Ovary 1-celled, usually with a solitary amphitropous ovule. Style short, elongated or none: stigmas 1-3. Fruit an utricle, circumscissile, bursting irregularly or indehiscent.

1 AMARANTHUS L. Sp, 989. (PIO WEED.)

Annual herbs with alternate petioled entire leaves and small green or purplish mostly 3-bracteolate flowers in dense terminal spikes or axillary clusters. Calyx of 2-5 distinct sepals. Stamens 2-5: anthers 2-celled, longitudinally dehiscent. Styles or stigmas 2 or 3. Fruit a utricle beaked by the persistent style.

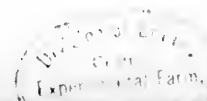
* Sepals 5, bracts 3.

A. *HYBRIDUS* L. Sp. 990. Pubescent to nearly glabrous, green to purple: stem rather slender, 2 inches to 8 feet high, usually branched: leaves bright green on both sides or paler beneath, ovate or rhombic-ovate, 1-6 inches long, on slender petioles: flowers very numerous, in dense linear-cylindric ascending or spreading spikes, forming dense terminal panicles: bracts subulate, 2-3 lines long: sepals 5, oblong, acute or cuspidate, about half as long as the bracts: stamens 5: utricle smooth, circumscissile. Common in fields and waste places: naturalized from Tropical America.

** Sepals 3: bracts 3.

A. *blitoides* Watson Proc. Am. Acad. xii, 273. Nearly or quite glabrous, pale green: stem much branched from the base, the branches prostrate and spreading, rigid, 6-20 inches long: leaves obovate to spatulate 3-12 lines long, obtuse to acute at the apex, narrowed into slender petioles: flowers in small axillary clusters mostly shorter than the petioles: bracts subulate-lanceolate, little longer than the 4 or 5 oblong-lanceolate acute or cuspidate sepals: stamens 3: utricle nearly smooth. In waste places and roadsides Idaho to the Atlantic States.

A. *GRÆCIZANS* L. Sp. 990. *A. albus* L. Glabrous: stem erect, 6-24 inches high whitish diffusely and widely branched: leaves oblong, spatulate or obovate, 6-18, lines long, pale green, long-petioled: flowers polygamous, in small axillary clusters shorter than the leaves: bracts subu-



late, pungent-pointed, spreading, much longer than the 3 membranaceous sepals: stamens 3: utricle wrinkled, longer than the sepals, circumscissile common in fields and waste places: naturalized from tropical America.

A. carneus Greene Pitt. ii, 105. "Monœcious: glabrous, prostrate, forming a mat 6-10 inches broad, the branches pinkish, the glomerules of flowers and lower face of leaves deep flesh-purple: plant leafy and floriferous throughout: leaves obovate-lanceolate, entire, setose-tipped, $\frac{1}{2}$ - $\frac{3}{4}$ inch long, tapering to a short petiole: bracts ovate-acuminate and setose-tipped: utricle smooth: seed black and shining, $\frac{1}{3}$ line wide. Beaver Canyon, Idaho."

* * * Sepal 1, Bract 1.

A. Californicus Watson Bot. Cal, ii, 42. Prostrate or ascending, glabrous, branching at the base, the stems often a foot long or more, with numerous short branchlets: leaves obovate to oblong, an inch long or less including the petiole, often small, obtuse or acutish, with white veins and margin: flowers green or reddish, in numerous small dense axillary clusters: bracts often membranaceous and inconspicuous, lanceolate, acuminate slightly or not at all exceeding the utricle: sepal of the staminate flowers $\frac{3}{4}$ line long, that of the fertile flower shorter and narrower, lateral: utricle slightly rugose, tardily circumscissile: seed half a line broad. Idaho to California and Southern Oregon.

ORDER LXXVIII CHENOPODIACEÆ Dumort.

Anal. Fam 15. (1829.)

Herbs or shrubs with alternate or rarely opposite leaves without stipules and small greenish flowers mostly in axillary and terminal panicles or racemes. Flowers perfect, monœcious or dioecious. Calyx persistent, 2-5-lobed or 2-5-parted, rarely reduced to a single sepal, or wanting in pistillate flowers. Stamens as many as lobes or divisions of the calyx, or fewer, opposite them: filaments slender: anthers 2 celled, longitudinally dehiscent. Ovary mostly superior and free from the calyx, 1-celled, with a solitary amphitropous or campylotropous ovule on a stipe rising from its base: styles 1-3, with capitate stigmas. Fruit an achene or utricle. Embryo slender, either annular and surrounding the mealy albumen, or spiral with the albumen lateral or wanting.

TRIBE I Flowers perfect, without bracts. Seeds free.

- 1 **Nitrophila** Perennial herbs with opposite leaves and axillary flowers.
- 2 **Kochia** Perennial herbs with scattered terete or linear leaves and axillary flowers.
- 3 **Chenopodium** Annual or perennial herbs with mostly thin leaves: flowers somewhat paniced.
- 4 **Bicum** Annual herbs with broad thin leaves: flowers in dense spicate clusters.
- 5 **Monolepis** Low annuals with the flowers densely clustered in the axils: sepal 1, bract like: stamen 1: fruit naked: seeds vertical.

TRIBE II Flowers monœcious or dioecious, bracted. Seeds free.

* Bracts compressed: testa of the seeds mostly coriaceous.

- 6 **Atriplex** Fruiting bracts with margins often dilated and the sides often muricate.

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7 *Eurota* Low and shrubby white-tomentose perennials: pericarp conical, densely hairy, not winged.

8 *Eremosium* Somewhat spinescent nearly glabrous shrubs: pericarp flattened, orbicular, wing-margined, glabrous.

TRIBE III Flowers perfect, without bracts. Seed invested by the pericarp.

Corispermum Low annuals: flowers solitary in the axils; fruit compressed-elliptical, acutely margined.

TRIBE IV Fleshy saline plants with jointed stems and scale-like leaves.

9 *Salsicornia* Branches opposite: flower clusters decussately opposite: calyx saccate, becoming spongy.

TRIBE V Herbs or shrubs with fleshy leaves. Stems not jointed.

10 *Sarcobatus* Somewhat spinescent shrubs: flowers unisexual: the staminate in aments, without calyx; the pistillate axillary, solitary, with saccate calyx: fruit transversely winged.

11 *Dondia* Saline herbs or shrubs with perfect axillary flowers: the calyx 5-cleft or 5-parted.

Tribe 1 Chenopodiæ Moq. in DC. Prodr. xiii, 48. Stems not jointed. Leaves flat, except in *Kochia*. Flowers perfect, without bracts. Sepals persistent. Seeds free, mostly with crustaceous testa and copious albumen. Embryo annular.

1 NITROPHILA Watson Bot. King 257.

Low branching perennials with fleshy opposite leaves and small perfect axillary flowers. Calyx of 5-7 equal erect concave and carinate sepals, mostly 2-bracted at base. Stamens as many as sepals, united into a very narrow perigynous disk. Style short. Stigmas 2. Utricle subglobose, indehiscent beaked by the persistent style included within the connivent sepals.

N. occidentalis Watson l. c. Glabrous throughout: stems ascending or decumbent, 3-8 inches long, from a perennial running rootstock, branching from the base: lower leaves broadly ovate or oblong, 2-3 lines long. The rest linear, 12 lines long, semiterete, acuminate and cuspidate: bracts similar but shorter, mostly twice longer than the flowers: flowers 1-3 in each axil, the lateral ones often short-pedicelled, 2-3-bracted, the central one often bractless: sepals a line long, rather rigid, ovate acute exceeding the stamens and style: utricles brownish: seeds half a line broad, black and shining. In moist alkaline soil, southeastern Oregon to California.

2 KOCHIA Roth. Schrad. Journ. Bot. i, 307. (1799.)

Perennial or annual herbs or low shrubs with alternate leaves and small flowers solitary or few in the axils of the upper leaves. Flowers perfect or pistillate sometimes bracteolate. Calyx herbaceous, 5-cleft, persistent over the fruit, and at length developing a horizontal wing. Stamens 3-5, usually exserted: filaments linear.

Ovary ovoid, narrowed upward into the style: stigmas 2. Utricle pear-shaped or oblong the pericarp membranaceous, not adherent to the inverted seed. Embryo annular, green, enclosing the scanty albumen.

K. Americana Watson Proc. Am. Acad. ix, 93. Woody and branching at base: stems erect, mostly simple and virgate, 6-18 inches high, leafy, villous-tomentose to nearly glabrous: leaves terete, linear 3-12 lines long, acutish, ascending: flowers 1-3 in the axils, mostly with abortive stamens: calyx densely white-tomentose, nearly a line broad in fruit, the membranous wing as wide or wider, its lobes cuneate, rounded, nerved and somewhat crenulate: ovary ovate tomentose above: style elongated: pericarp nearly smooth: seed $\frac{2}{3}$ of a line broad, Valleys and foothills, eastern Oregon to Nevada and Arizona.

3 CHENOPODIUM L. Sp. 218.

Annual or perennial herbs with alternate flat leaves and very small perfect sessile, bractless flowers clustered in axillary and terminal often paniced or compound spikes. Calyx 2-5-parted or 2-5-lobed, more or less closely covering the fruit, its segments or lobes herbaceous or somewhat fleshy, often keeled or rigid. Stamens 1-5. Styles 2-4, slender. Pericarp membranaceous, closely investing the lenticular or globose seed. Testa crustaceous. Embryo annular or curved around copious albumen.

§ 1 **CHENOPODIASTRUM** Moq. in DC. Prodr. xiii, 61. Annuals, usually somewhat mealy but not pubescent, or glandular nor aromatic. Fruit dry. Seeds lenticular, horizontal. Embryo completely annular.

C. album L. Sp. 219. (LAMB'S QUARTERS.) More or less mealy throughout: stem usually slender erect, commonly much branched usually 1-4 feet high: leaves rhombic-ovate or the upper ones lanceolate to linear-lanceolate, 1-4 inches long, obtuse or acute, at least the lower ones sinuate-dentate, the upper usually entire: flowers densely clustered in simple or compound often paniced spikes: calyx about half a line broad in fruit, its segments strongly keeled, usually completely enclosing the utricel: seed firmly attached to the pericarp. Common in cultivated fields and waste places everywhere.

C. hybridum L. Sp. 519. Glabrous throughout, or the inflorescence more or less mealy: stem rather stout erect, 2-3 feet high, simple or sparingly branched above: leaves ovate or rhombic-ovate, long-acuminate at the apex, truncate, rounded or subcordate at base, sharply dentate with 1-4 large acute teeth on each side, or the upper lanceolate and entire, the lower ones 4-7 inches long: flowers in large axillary and terminal panicles: calyx about a line broad its segments oblong, slightly keeled incompletely covering the fruit: stamens 5: seed sharp-edged, firmly attached to the pericarp. In woods and thickets, Brit. Columbia to Oregon and the Atlantic States, also Europe.

C. murale L. Sp. 219. Scarcely or not at all mealy, somewhat scurfy above: stems erect or decumbent, usually branched 1-3 feet high: leaves rhombic-ovate bright green on both sides, acute or acuminate at the apex, sharply and coarsely sinuate dentate, broadly cuneate or subtruncate at base, 2-4 inches long: flowers in loose axillary panicles shorter than the leaves: segments of the calyx not entirely enclosing the utricel: seeds sharp-edged, firmly attached to the pericarp. Along the coast. Brit. Columbia to California

also in the Eastern

C. leptophyllum usually erect 6-30 in white-mealy beneath entire or the lower nerved: flowers in terminal simple or branched panicles strongly keeled and the pericarp. On the Great Lakes.

§ 2 **BOTRYOIS** mealy, more or less small, not exceeding

C. Botrys L. S. strongly-scented, often branched, 6-20 inches long, usually 3-5-lobed, acute or per ones much smaller, in numerous small leaves: calyx 3-5-parted, rather longer than the lobes. On sandy bars and the Continent: also in Europe.

C. ANTHELMINTICUM dark green, strongly-scented, 3 feet high: leaves lanceolate, apex, narrowed at the base, 1-2 inches long, the upper linear, usually branched. In waste places, not

§ 3 **BLUTEÆ** crowded clusters, what fleshy in fruit

C. rubrum L. S. stem erect, leafy, 1-2 feet long, rhombic-ovate dentate or the upper bracted axillary and fleshy, red, not keeled separating from the California and the Atlantic

C. humilis Hook. ascending, 1-6 inches long, acute, often hastate, in short axillary panicles: stamens slightly fleshy utricel: stamens one sharp-edged. On the Nevada and Colorado

Annual herbs v

also in the Eastern States and Europe.

C. leptophyllum Nutt. Moq. in DC. Prodr. xiii, 71. Stem slender usually erect 6-30 inches high branched, mealy above; leaves linear to oblong, white-mealy beneath, green above, acute or acuminate, or the lower obtuse, entire or the lower sometimes toothed, short-petioled, 6-18 lines long, 1-3-nerved; flowers in small dense clusters in dense or interrupted axillary and terminal simple or branched spikes; calyx about half a line broad, its segments strongly keeled and nearly covering the fruit; seed not firmly attached to the pericarp. On dry hillsides. Brit. Columbia to California and the Great Lakes.

§ 2 **BOTRYOIS** Moq. in DC. Prodr. xiii, 272. Annuals, not mealy, more or less glandular-pubescent, aromatic. Seeds very small, not exceeding the dry calyx, often vertical: embryo curved.

C. Botrys L. Sp. 219. Glandular-pubescent and viscid throughout, strongly-scented, often red or purplish: stem slender, erect, simple to much branched. 6-20 inches high: leaves ovate or oblong, deeply and usually irregularly lobed, acute or obtuse at the apex, petioled 6-20 lines long, or the upper ones much smaller, the lobes mostly obtuse and dentate: flowers very small, in numerous loose axillary cymose panicles mostly longer than the leaves: calyx 3-5-parted, the segments lanceolate, acute, thin, very pubescent, rather longer than the utricle: seed firmly attached to the pericarp. On sandy bars and banks along streams, Oregon to California and across the Continent: also in Europe.

C. ANTHELMINTICUM L. Sp. 220. Glabrous or slightly glandular, rather dark green, strong-scented: stem much branched, ascending or erect, leafy, 2-3 feet high: leaves lanceolate or ovate-lanceolate, usually acuminate at the apex, narrowed at base, slender-petioled, coarsely dentate or incised, 2-5 inches long, the uppermost commonly linear-lanceolate and entire: flowers in linear, usually bractless paniced spikes, or the lower spikes leafy-bracted in waste places, not common: naturalized from Europe.

§ 3 **BLUTEÆ** Moq. l. c. Glabrous annuals. Flowers in crowded clusters, axillary or in spikes. Calyx becoming somewhat fleshy in fruit and often colored. Seeds subglobose.

C. rubrum L. Sp. 218. Glabrous and somewhat fleshy, not mealy: stem erect, leafy, 1-3 feet high, often much branched: leaves thick 1-4 inches long, rhombic ovate or rhombic-lanceolate, narrowed at base, coarsely sinuate dentate or the upper entire, petioled: flowers in erect compound leafy-bracted axillary and terminal spikes: calyx 3-5-parted its segments slightly fleshy, red, not keeled obtuse about as long as the utricle: stamens 1 or 2: seed separating from the pericarp. In saline or alkaline soil, Brit. Columbia to California and the Atlantic States also in Europe and Asia.

C. humilis Hook. Fl. ii, 127. Glabrous annual: stem prostrate or ascending, 1-6 inches long: leaves ovate to lanceolate, 6-12 lines long, obtuse to acute, often hastate, rarely toothed, attenuate below to a petiole: flowers in short axillary and terminal spikes or clusters: calyx 3-5-parted, its segments slightly fleshy, usually green, not keeled: obtuse; about as long as the utricle: stamens one or two: stigmas short: seed horizontal, shining, rather sharp-edged. On muddy banks and flats. Washington and Oregon to Nevada and Colorado.

4 **BLITUM** L. Sp. 2.

Annual herbs with alternate petioled rather light green leaves

and small green or reddish flowers in aggregated globose axillary sessile heads, or the upper heads forming an interrupted spike. Calyx 2-5-lobed, becoming pulpy and bright red in fruit. Stamens 1-5. Pericarp separating from the vertical shining seed. Embryo a complete ring around mealy albumen.

B. capitatum L. Sp. 2. Glabrous or sparingly pubescent, succulent: stem erect, ascending or prostrate, 6-24 inches high, commonly much branched: leaves usually longer than wide, broadly triangular or hastate, 1-4 inches long, sinuate, or the upper ones and sometimes all of them entire, rounded to cordate at base: flowers in globose sessile heads in the axils of the upper leaves and on the sides of the upper part of the stem and branches, 2-3 lines in diameter in flower, becoming bright red and 5-8 lines in diameter in fruit: seeds compressed, ovate, enclosed by the calyx or when mature slightly exerted. Brit. Columbia to California and the Eastern States.

5 MONOLEPIS Schrad. Ind. Sem. Gœtt. iv. (1830.)

Low annual branching herbs with alternate leaves and small perfect or polygamous flowers in small axillary clusters without bracts, calyx of a single persistent herbaceous sepal. Stamens 1. Styles 2, filiform. Pericarp membranaceous, persistent upon the vertical flattened seeds. Embryo annular around copious albumen, its radicle turned downward.

M. chenopodioides Moq. in DC. Prodr. xiii, 85. Glabrous or somewhat mealy: stem erect, much branched from the base, 3-12 inches high: leaves lanceolate, with 1 or 2 coarse teeth on each side, attenuate at base to a petiole, the upper ones much smaller, and usually entire: flower-clusters dense, often reddish: sepal fleshy-foliaceous, oblanceolate or spatulate, acute: pericarp adherent to the seed, minutely pitted: seed half a line broad, the margin acute. In moist places, Washington to California and the Saskatchewan.

M. spatulata Gray Proc. Am. Acad. viii, 386. Subpubescent or glabrous: stem decumbent or ascending, 3-6 inches high with elongated leafy branches: leaves narrowly spatulate, 6 lines long or less, acute entire: flowers 10-20 in dense clusters: sepal spatulate obtuse: pericarp separating from the seed minutely papillose: seed less than $\frac{1}{4}$ line broad. Eastern Oregon to Mou Pass, California.

M. pusilla Torr. Watson Bot. King 284. Stem erect, dichotomously much branched from the base 2-6 inches high, slender somewhat mealy, becoming glabrous often reddish: leaves oblong 3-6 lines long, obtuse, entire, shortly petioled: clusters 1-2-flowered; sepal obtuse: pericarp adherent, minutely tuberculate: seeds less than $\frac{1}{4}$ line broad, acute-margined. Alkaline valleys, eastern Washington to Nevada.

Tribe 2 Atriplicæ Moq. in DC. Prodr. xiii, part 2, 89. Stems not articulated nor leaves fleshy. Flowers monœcious or diœcious; the staminate with 3-5-cleft calyx; the pistillate without calyx, enclosed in a pair of more or less united bracts. Seed free, vertical, with annular embryo and copious albumen.

6 ATRIPLEX L. Sp. 1052.

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in the axils. Staminate flowers bractless, consisting of a 3-5-parted calyx and an equal number of stamens and with or without a rudimentary ovary. Pistillate flowers subtended by 2 bractlets which enlarge in fruit and are more or less united: calyx none. Ovary globose or ovoid. Stigmas 2. Utricle completely or partially enclosed by the enlarged bractlets. Seeds vertical or rarely horizontal. Embryo annular.

§ 1 Annuals: somewhat succulent. Fruiting bracts herbaceous or coriaceous, free or nearly so. Flowers androgynous or subdiœcious in leafy or naked spikes. Radicle inferior or somewhat ascending.

* Leaves usually more or less hastate, the lowest opposite: bracts ovate-rhombic to triangular or hastate, often crested, the margins foliaceous, entire or toothed.

A. patula L. Sp. 1053. Glabrous and dark green or somewhat scurfy above: stem much branched, diffuse, ascending or erect, 1-3 feet long: leaves lanceolate or linear-lanceolate, slender-petioled or the uppermost nearly sessile, entire, sparingly toothed or 3-lobed below the middle, acuminate at the apex, narrowed or cuneate at base, 1-5 inches long: flowers in paniced interrupted mostly leafless spikes and usually also capitate in the upper axils: fruiting bractlets united only at the base, fleshy, triangular or rhombic, 3-4 lines wide their sides often tuberoled. In saline places mostly along the coast, Alaska to California: also on the Atlantic coast and Europe.

** Leaves petioled: bracts ovate to linear, mostly 4-6 lines long, entire and not margined nor appendaged, only the apex foliaceous.

A. zosterifolia Watson Proc. Am. Acad. ix, 109. Weak and slender: ascending, a foot high or less, diffusely branched, glabrous or slightly scurfy: leaves fleshy, mostly opposite, linear, 1-4 inches long, 1½ line broad: flowers in axillary clusters and in short axillary androgynous spikes: calyx deeply 5-cleft: bracts linear, somewhat unequal, 1-2 lines becoming 4-6 lines long, free, fleshy: immature seed less than half a line broad: radicle, slightly ascending: mature fruit unknown. Collected only by Scouler at the Straits of De Fuca.

§ 2 Annuals with alternate or sometimes opposite leaves. Radicle superior.

A. pusilla Watson l. c. 110. Hoary-scurfy throughout: stem slender, 2-6 inches high, diffusely much-branched, leafy: leaves broadly ovate to oblong-lanceolate, 2-4 lines long, acute, sessile, entire, mostly crowded on the branches: flowers minute, subsolitary or one of each sex in the axils: calyx deeply 5-cleft: bracts ovate, half a line long in fruit, acutish, not foliaceously margined nor appendaged: style exserted: seeds with thin transparent testa. On alkaline plains, southeastern Oregon to Nevada.

A. truncata Gray Proc. Am. Acad. viii, 398. Rather stout, erect and mostly straggling, 1-3 feet high, sparingly branched: leaves broadly ovate, 18 lines long, truncate or cordate at base, acute, sessile or the lower shortly petioled, spikes more or less leafy: fruiting bracts coriaceous, 1½ lines long, ovate-oblong sessile or shortly pedicelled, united up to the truncate herbaceous summit, which is obtusely 3-toothed the sides rarely subtuberculate: calyx mostly 3-4-parted. Oregon to Nevada.

A. argentea Nutt. Gen. i, 198. Grayish-scurfy or nearly glabrous: stem erect, ascending or, decumbent, 6-8 inches high, diffusely branched

and leafy: leaves rather thick, deltoid or triangular-ovate or subrhombic, often subhastate $\frac{1}{2}$ -2 inches long, acute or obtuse, opposite and petioled or the upper sessile and alternate: flowers in capitate axillary clusters or the staminate in short dense spikes: fruiting bracts shortly pedicelled, united nearly or quite to the top, more or less acutely and deeply toothed, the sides usually tubercled or crested. Dry or saline soil, eastern Oregon to California and Nebraska.

§ 3 More or less shrubby perennials, closely appressed-scurfy, mostly dioecious. Leaves mostly alternate. Radicle usually superior.

A. Nuttalli Watson Proc. Am. Acad. ix, 116. Stems erect, shrubby 1-3 feet high branching mostly from the base, bark nearly white: leaves narrowly oblong or oblanceolate 6-24 lines long, narrowed at base, sessile, entire: flowers in terminal spikes and capitate clustered in the axils, often strictly dioecious: calyx 5-cleft: bracts ovate, united to above the middle, mostly sessile, becoming suborbicular, 1-2 lines long, not compressed, the margins and summit irregularly gash-toothed and the sides usually muricate or toothed. In dry saline soil, eastern Oregon to Brit. Columbia and Nebraska.

A. confertifolia Watson l. c. 119. A much branched spinescent shrub 1-8 feet high, hoary-scurfy: leaves alternate, ovate or obovate to lanceolate, 2-8 lines long, obtuse or acutish, cuneate at base, sessile or short-petioled, entire: flowers in small axillary clusters: calyx 5-parted: bracts thick and scurfy, about 6 lines broad, suborbicular, with free entire margins, not veined nor appendaged, sessile, united at the cuneate base around the seed and broadly margined above: seed a line broad, filling the cavity. On alkaline plains, eastern Oregon and Idaho to New Mexico.

7 **EUROTIA** Adans. Fam. Pl. ii. 260. (1763.)

Low pubescent undershrubs, with alternate entire leaves and small clusters of axillary and subspicate flowers. Flowers dioecious or monœcious. Staminate flowers bractless, the calyx 4-parted with unappendaged lobes and as many stamens: filaments slender, exserted. Pistillate flowers without calyx, bibracteate. Bracts sessile, somewhat obcompressed, united to the apex, becoming enlarged and rather rigidly membranaceous, not winged, 2-horned at the apex, the sides densely covered with long spreading tufted hairs. Ovary oblong-ovate sessile, hairy, firmly membranaceous. Styles 2, exserted. Seed vertical, obovate, the testa simple. Cotyledons broad and green: radicle inferior.

E. lanata Moq. Enum. Chenop. 81. White-tomentose throughout with stellate hairs: stems erect, with strict ascending leafy branches, 6-30 inches high: leaves linear to narrowly lanceolate, with revolute margins, 6-18 lines long, obtuse: calyx-lobes ovate, acute, hairy: bracts lanceolate, 2-3 lines long in fruit, with 2 short horns at the apex, penicillate with 4 dense spreading tufts of silvery white hairs: utricle loose, the pericarp readily separating from the large seed. On dry ridges, eastern Brit. Columbia to California and Nebraska.

8 **EREMOSEMIUM** Greene Pitt. iv, 225.

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Subspinescent undershrubs with alternate entire leaves and small flowers in axillary clusters or terminal spikes. Flowers

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dioecious or sometimes monoecious. Calyx of the bractless staminate flowers mostly 4-parted, the 4-5 stamens central, with short subulate filaments. Pistillate flowers without calyx, enveloped in the obcompressed membranaceous bracts which are united into an orbicular flattened sac with a small naked orifice at the apex, adherent below to each other and to the pedicel of the ovary, becoming enlarged and reticulately veined and somewhat wavy-margined vertically. Styles 2, slender, at first exerted. Seeds vertical, with a membranaceous testa. Embryo annular: radicle inferior.

E. spinosa Greene Pitt. iv. 225 *Grayia polygaloides* H. & A. Stems erect, diffusely branched, 1-4 feet high, the branchlets often spinescent: leaves rather fleshy, glabrous or at first with the young branches somewhat mealy, oblanceolate or spatulate to obovate, 6-15 lines long, obtuse or acute, narrowed at base and sometimes petioled: staminate flowers in axillary clusters, the pistillate mostly spicate: fruiting bracts 3-6 lines in diameter, sessile, smooth, emarginate, thin, white or pinkish: the seed usually central, about $\frac{2}{3}$ of a line broad. On rocky ridges, eastern Oregon to California and Utah.

Tribe 3 *Corispermæ* Moq. *Chenop.* 101. Stems not articulated. Leaves not fleshy. Flowers perfect, bractless. Pericarp adherent to the vertical seed. Embryo annular around copious albumen.

9 CORISPERMUM L. Sp. 4.

Annual herbs with alternate leaves and small perfect bractless green flowers solitary in the axils, forming narrow leafy terminal spikes, the upper leaves shorter and broader than the lower. Calyx 1 or 2 thin broad sepals. Stamens 1-3, rarely more and one of them longer. Ovary ovoid: styles 2. Utricle ellipsoidal, mostly plano-convex, the pericarp firmly adherent to the vertical seed, its margins acute or winged. Embryo annular, surrounding somewhat fleshy albumen: radicle inferior.

C. hyssopifolium L. Sp. 4. More or less floccose or villous-pubescent: stem erect, 6-18 inches high, diffusely much branched: leaves linear, 8-18 lines long, cuspidate: floral bracts reduced more or less abruptly, from linear-lanceolate to ovate, acute to acuminate, membranously margined: sepals rarely wanting, shorter than the bracts: stamens more or less perfectly developed: fruit $1\frac{1}{2}$ -2 lines long narrowly winged, obtuse, often mucronate with the projecting style. On sandy alkaline plains, Alaska to California and the Atlantic States and Europe.

Tribe 4 *Salicorniæ* Dumort. Moq. in DC. *Prodr.* xiii pt. 2, 144. Fleshy saline plants with jointed stems and scale-like leaves. Flowers mostly perfect, immersed by threes in depressions in the rachis of a close cylindrical spike. Seed vertical. Embryo annular, with little albumen.

9 SALICORNIA L. Sp. 3.

Fleshy annual or perennial plants with opposite terete branches scale-like leaves and small perfect, or the lateral staminate, flowers in heads of 3-7 sunken in the axils of the upper scales, form-

ing terminal narrow spikes. Calyx obpyramidal or rhomboid, fleshy, 3-4-toothed or truncate, becoming spongy in fruit, deciduous. Stamens 1 or 2, exserted: filaments cylindric, short: anthers oblong. Ovary ovoid: styles or stigmas 2. Utricle enclosed in the spongy fruiting calyx, the pericarp membranaceous. Seed erect, compressed. Embryo conduplicate.

S. herbacea L. Sp. ed. 2, 5. Annual: stem erect, rather slender, 6-18 inches high, usually diffusely branched: spikes 1-3 inches long, becoming a line or more thick: scales narrow, truncate or shortly acute: flowers in threes, the middle one twice higher than the lateral ones, slightly shorter than the joint: fruit pubescent: seeds $\frac{1}{2}$ to nearly a line long. In saltmarshes and wet saline places, Oregon to the Atlantic coast: Europe and Asia.

S. ambigua Michx. Fl. i, 2. Perennial by a woody base: stems decumbent and rooting at the nodes, or ascending, 6-18 inches long, the branches nearly simple: spikes 6-18 lines long, slender, short jointed: scales short, acutish or acute: flowers nearly equal in height and equalling the joint: seeds pubescent, $\frac{1}{2}$ of a line long. Along the coast, Alaska to California and the Atlantic coast.

Tribe 5 Suedex Moq. l. c. 152. *Stems not articulated. Leaves fleshy, terete. Embryo spiral, with little or no albumen.*

10 SARCOBATUS Nees in Max. Reise. N. A. i, 510.

Subspinescent rigidly branched shrubs with alternate fleshy leaves and small green flowers in terminal aments and solitary in the axils. Flowers monoecious or dioecious without bracts, dimorphous: the staminate in terminal aments, without calyx, the stamens irregularly arranged around the base of stipitate peltate scales: the pistillate axillary and solitary with a closed compressed-ovate calyx adherent at the base of the stigma, and margined laterally by a narrow erect border which develops into a broad membranaceous horizontal wing. Ovary thin and hyaline, nearly filled by the ovule. Embryo spiral with little or no albumen.

S. vermiculatus Torr. Emory's Rep. 150. Glabrous or the young twigs and leaves grayish pubescent: stems erect, 2-8 feet high, much branched, the branches with a smooth white bark, leafy and spiny or spinecent: leaves linear, entire, 6-18 lines long, narrowed at both ends: staminate spikes cylindrical, 3-12 lines long, narrow, the persistent scales spirally arranged, rhombic-ovate, acute: stamens about 3, soon falling: fruiting calyx coriaceous, 2-3 lines long, the wing 2-3 lines broad: seeds half a line in diameter. In alkaline soil, eastern Washington to California and Nebraska.

11 DONDIA Adans. Fam. Pl. ii, 216. (1775.)

SUÆDA Forsk. (1775.)

Herbs or low shrubs with alternate fleshy subterete leaves and small axillary clustered or solitary perfect, or rarely polygamous minutely bracteolate flowers. Calyx 5-parted or 5-cleft, the lobes fleshy, unappendaged or more or less strongly carinate or crestate or becoming somewhat winged, enclosing the fruit. Stamens 2. Styles 2, rarely 3 or 4, short and rather stout. Pericarp mem-

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D. diffusa Watson Proc Am Acad. ix, 88, under *Sueda*. Glabrous or more or less pubescent, green or often purple. Stem erect, 12-18 inches high, diffusely branched with usually slender flexuous elongated branches: leaves subterete, 6-12 lines long, acute or acuminate, the floral ones similar but shorter, usually rather distant on the branchlets; clusters 2-4-flowered: calyx cleft to below the middle fleshy, but carinate: seeds mostly vertical half a line broad, perfectly smooth. Common on alkaline plains, southeastern Oregon to Nevada and New Mexico.

D. depressa Britton B. & B. Ill. Fl. i, 585 *Sueda depressa* Watson. Low and mostly decumbent, branching from the base, smooth, the lowest branches sometimes opposite: leaves linear, 3-12 lines long, broadest at base, the floral ones oblong to ovate-lanceolate or ovate, acute, rather crowded upon the branchlets: calyx cleft to the middle, one or more of the acute lobes very strongly carinate or crested: seed vertical or horizontal, $\frac{1}{2}$ line broad, very lightly reticulate. Idaho to Nevada, Colorado and the Saskatchewan,

D. occidentalis Watson Proc. Am. Acad. ix, 90 under *Sueda*. "Erect slender, 8-10 inches high, smooth, with elongated flexuous spreading branches: leaves linear, $\frac{1}{2}$ -1 inches long, acute, narrow at base, the floral leaves somewhat widest: flowers few in the axils: calyx cleft nearly to the middle, with obtuse lobes, at length surrounded by a transverse irregular lobed veinless wing a line broad: seed horizontal, $\frac{1}{2}$ line broad, obscurely reticulated." Eastern Washington to Nevada.

D. intermedia Watson Proc. Am. Acad. xiv, 296, under *Sueda*. "Perennial, the straight erect slender herbaceous stems from a short woody base, 9-18 inches high, glabrous or sometimes puberulent: branchlets also slender, ascending: leaves very narrowly linear, with a contracted base, acute, 6-10 lines long, much shorter on the branches: fertile flowers very small, often solitary the deeply cleft calyx unappendaged: seed very small ($\frac{1}{3}$ of a line broad), horizontal, not at all tuberculate under the microscope." Eastern Oregon to Utah and Arizona.

Tribe 6 Salsolæ Moq. Annal. Sci. Nat. series 2, 209. Stems not articulated. Leaves subterete. Flowers perfect, 2-bracted. Sepals persistent. Seeds horizontal or vertical, with simple membranaceous testa. Embryo spiral.

13 SALSOLA L. Sp. 222.

Annual or perennial branched herbs with rigid subulate prickly-jointed leaves and sessile perfect 2-bracteolate flowers solitary in the axils, or sometimes several together. Calyx 5-parted, its segments appendaged by a broad membranous horizontal wing in fruit and enclosing the utricle Stamens 5. Ovary depressed: styles 2. Utricle flattened. Seed horizontal. Embryo coiled into conic-spiral: albumen none.

S. TRAGUS L. Sp. ed. 2, 322. Annual. Glabrous, loosely bushy-branching 1-2 feet high: leaves 3-10 lines long succulent, lanceolate-subulate the midnerve excurrent into a stout yellowish-green prickly often bright red maturity: calyx membranaceous, conspicuously veiny, its wing longer than the ascending lobe. In cultivated fields, eastern Oregon and Washington to the Atlantic States: naturalized from Europe.

ORDER LXXIX LAURACEÆ Lindl, Nat. Syst. ed. 2, 200.

Aromatic trees or shrubs with alternate, very rarely opposite, mostly thick, petioled leaves without stipules and small flowers in panicles, racemes or umbels. Calyx 4-6-parted, the segments imbricated in 2 series in the bud. Stamens inserted in 3 or 4 series of 3, on the calyx, distinct, some of them often imperfect or reduced to staminoidea: anthers 2-celled or 4-celled opening by valves. Ovary superior, free from the calyx, 1-celled with a solitary anatropous pendulous ovule. Style filiform or short, rarely almost wanting: stigma discoid or capitate. Fruit a drupe or berry. Embryo filling the seed, with large plano-convex cotyledons and short included radicle.

1 UMBELLULARIA Nutt. Sylv. i, 87.

Shrubs or trees with alternate thick evergreen leaves and small perfect flowers in axillary umbels which are included before expansion in involucre consisting of 4 broad caducous bracts. Calyx deciduous, 6-parted. Stamens 9, inserted on the throat in 3 rows, the 3 inner ones with a fleshy 2-lobed stipitate gland on each side at base, alternating with 3 ligulate staminoidea: anthers 4-celled, 4-valved, the outer introrse, the inner extrorse. Stigma dilated, somewhat lobed. Drupe subglobose, subtended by the thickened base of the calyx.

U. Californica Nutt. Sylv i, 87. A handsome shrub or tree 10-70 feet high or more, young branches, petioles and inflorescence somewhat puberulent: leaves green, and shining, lanceolate-oblong, acute at each end or sometimes rounded at base, 2-4 inches long, short-petioled, very aromatic: peduncles in an apparently terminal panicle, or solitary in the upper axils, 6-12 lines long, 6-10-flowered: involucre bracts ovate, imbricated: pedicels 1-5 lines long, usually bracteate at base: sepals yellowish-green $1\frac{1}{2}$ -3 lines long, oblong to ovate: stamens included: drupes on short stout peduncles, ovate-elliptical or globose, nearly an inch long. Along streams, southwestern Oregon to California.

ORDER LXXX ELÆAGNACEÆ Lindl. l. c. 194.

Shrubs or trees, mostly silvery-scaly or stellate-pubescent, with entire alternate or opposite leaves and perfect polygamous or dioecious flowers clustered in the axils or at the nodes of branchlets of the previous season, rarely solitary. Lower part of the calyx of pistillate flowers tubular or urn-shaped, enclosing the ovary and persistent, the upper part 4-lobed or 4-cleft deciduous: calyx of the staminate flowers 4-parted or 2-parted. Stamens 4 or 8: those of perfect flowers borne on the throat of the calyx: anthers 2-celled, the cells longitudinally dehiscent. Ovary 1-celled, with a solitary anatropous erect ovule. Fruit drupe-like, the base of the calyx becoming thickened and enclosing the achene or nut. Embryo straight, with little or no albumen.

I SHEPHERDIA Nutt. Gen. ii, 240.

Shrubs with opposite petioled leaves and small dioecious or polygamous flowers subspicate at the nodes of the previous season's growth, or axillary: the pistillate few or solitary. Pistillate flower with an urn-shaped or ovoid calyx bearing an 8-lobed disk at its mouth which nearly closes it. Style somewhat exerted. Calyx of the staminate flowers 4-parted. Stamens 8; alternating with as many lobes of the disk. Fruit drupe-like, the fleshy base of the calyx enclosing a nut or achene.

S. Canadensis Nutt. Gen. ii, 240. A thornless shrub with dark brown or grayish bark, the young shoots brown scurfy: leaves ovate or oval, obtuse, entire, rounded at base, 12-18 lines long, green and sparingly stellate-scurfy above, densely silvery and brown-stellate beneath, on petioles 2-6 lines long: flowers in short spikes at the nodes of the twigs, yellowish: heads globose, less than a line in diameter, forming in summer, expanding with or before the leaves the following spring: calyx about 2 lines broad when expanded: fruit oval, red or yellowish. 2-3 lines long, the nut smooth. In the mountains, Brit. Columbia to eastern Oregon and across the continent.

S. argentea Nutt. l. c. A shrub 6-18 feet high, the twigs often terminating in thorns: leaves oblong to oblong-lanceolate, 1-2 inches long, obtuse, usually cuneate-narrowed at base, densely silvery-scurfy on both sides. 2-6 lines long: flowers fasciated at the nodes, the globose buds very silvery: fruit ovoid to oblong, sour, edible. Alaska to California and Minnesota.

ORDER LXXXI ULMACEÆ Mirbel Elem. ii, 905.

Trees or shrubs with alternate leaves with small fugaceous stipules, and small monoecious, dioecious, polygamous or perfect flowers in lateral or axillary clusters, or the pistillate solitary. Calyx 3-9-parted or of 3-9 distinct sepals. Stamens, in our species, as many as lobes of the calyx and opposite them: filaments straight: anthers longitudinally dehiscent, Ovary 1-celled, rarely 2-celled, mostly superior, with a solitary pendulous an-tropous or amphitropous ovule: styles or stigmas 2. Fruit a samara, drupe or nut. Embryo straight or curved, with little or no albumen. Cotyledons mostly flat.

1 CELTIS L. Sp. 1043.

Trees or shrubs with alternate leaves and small monoecious or polygamous flowers borne in the axils of leaves of the season, the staminate clustered, the pistillate solitary or 2-3 together. Calyx 4-6-parted or of distinct sepals. Stamens, as many as sepals: filaments erect, exerted. Ovary sessile: stigmas 2, recurved or divergent, tomentose or plumose. Fruit an ovoid or globose drupe.

C. occidentalis L. Sp. 1044. A tree or shrub 4-120 feet high, with dark brown rough bark, the twigs glabrous: leaves ovate or ovate-lanceolate, sharply serrate, mostly thin, acute or acuminate, somewhat oblique and 3-nerved at base, pinnately veined, 1½-4 inches long, glabrous above, pubescent. at least on the veins, beneath: staminate flowers numerous;

pistillate usually solitary, slender-peduncled: calyx-segments linear-oblong, deciduous: d. globose and purple or nearly black when mature, sometimes orange, 4-5 lines in diameter. On dry soil, Idaho and eastward.

C. reticulata Torr. A shrub or small tree 4-20 feet high, with bright brown rough bark, the twigs pubescent: leaves thick, strongly reticulated, rough-glandular above, ovate or narrower, 1-4 inches long, serrate, acute or somewhat acuminate, obliquely cordate at base, on short petioles: staminate flowers numerous; pistillate usually solitary, slender-peduncled: calyx-segments ovate-lanceolate or oblong, deciduous: drupe globose 2-3 lines long, black when mature. Along streams eastern Oregon to Brit. Columbia and the Rocky Mountains.

ORDER LXXXII URTICACEÆ Reichenb. Cons. 83. (1820.)

Herbs, rarely shrubs with watery juice, alternate or opposite mostly stipulate simple leaves and small greenish dioecious, monoecious or polygamous flowers variously clustered. Calyx 2-5 cleft or of distinct sepals. Stamens as many as lobes of the calyx or sepals and opposite them, the filaments inflexed and anthers reversed in the bud, straightening at anthesis. Ovary superior, 1-celled: style simple: stigma capitate and penicillate. Ovule solitary, erect or ascending. Fruit an achene. Embryo straight, in oily albumen.

1 *Urtica* Herbs with opposite leaves and stinging hairs.

2 *Parietaria* Herbs with alternate leaves without stinging hairs.

1 URTICA L. Sp. 983. (NETTLES.)

Herbs with 4-angled sulcate stems, stinging hairs, opposite leaves with distinct lateral stipules and small flowers clustered in axillary geminate racemes, spikes or loose heads without bracts. Staminate flowers on jointed pedicels with 4 sepals, 4 stamens and a rudimentary cup-shaped ovary: the pistillate with 4 sepals, the 4 outer small and spreading, the inner erect, becoming membranaceous and enclosing the flattened ovate achene. Stigma sessile, capitate, tufted.

U. holosericea Nutt. Pl. Gambel. 183. Stems stout, 4-8 feet high, usually simple ashy-scurfy and sparingly armed with stinging bristles: leaves ovate-lanceolate, 2-6 inches long, very coarsely serrate, acuminate green above, whitish beneath with a dense minute pubescence, rounded or subcordate at base, all petioled: stipules membranaceous, 6 lines long, oblong, obtuse or acute: staminate flowers in loose slender diffuse panicles, nearly equalling the leaves: pistillate panicles denser and shorter: inner sepals ovate, densely hispid $\frac{1}{2}$ line long, about equalling the broadly ovate achene. About springs and along streams in the dry interior regions, Washington to California and Utah.

U. Breweri Watson Proc. Am. Acad. x, 348. Grayish with a short: somewhat hispid pubescence or nearly glabrous: stem stout, 4-6 feet high, stipules membranaceous, oblong-lanceolate: leaves thin, finely pubescent soon glabrate, or roughish above, ovate to oblong-lanceolate, 2-6 inches long, acute or slightly cordate at base, coarsely serrate, on slender petioles, 1-3 inches long or more: flowers in short open panicles scarcely exceeding the petioles: sepals obovate or rounded, obtuse, minutely hispid, nearly a line long and nearly twice longer than the broadly ovate achene. Along streams, Southern Oregon to California and Colorado.

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U. Lyallii Watson l. c. More or less pubescent, becoming nearly glabrous with scattered bristles: stems slender, 4-6 feet high: stipules large, membranaceous, broadly oblong, obtuse: leaves ovate, somewhat cordate at base, acute, 3-9 inches long or more, coarsely serrate, on slender petioles 1-4 inches long; flowers in loose slender spreading panicles, equalling or shorter than the petioles: sepals broadly ovate or rounded, obtuse, shorter than the broadly ovate achene, which is $\frac{2}{3}$ of a line long. Along streams, Brit. Columbia to California,

U. gracilis Ait. Hort. Kew. iii, 341. Perennial with long creeping yellow rootstocks armed with stinging hairs: stems erect, mostly simple, 2-7 feet high: leaves lanceolate to ovate, long-acuminate, coarsely and sharply serrate, sparingly pubescent, 2-7 inches long, narrowed to rounded or subcordate at base, on slender petioles shorter than the blade: stipules lanceolate: flower-clusters compound, commonly longer than the petioles. In rich soil, along streams, Alaska to California and across the continent.

2 PARIETARIA L. Sp. 1052.

Low annual or perennial herbs, the hairs not stinging, with alternate leaves without stipules and small greenish polygamous flowers in axillary involucre clusters. Calyx in the perfect flowers 4-parted; in the pistillate tubular-ventricose and 4-cleft, with connivent lobes. Style slender or none; stigma spatulate, recurved, densely tufted. Achene ovoid, enclosed in the dry calyx.

P. debilis Forster Weddell in DC. Prodr. xvi, 235. A very slender annual, 3-12 inches high, usually diffusely branched from the base, somewhat hispid: leaves broadly ovate, obtuse, rounded at base or abruptly cuneate, 2-6 lines long or more, on petioles about as long as the blade: clusters few-flowered: bracts linear or narrowly oblong, $\frac{1}{2}$ -1 line long, about equaling the flowers: achenes $\frac{1}{2}$ a line long. Southern Oregon to California and eastward.

P. Pennsylvanica Muhl. Willd. Sp. iv, 955. A pubescent annual: stem weak, simple or sparingly branched, ascending or reclining, very slender, 4-15 inches high: leaves lanceolate or oblong-lanceolate, membranaceous, dotted, acuminate at the base, 3-nerved and with 1-3 pairs of weaker veins above, slender-petioled, 1-3 inches long: flowers glomerate in all except the lowest axils, the clusters shorter than the petioles: bracts of the involucre linear, 2-3 times as long as the flowers: style almost none: achenes about $\frac{1}{2}$ line long. In dry rocky places, Brit. Columbia to eastern Oregon and the Eastern States.

ORDER LXXXIII EUPHORBIACEÆ J. St. Hil.
Expos. Fam. 276. (1805.)

Herbs shrubs or trees with acrid often milky juice, alternate opposite or verticillate leaves with or without stipules and monœcious or dioecious flowers variously disposed. Flowers mostly apetalous, sometimes the calyx also wanting or represented by a scale at the base of the stamens, in Euphorbia subtended by an involucre that resembles a calyx. Stamens one to many. Ovary usually 3-celled with one or two pendulous ovules in each cell. Styles as many as cells of the ovary, simple, divided or many-cleft. Fruit a mostly 3-celled, elastically dehiscent capsule. Seeds anatropous, with a straight or slightly curved embryo in fleshy or oily albumen.

- 1 **Eremocarpus** Flowers not involucre: staminate flowers with a 5-8-parted calyx; pistillate without: capsule 1-celled and 1-seeded.
- 2 **Euphorbia** Flowers all without or with only a rudimentary calyx, subtended by a calyx-like involucre: capsule 3-celled.

1 **EREMOCARPUS** Benth. Bot. Sulph. 53, t. 20.

Low heavy-scented annuals with alternate entire petioled leaves without stipules and small flowers in axillary clusters without an involucre. Calyx of the staminate flowers 5- or 6-parted, slightly imbricated. Stamens 6 or 7, central on the hairy receptacle; filaments exserted: anthers inflexed in the bud. Pistillate flowers without calyx. Ovary with 4 or 5 glands at the base, 1-celled, 1-ovuled. Style simple, filiform, stigmatic at the apex. Capsule 2-valved. Seeds smooth and shining. Cotyledons broad, cordate, as long as the radicle.

E. setigerus Benth. l. c. Hoary throughout with a very dense stellate pubescence and hispid with stiff spreading hairs: stem stout, dichotomously branched from the base, the branches mostly procumbent or ascending, 4-12 inches long: leaves thick ovate, obtuse, cuneate or rounded at base, $\frac{1}{2}$ -2 inches long, on long petioles, the upper crowded and apparently opposite or ternate: staminate flower-pedicelled: calyx with oblong obtuse segments a line long: pistillate flowers in the lower axils, 1-3 together: ovary and style densely pubescent: capsule obovate-oblong 2 lines long, smooth and shining, filled by the seed. In dry valleys, eastern Washington to California.

2 **EUPHORBIA** L. Sp. 450.

Herbs or shrubs with alternate, opposite or verticillate leaves and usually small monoecious flowers without floral envelopes but subtended by a top-shaped or campanulate involucre. Staminate flowers numerous, of a single naked stamen jointed upon a short pedicel which has usually a minute bract at base: anther-cells globose, distinct: pistillate flowers solitary in the center of the involucre, pedicellate and soon exserted. Ovary 3-celled and 3-ovuled: styles 3, usually 2-cleft. Cotyledons linear or ovate.

E. serpyllifolia Pers. Syn. ii, 14. Glabrous dark green or reddish annual: stem branched from the base, the slender branches prostrate or ascending, 2-15 inches long: leaves oblong to spatulate, 1-6 inches long, obtuse or retuse, nearly entire or serrulate to below the middle, short-petioled, the base oblique, mostly truncate or obtuse: stipules at length a fringe of weak setae: involucre solitary in the axils, sometimes clustered toward the ends of the branchlets, less than a line long, bearing 4 disk-like glands, each subtended by a narrow lobed appendage: capsule a line broad, slightly nodding: seeds ovoid, 4-angled, the face transversely wrinkled and pitted. In dry soil Washington to California and Wisconsin.

Var. consanguinea Boiss. Branches erect: leaves with an obtuse sharply serrate apex: lobes of the involucre lacerate: seeds darker and more nearly ovate, less sharp on the angles. Range of the type.

E. Greenei Millsp. Pitt. ii, 88. Glabrous annual, radiately branched from the base, the branches prostrate and divaricately much branched, 5-6 inches long: stipules triangular at base, lacerate, leaves ovate, entire, oblique, mucronulate: involucre solitary in the axils, on peduncles twice

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the length of the petioles, campanulate, glabrous without, hairy within: glands rose-red, orbicular, folded upward upon themselves. appendages white: capsule smooth, the carpels bluntly carinate: seeds ovate, sharply quadrangular, the faces irregularly transversely ridged. Beaver Canyon, Idaho.

E. glyptosperma Engelm. Bot. Mex. Bound. Serv. 187. Pale green and glabrous annual: stem branching from near the base, the branches ascending, spreading or prostrate, 2-15 inches long: leaves oblong to linear-oblong or ovate, 1-9 lines long, more or less falcate, obtuse at the apex, serrulate, very oblique and obtuse or subcordate at base, short-petioled: stipules becoming a fringe of setae: involucre solitary in the axils, campanulate, half a line long, with 4 dark ribs and 4 saucer-shape glands, their appendages narrow, crenulate or slightly lobed: capsule depressed-globose, less than a line in diameter, nodding: seeds oblong, half a line long, ash-color, strongly transversely wrinkled, not pitted. In sandy places, Brit. Columbia to California, Ontario and Connecticut.

E. maculata L. Sp. 545. Puberulent or pilose annual: stem branched from the base, the branches slender, radially spreading, 2-15 inches long, prostrate, often dark red: leaves usually blotched, oblong or ovate-oblong 2-3 lines long, obtuse, more or less serrate, short-petioled, the base oblique, subcordate: stipules a fringe of setae: involucre solitary in the axils, entire, half a line long, with 4 cup-shaped glands, the appendages narrow, white or red, crenulate: capsule ovoid, glabrous, about a line in diameter, pubescent: seeds ovoid-oblong, obtusely angled, ash-color, minutely pitted and transversely wrinkled. Throughout North America except the extreme north.

E. LATHYRUS L. Sp. 457. Annual or biennial, glabrous and glaucous. Stem stout 1-3 feet high, mostly simple below, umbellately branched above: leaves numerous, the lower scattered, those subtending the branches verticillate, the lower linear, reflexed, the upper lanceolate, 1-5 inches long, entire, sessile, subcordate: involucre 2-3 lines long, bearing 4 crescent-shaped unappendaged glands prolonged into short horns: capsule subglobose, 5-6 lines in diameter, its lobes rounded: seeds oblong-ovoid, 2-3 lines long, terete, usually wrinkled. In waste places, Native of Europe.

E. dictyosperma F. & M. Ind. Sem. Hort. Petrop. ii, 37. Glabrous annual: stem erect, rather slender, 4-15 inches high, simple, or branched from the base: leaves, except those subtending the inflorescence scattered, spatulate or oblong, 6-18 lines long, obtuse, serrate to below the middle, sessile, without stipules, the upper slightly auricled at base: bracts oblong or ovate, small, serrate, cordate: inflorescence dichotomously paniculate: involucre solitary in the axils, less than a line long, with 4 oblong naked nearly sessile glands: capsule depressed-globose, less than 2 lines in diameter, with elongated warts: seeds ovoid, lenticular, reddish-brown, finely but distinctly reticulated. Southern Oregon to California and the Atlantic States.

E. crenulata Engelm. l. c. Biennial or sometimes perennial: glabrous: stems erect or decumbent at the branching base, 6-12 inches high: leaves obovate-spatulate, obtuse, often mucronate, 6-15 lines long, without stipules, the upper ones sometimes erose-denticulate, those on the branches and floral ones opposite or usually ternate, deltoid or broadly rhombic-ovate, sometimes connate, acute 3-8 lines broad: floral branches 2-3 times dichotomous, the upper nodes much the shorter: involucre solitary in the axils, turbinate, the oblong lobes nearly entire: glands large crescent-shaped, the slender horns sometimes cleft: capsule 2 lines in diameter: seeds usually ash-color, oblong-ovate, conspicuously dark-pitted. In open woods, western Oregon to California.

ORDER LXXXIV EMPETRACEÆ Dumort. Fl. Belg. 106.

Low evergreen shrubs with watery juice, small narrow leaves without stipules and small dioecious or polygamous flowers in terminal heads or axillary. Calyx of 3 sepals sometimes a few petals also present. Staminate flowers with 2-4 stamens: filaments filiform: anther 2-celled, the cells longitudinally dehiscent: sometimes a rudimentary pistil present. Pistillate flowers with a 2-several-celled sessile ovary: the single style cleft into as many segments as cells of the ovary. Ovules one in each cell, amphitropous. Fruit a berry-like drupe containing 2-several 1-seeded nutlets. Embryo straight, terete, in copious albumen.

1 EMPETRUM L. Sp. 1022.

Depressed or spreading, freely branching shrubs with narrow sessile leaves and small flowers solitary in the upper axils. Sepals mostly 3, often with as many petals. Staminate flowers with 3 stamens, the anthers introrse. Pistillate flowers with a globose 6-9-celled ovary and short thick style with 6-9-toothed segments. Drupe black or red, containing 6-9 nutlets.

E. nigrum L. Sp. 1022. Glabrous or the young shoots pubescent: stems 6-18 inches long, usually much branched, the branches diffusely spreading: leaves crowded dark green, linear-oblong, obtuse, 2-4 lines long, the strongly revolute margins roughish: flowers very small, purplish: stamens exerted: drupe 2-3 lines in diameter, usually not maturing until the following season. On rocky banks near the coast, California to the Arctic regions, and on the northern Atlantic coast Europe and Asia.

ORDER LXXXV ARISTOLOCHIACEÆ Blume
Enum. Pl. Jav. 181. (1830.)

Herbs or shrubs with watery juice, alternate or all radical leaves without stipules and mostly large flowers solitary or clustered in the axils of the leaves or terminal. Calyx-tube adnate to the ovary, its limb 3-lobed, 6-lobed or irregular. Stamens 6-many, inserted on the pistil: anthers 2-celled, extrorse longitudinally dehiscent. Ovary wholly or partly inferior, mostly 6-celled. Ovules numerous in each cell, anatropous, horizontal or pendulous. Fruit a many-seeded mostly 6-celled capsule. Seeds ovoid or oblong, angled or compressed, the testa crustaceous, smooth or wrinkled, usually with a fleshy or dilated raphe. Embryo minute, in copious fleshy albumen.

1 ASARUM L. Sp. 442.

Acaulescent perennials with cordate long-petioled leaves and dull-colored flowers solitary in the axils of the leaves. Calyx campanulate or hemispheric, adnate to the ovary, at least below, regularly 3-lobed, the lobes valvate. Stamens 12, inserted on the ovary. Ovary partly or wholly inferior, 6-celled, the parietal placentæ intruded. Capsule coriaceous, crowned by the marces-

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A. caudatum Lindl. Bot. Reg. xvii, under t. 1399. Rootstocks er-
ring, 6-12 inches long: leaves rounded-cordate with large rounded auricles,
dark green, not marked with white, 2-4 inches broad, rather sparsely pu-
bescent with short stiff hairs, obscurely crenulate and finely ciliate, on
sparsely hairy petioles 3-10 inches long, remaining green until the next
pair are mature; flowers solitary in the axils of the leaves and thus becom-
ing terminal, on slender peduncles 1-2 inches long, dark brown, the ovate
lobes attenuate into slender appendages 1-3 inches long, more or less pu-
bescent: filaments stout, the free apex of the connective much shorter than
the anthers: styles united, equalling the stamens: seeds ovate, $1\frac{1}{2}$ lines
long. In forests, Brit. Columbia to California.

A. Hartwegi Watson Proc. Am. Acad. x, 346. ? Rather stout, tufted,
more or less floccose-pubescent: leaves usually large, 2-6 inches long,
rather thick and marked with white above, nearly smooth, deeply cordate
with large rounded auricles, somewhat acuminate, finely ciliate, on woolly
petioles 4-8 inches long: peduncles 6-18 lines long: ovary about 6 lines
broad, white woolly: lobes of the calyx ovate, narrowed to linear append-
ages 1-2 inches long: filaments rather stout, nearly free from the styles:
anthers about a line long, the produced connective setose, about a line long:
styles short, nearly distinct, scarcely equalling the anthers: seeds ovate,
2 lines long. In forests, southwestern Oregon to California.

ORDER LXXXVI SANTALACEÆ R. Br.
Pl. Nov. Hol. i, 350. (1810)

Herbs shrubs or trees with alternate or opposite leaves with-
out stipules and mostly small solitary or clustered axillary or
terminal flowers. Calyx adnate to the base of the ovary or to
the disk, 3-5-lobed, the lobes valvate. Stamens as many as
lobes of the calyx and inserted near their bases, or opposite
them upon the lobes of an annular disk. Ovary 1-celled:
ovules 2-4, pendulous from the summit of the central placenta.
Style cylindric or conic, sometimes wanting: stigma capitate.
Fruit a drupe or nut. Seed solitary, ovoid or globose, without
testa. Embryo small, apical, with copious albumen.

1 COMANDRA Nutt. Gen i, 157. (1818.)

Glabrous perennial herbs, mostly parasitic on the roots of other
plants with alternate leaves and small perfect flowers in terminal
and axillary bractless cymes. Calyx campanulate, the base of
its tube adnate to the ovary, its limb 5-lobed, Stamens inserted
at the base of the calyx-lobes and between the lobes of the disk,
attached to the middle of the lobes by tufts of hairs. Anthers
ovate, 2-celled. Fruit drupaceous, crowned by the persistent calyx.

C. umbellata Nutt. l. c. Stems slender, very leafy, branched, 6-18
inches high: leaves oblong or oblong-lanceolate, pale green, acute or acut-
ish at both ends, sessile, ascending, 6-15 lines long, the lower smaller:
cymes several-flowered corymbose at the summit of the stems and often
axillary also: peduncles slender, 3-12 lines long: pedicels very short: calyx
greenish-white or purplish, about 2 lines high: style slender: drupe globose,
about 3 lines in diameter, crowned with the upper part of the calyx-tube

and its 5 oblong lobes. In dry open places, Brit. Columbia to California and the Eastern States.

C. pallida A. DC. Prodr. xiv, 636. Stems slender, simple or branched, 4-12 inches high, very leafy: leaves linear or linear-lanceolate, or the lower ones oblong-elliptic, acute, sessile: cymes few-several-flowered, corymbose-clustered at the summit: peduncles usually short: pedicels about a line long: calyx greenish or purplish, about 2 lines high: drupe ovoid-oblong, about 2 lines in diameter crowned by the very short upper portion of the calyx-tube and its 5 oblong acute lobes. On dry hillsides, in the interior, Brit. Columbia to California and Minnesota.

ORDER LXXXVII LORANTHACEÆ D. Don
Prodr. Fl. Nepal. 142. (1825)

Parasitic, green or reddish plants growing upon wood plants and absorbing food from their sap through specializy roots called haustoria, with mostly opposite leaves and regular monoecious or dioecious flowers in axillary or terminal clustered or solitary. Calyx-tube adnate to the ovary, its limb entire toched or lobed. Stamens 2-6: anthers 2-celled, or confluenty 1-celled. Ovary solitary, erect: style simple or none: stigma-terminal, entire. Fruit a berry with glutinous pulp. Seed solitary, its testa indistinguishable from the copious fleshy albumen. Embryo terete or angled.

1. *Phoradendron* Leaves thick and flat: anthers 2-celled: berry sessile.

2. *Razoumofskya* Leaves scale-like, united at base: anthers 1-celled: berry peduncled.

1 PHORADENDRON Nutt. Journ. Acad. Philad. ser. 2, i, 185.

Parasitic shrubs with mostly jointed branches, opposite flat leaves and small dioecious flowers in axillary spikes. Staminate flowers with a 2-4- usually 3-lobed globose or ovoid calyx, bearing a transversely 2-celled anther at the base of each lobe. Pistillate flowers with a similar calyx adnate to the inferior ovary. Style short, with obtuse or capitate stigma. Fruit a sessile ovoid or globose berry.

P. villosum Nutt. Pl. Gambel. 185. Stems stout, diffusely much branched, 1-2 feet long: leaves orbicular to spatulate, 6-20 lines long, permanently villous, rounded at the apex, narrowed below to a short petiole, very thick and obscurely veiny: spikes slender, rather short: berries white, 1-2 lines in diameter. On oak trees, from the Willamette valley Oregon to California.

P. juniperinum Engelm. Pl. Fendl. 85. Glabrous, stout, densely branched: 6-9 inches high: branches terete, the ultimate branchlets quadrangular: leaves mostly reduced to broadly triangular, obtusish connate or distinct ciliate scales: staminate spikes solitary, 6-8-flowered: anthers transverse, opening by pores: pistillate spikes 2-flowered: berries globose, whitish or light red, $1\frac{1}{2}$ lines in diameter. On Junipers, south-eastern Oregon to California.

P. Libocedri. *P. juniperinum* var. *Libocedri* Engelm. ? Glabrous: stems fleshy, 6-12 inches long, densely branched: most of the leaves reduced to broadly triangular connate naked scales: staminate spikes solitary

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6-18-flowered: anthers transverse, opening by pores: pistillate spikes 2-flowered: berries reddish. On *Libocedrus decurrens*, southern Oregon to California.

2 RAZOUMOFSKYA Hoff. Hort. Mosq. 1808.

ARCEUTHOBIMUM Bieb. 1819.

Small fleshy plants parasitic on the branches of coniferous trees, with 4-angled jointed branches, opposite connate scales in the place of leaves and small naked dioecious flowers solitary or several together in the axils of the scales. Staminate flowers with a 2-5-parted calyx and usually an equal number of stamens, the anthers sessile on the segments. Pistillate flowers with the calyx-lobes 2-parted. Fruit a fleshy more or less flattened berry borne on a short somewhat recurved peduncle. Embryo enclosed in copious albumen.

R. Americana Kuntze Rev. Gen. ii, 587. *Arceuthobium Americanum* Nutt. Greenish-yellow, glabrous: stems slender, dichotomously or verticillately much branched: staminate plants 2-4 inches long with the flowers on terminal peduncle-like joints, paniculate, a line broad or more, with ovate-orbicular acutish lobes: pistillate plant much smaller, with the flowers a line long or less: berries 2 lines long. On *Pinus contorta*, Brit. Columbia to California and Colorado.

R. Douglasii Kuntze l. c. *Arceuthobium Douglasii* Engelm. Greenish yellow: stems slender, 3-12 lines high, much branched but not verticillately: spikes short, mostly 5-flowered: staminate flowers less than a line wide, with round-ovate acutish lobes, axillary, forming simple or compound spikes: accessory branchlets of fruiting plant flower-bearing: berries $2\frac{1}{2}$ lines long. On *Pseudotsuga Douglasii*, Idaho to California and New Mex.

Var. abietinum Greene Fl. Fr. 341. Fertile plants larger 1-3 inches high, the sterile smaller with spreading or recurved branchlets: fruit smaller. On *Abies concolor*. Oregon and California.

R. occidentalis Kuntze l. c. *Arceuthobium occidentale* Engelm. Greenish brown, glabrous: stems stout, 2-5 inches high paniculately much branched: staminate plants brownish-yellow, smaller, its flowers in long dense spikes, often 9-17 on a single axis, buds ventricose with the upper edge curved outward; calyx 3-5, usually 4-parted $1\frac{1}{2}$ -2 lines wide: anthers sessile below the middle of the lanceolate-acuminate lobes: pistillate plant commonly of a dark olive-brown color, accessory branchlets mostly leaf-bearing: fruit $2\frac{1}{2}$ lines long. On various conifers, Oregon to California and Idaho.

Var. abietinum. *Arceuthobium abietinum* Engelm. More spreading and less densely branched: the accessory branchlets in the fertile plant bearing fertile flowers as often as they do leaf-buds. On *Abies grandis*, Columbia river valley.

R. robusta Kuntze l. c. *Arceuthobium robustum* Engelm. Reddish-brown and glabrous: stems 2-4 inches long, much branched: staminate flowers in short spikes, flat, appressed to the rachis, 3-parted, with broad lobes, bearing the stamens above the middle fertile flowers mostly solitary: fruit 2-3 lines long. On *Pinus ponderosa*, Brit. Columbia to Oregon.

ORDER LXXXVIII FAGACEÆ Drude Phan. 40 9

Trees or shrubs with alternate leaves, deciduous stipules and small monoecious flowers, the staminate in aments, the pis-

tillate solitary or in small spikes, each surrounded by an involucre of partly or wholly united bracts which becomes a burr or cup. Staminate flowers with a 4-7-lobed calyx and 4-20 stamens: filaments slender, distinct: anther-cells adnate, longitudinally dehiscent. Pistillate flowers with a 4-8-lobed urn-shaped or oblong calyx adnate to the 3-7-celled ovary: ovules 1 or 2 in each cell, but only 1 in each ovary maturing, pendulous, anatropous. Styles as many as cells of the ovary, terminally or longitudinally stigmatic. Fruit a 1-seeded nut. Seed without albumen. Embryo straight, with small apical radical and large fleshy albumen.

- 1 *Quercus* Involucres 1-flowered, becoming a cup.
- 2 *Castanopsis* Involucre 1-5-flowered, becoming a prickly burr.

QUERCUS L. Sp. 994.

Trees or shrubs with alternate deciduous or evergreen leaves and small flowers. Staminate flowers numerous, in slender mostly drooping aments subtended by caducous bracts. Calyx mostly 6-lobed, campanulate. Stamens 6-12, with filiform filaments. Pistillate flowers with a mostly urn-shaped or oblong calyx, adnate to a 3-celled ovary: ovules 2 in each cell of the ovary, rarely more than one in each ovary maturing. Styles as many as cells of the ovary, short, erect or recurved. Fruit a solitary oblong, ovoid or subglobose coriaceous 1-seeded nut, called an acorn, subtended by or almost included in the more or less united bracts of the involucre.

§ 1 Staminate aments naked, from the previous season's bud or from the lower part of the present season's shoots: pendulous: filaments not longer than the anthers. Pistillate flowers above the staminate aments, from the axils of young leaves: stigmas dilated.

* Abortive ovules at the base or at the side of the seed: stamens 5-10, usually 6-8 stigmas sessile or subsessile.

← Acorns maturing the first season, glabrous within.

↔ Leaves deciduous.

Q. Garryana Dougl. Hook. Fl. ii, 159. A small shrub to a large tree, 2-150 feet high, the trunk often 3 feet in diameter, with light-colored bark: branchlets rather rigid, tomentose: leaves 4-6 inches long by 2-5 inches wide, coarsely lobed, the lobes broad or sometimes acutish, entire or again notched or lobed, dull green on the upper side, pale yellowish or whitish and strongly reticulated as well as somewhat pubescent beneath, on petioles 6-12 lines long: calyx lobes 7 or 8, linear-lanceolate, ciliate: anthers 6-8: acorns sessile or nearly so; cup shallow, its scales lanceolate, somewhat pubescent, flat or tuberculate-thickened at base: nut oval to obovate-oblong, obtuse, about an inch long. Common from Brit. Columbia to California.

Q. Jacobi R. Br. Campst. Ann. and Mag. Nat. Hist. 4th ser. vii 255. A middle-sized or large tree, branching from near the base and forming a compact head: trunk 1-3 feet in diameter, with rather thick fissured gray

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bark: branchlets short, stout, very leafy, tomentose-pubescent: leaves broadly obovate: veinlets only gradually divergent from the midrib and directing the lobes somewhat digitately toward the apex of the leaf which is broadest far above the middle: acorns ovate, less than an inch long, well inserted into a hemispherical scaly cup. On Islands in Puget Sound and northward.

Q. Erstediana R. Br. Campst. l. c. A shrub 2-6 feet high, with pubescent branchlets: leaves 3-5 inches long, usually deeply pinnatifid, sometimes merely sinuate; lobes obtuse or acutish, entire or toothed: staminate aments rather few-flowered, erect: acorns rarely sessile, usually several, crowded near the summit of a peduncle an inch long or more; cup shallow, strongly tuberculate: nut oval, obtuse, an inch long. On dry mountain sides at middle or high elevations, Southern Oregon to California.

** ** Leaves persistent through winter and mostly until the appearance of new leaves for the next season.

Q. Sadleriana R. Br. Campst. l. c. A shrub 4-6 feet high with rather dark-colored bark and glabrous branchlets: buds oblong densely silky: stipules filiform, densely silky: leaves oblong to obovate, not lobed, serrate, 1-3 inches long, on petioles 2-6 lines long, dark green above, at length becoming whitish and strongly reticulated beneath: aments densely flowered erect or spreading 1-4 inches long: bracts silky, sepals ovate: stamens about 8: acorns sessile or nearly so; cup shallow, tuberculate, 5-6 lines broad: nut oblong, obtuse, about 8 lines long. In moist places on top of the coast mountains along the old Wimer road, also on top of the Siskiyou Mountains near the Happy Camp trail.

+ + Acorns maturing the second season, the nuts often pubescent within.

Q. chrysolepis Leibm. in Benth. Pl. Hartw. 336. As represented in our region a small tree or low shrub 2-30 feet high, farther south a large tree, with ashy-gray flaky bark and glabrous branchlets: leaves oblong-lanceolate entire or sharply dentate, acute, cuspidate obtuse or subcordate at base, 1-3 inches long, at first fulvous-tomentose beneath, after a year glabrate and bluish or whitish, on petioles about 3 lines long: aments sometimes branched, tomentose, soon glabrate: calyx lobes 5-7, broadly ovate, acute glabrous, ciliate: anthers about 10, conspicuously cuspidate: pistillate flowers sessile, or rarely in spikes: cups covered with small triangular appressed scales, more or less hidden in the dense yellow or fulvous tomentum, very variable in shape and size, 4-12 lines wide, hemispherical and rather thin to flat saucer-shaped and very thick with a dark thick rim: nut oval, obtuse 6-18 lines long, and half as thick. Along streams, Southern Oregon to California.

Q. vaccinifolia Kellogg Proc. Am. Acad. i, 96. A low shrub 1-4 feet high, densely branched and very leafy: leaves ovate to oblong or lanceolate, entire or with a few sharp teeth on one or both margins acute and very shortly or not at all cuspidate, 6-18 lines long, on petioles 4-8 lines long yellowish green and glabrous on the upper side, white or whitish with a dense scurf beneath, obtuse or subcordate at base: stipules 4-8 lines long linear-lanceolate somewhat silky: aments glabrous: calyx lobes 5-7, broadly ovate: anthers about 8, not cuspidate: pistillate flowers sessile or in spikes: cups covered with small appressed scales not tomentose: nuts 8-12 lines long. Common on dry rocky hillsides Southeastern Oregon and adjacent California.

** Anthers usually 4 or 5: stigmas on long spreading or recurved styles: abortive ovules borne at the top of the seed.

Q. Kelloggii Newberry Pac. R. Rep. vi, 28, fig. 6. A middle-sized

tree 60-90 feet high and 1-6 feet in diameter, with rough black bark, the slender twigs soon glabrate: leaves deciduous, broadly oval in outline, deeply sinuate-lobed, the lobes entire or coarsely lobed and slender-pointed, obtuse to subcordate at base, on petioles about an inch long, puberulent both sides, 4-7 inches long: acorns maturing the second season, mostly short-pedicelled, solitary or 2-4 together; cups an inch or less broad, with ovate-lanceolate obtusish, imbricated scales, hemispherical, often very deep; nuts oblong, 12-16 lines long by 10-12 in diameter. Common on plains and hillsides from the Willamette Valley Oregon to California.

§ 1 Aments erect persistent, pistillate at base and staminate above or entirely staminate. Filaments slender, many times longer than the very small anthers. Stigmas linear. Fruit maturing the same season.

Q. densiflora H. & A. Bot. Beech. 391. A middle-sized tree or shrub 10-100 feet high: with mostly smooth bark and tomentose branchlets: leaves oblong, acute, obtuse or rarely acute at base, entire with revolute margins or sometimes dentate, tomentose, especially beneath, at length glabrate and whitish beneath, 2-5 inches long, $\frac{1}{2}$ -2 inches wide, on petioles 3-6 lines long: aments 4-6 inches long densely flowered, tomentose: flowers in glomerules of 3, supported by 3 bracts: calyx of 5 broad woolly lobes: anthers 10: acorns solitary or in short peduncled clusters: cups very shallow, 8-15 lines broad, covered with linear rigid spreading or recurved scales, silky-tomentose inside: nuts oval or oblong, acute or obtuse, 12-18 lines long, with very thick shell, densely tomentose inside. Along streams southwestern Oregon to southern California.

5 CASTANOPSIS Spach.

Trees or shrubs with coriaceous evergreen leaves and small monoecious flowers in axillary aments, the fruit maturing the following season. Staminate flowers in slender paniced aments upon the young shoots, with regular 5-6-lobed calyx and usually twice as many stamens. Pistillate flowers 1-3, in a scaly involucre, sessile at the base of the aments: lobes of the calyx 6, in 2 rows. Styles usually 3. Ovary 3-celled, with 2 amphitropous ovules at the lower angle of each cell. Nuts 1-3, enclosed in the subglobose involucre which is densely covered with stout branched prickles, at length bursting irregularly. Seed solitary.

C. chrysophylla A. DC. Seem. Journ. Bot. i, 182. A shrub or middle sized tree, 6-90 feet high: leaves lanceolate or oblong, 1-4 inches long, acuminate or only acuti-h, cuneate at base and shortly petioled, entire, glabrous, or sometimes scurfy, above, densely scurfy beneath with more or less yellow scales: aments 1-3 inches long, densely pubescent: styles 3, stout, glabrous, divergent: spines of the involucre 6-12 lines long, subverticillately many-branched: nuts usually solitary obtusely triangular, 6 lines long. On dry hillsides, from the Columbia river to California.

ORDER LXXXIX CORYLACEÆ.

Small trees or shrubs with alternate leaves and small flowers in axillary aments or clusters. Staminate flowers in aments, without floral envelopes each subtended by a scale-like bract: stamens several, with often divided filaments and distinct anther-cells. Pistillate flowers in short spikes, 2 to each bract, with

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1 CORYLUS L. Sp. 998. (HAZEL-NUT.)

Shrubs or small trees with broad thin leaves that are plicate in the bud and small flowers that appear before the leaves; the staminate in drooping cylindrical aments, from lateral buds, without calyx but subtended by a scaly bract, consisting of 4 stamens with forked filaments, each fork bearing one cell of an anther, the undivided portion adnate to the bract. Pistillate flowers several in a scaly bud, 2 to each scale, each with a pair of bractlets that enlarge and in fruit more or less envelope the nut: calyx minute, adnate to the ovary, without limb. Style short: stigmas elongated. Nut oblong or ovoid, large and bony.

C. rostrata Ait. Hort. Kew. iii, 364. A shrub 3-8 feet high, with pubescent branchlets and smooth bark: leaves ovate or narrowly oval, acuminate, cordate or obtuse at base, incised-serrate and serrulate, glabrous or with some scattered appressed hairs above, sparingly pubescent, at least on the veins beneath, 2½-4 inches long, on petioles 2-4 lines long: involucre bracts bristly hairy, united to the summit and prolonged into a tubular beak about twice as long as the nut, lacinate at the summit: nut ovoid, scarcely compressed, striate, 5-7 lines high. In thickets, Oregon to Brit. Columbia, the Eastern States and Nova Scotia.

C. Californica Rose. A shrub or small tree 4-30 feet high with pubescent branchlets: leaves orbicular to obovate, 1-4 inches broad, often shortly acuminate, obscurely 6-10-lobed, sharply serrate, on petioles 5-12 lines long, mostly subcordate at base, sparsely pubescent above, soft-pullescent on the veins beneath: involucre united to the summit, prolonged into a broad tubular beak about twice as long as the nut or less, setose-hispid below with short brittle hairs, erose to lacerate at the summit: nut ovoid 5-8 lines high. Common on low hillsides and in forests, Brit. Columbia to California.

ORDER XC BETULACEÆ Agardh Aph. 208 in part.

Trees or shrubs with deciduous alternate leaves, mostly caducous stipules and small monœcious flowers, the staminate in long aments, the pistillate in shorter cone-like aments with thickened and rigid scales. Staminate flowers 3-6 together in the axil of each bract, consisting of a membranous calyx and 2-4 stamens inserted on the receptacle, with distinct filaments and 2-celled anthers. Pistillate aments spike-like or capitate, its flowers with or without a calyx adnate to the 2-celled ovary which is crowned with 2 sessile filiform stigmas and becomes a winged or angled nutlet. Seed anatropous, pendulous, without albumen. Cotyledons flat, foliaceous in germination.

1 *Betula* Bracts 3-lobed, becoming coriaceous, deciduous: stamens 2, with bifurcate filaments and separate anther-cells: nutlets broadly winged.

2 *Alnus* Bracts entire, becoming woody, persistent: stamens 4; anther-cells contiguous.



1 *BETULA* L. Sp. 982.

Trees or shrubs with smooth or laminated outer bark, toothed simple leaves and small flowers appearing with or before the leaves. Staminate aments long and drooping, solitary or in pairs, from lateral or terminal leafless buds the flowers about 3 together in the axil of each shield-shaped bract, consisting of a membranaceous usually 4-toothed calyx and 2 stamens, subtended by 2 bractlets: filament short, deeply 2-cleft, each fork bearing an anther-cell. Pistillate aments oblong to cylindrical, solitary or racemose, from lateral 3-5-leaved buds, the flowers 1-3 in the axil of each bract, without calyx. Bracts usually 3-lobed and falling with the seed. Ovary sessile: styles 2, stigmatic at the apex, mostly persistent. Nuts small, lenticular, surrounded by a wing.

B. occidentalis Hook. Fl. ii, 155. A small or middlesized tree 20-60 feet high and 6-18 inches in diameter, with smooth dark brown bark and greenish-brown warty twigs: leaves broadly ovate to nearly orbicular, acute to rounded at the apex, sharply serrate, the teeth glandular tipped, rounded or obtuse at base, short-petioled glabrous, or sparingly pubescent on one or both sides, 1-2 inches long: staminate aments usually 3 together at the ends of slender branchlets, 2-3 inches long: pistillate aments manifestly peduncled, cylindric, spreading or pendent, 12-18 lines long, 4-6 lines in diameter when mature: fruiting bracts ciliate, 2-3 lines long, their lateral lobes ascending, usually shorter than the middle one: nutlets much narrower than the wings. Along streams in the interior, Brit. Columbia to California and Nebraska. As here defined perhaps includes more than one species.

B. Hallii. *B. glandulosa* of authors as to the Oregon plant. An erect shrub 4-10 feet high, the twigs ashy-gray, glandular and somewhat pubescent, very leafy: leaves obovate, rounded at the apex, cuneately narrowed at base into short petioles, green and glabrous both sides, finely serrate, 10-12 lines long: pistillate aments cylindric, erect or barely spreading, 10-14 lines long, 2-3 lines thick, dark green, on slender peduncles 4-6 lines long: fruiting bracts a line long, glabrous, the lateral lobes usually broader than the middle one which is spreading and hyaline-margined: nutlets as broad or broader than long, narrowly winged. Lake Labish, Marion Co. Oregon: specimens collected by Mr. Gorman at Ft. Selkirk, Yukon Ter. appear to be of this species.

2 *ALNUS* Gært. Fr. & Sem. ii, 54, t. 90. (1791.)

Shrubs or trees with alternate serrate or dentate leaves and small flowers in aments, opening with or before the leaves, making their first appearance during the previous season. Staminate aments fascicled, drooping. Bracts shield-shaped, stipitate, including the 5 bractlets and usually 3 flowers with regular 4-lobed calyx. Stamens 4, inserted opposite the lobes of the calyx, with very short filaments and contiguous anther-cells. Pistillate aments panicled, short and usually erect, their bracts fleshy and imbricated, including 4 bractlets and 2 flowers, connate and slightly 4-lobed, in fruit woody and persistent, thickened and truncate at the apex, at length divergent. Nutlets compressed, mostly wingless or nearly so.

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feet high and 1-4 feet in diameter with dark brown bark blotched with white: leaves oval to elliptic, blackish, dark green above, pale or whitish beneath with prominent rusty-pubescent veins, coarsely serrate and finely serrulate, 2-8 inches long, acute or shortly acuminate, rounded or narrowed below to petioles 6-18 lines long: staminate aments reddish, 2-6 inches long; the pistillate ovoid to oblong, 6-12 lines long, the bracts much thickened above: nutlets more than a line long, nearly orbicular or oblong, surrounded by a narrow somewhat membranous wing. Common in moist places, California to Alaska.

A. rhombifolia Nutt. *Sylva*, i, 33. A tree 30-50 feet high, with white bark which becomes broken rectangular flakes: leaves rhombic-ovate to elliptic or obovate, mostly cuneate at base and obtuse at the apex, 2-3 inches long, irregularly glandular-dentate: fruiting aments oblong, 6-8 lines long, the bracts rather thin above: nutlets a line long, very broadly obovate with a thickened margin. Eastern Washington to California.

A. tenuifolia Nutt. *A. incana* var. *virescens* Watson. A shrub 4-20 feet high with brown bark: leaves more or less broadly ovate, 2-3 inches long, acute, rounded or slightly cordate at base, acutely doubly toothed, light green and glabrous on both sides, or sparingly pubescent: staminate aments rather slender, 1-2 inches long: fruiting aments ovate-oblong, 4-6 lines long: nutlets rounded-obovate, slightly margined, $1\frac{1}{2}$ lines long. In wet places in the mountains, Alaska to California and the Rocky Mts.

A. serrulata Willd. *Sp. Pl.* iv, 336. *A. rugosa* K. Koch. A shrub 5-10 feet high, or sometimes a small tree 40 feet high, with smooth bark, the young shoots sometimes pubescent: leaves green both sides obovate or oval, mostly obtuse or rounded at the apex, narrowed or rounded at base sharply and minutely serrulate when mature, glabrous above, usually pubescent on the veins beneath, 3-5 inches long, on petioles 4-12 lines long: aments appearing from naked buds much before the leaves, the staminate 2-4 inches long, the pistillate ovoid 5-9 lines long when mature: nutlets ovate, narrowly coriaceous-margined. In wet soil. Idaho to the Eastern States.

A. sinuata Rydb. A small tree or shrub 9-15 feet high, erect or ascending: bark rather dark except on old stems: leaves ovate, acuminate, obtuse or cuneate at base, bright green, doubly dentate, glabrous above, nearly so beneath, thin, very gummy when young, 2-4 inches long, on slender petioles 5-12 lines long: fruiting aments 7-9 lines long, on slender longer peduncles. Eastern Washington.

ORDER XCI MYRICACEÆ Dumort. Anal. Fam, 95.

Shrubs or trees with alternate simple leaves and small diœcious or monoœcious flowers in bracted aments without calyx or corolla. Flowers solitary in the axils of the bracts: staminate with 2-15 stamens inserted on the receptacle: filaments short distinct or somewhat united: anthers ovate, 2-celled, the cells longitudinally dehiscent: pistillate with a solitary 1-celled ovary subtended by 2-8 bractlets: ovules solitary, orthotropous: style very short: stigmas 2, linear. Fruit a small drupe or nut, often waxy. Seed erect, orthotropous, with thin testa and no albumen.

1 MYRICA L. Sp. 1024.

Shrubs or small trees with alternate mostly resinous-dotted leaves and small flowers in bracted aments. Staminate aments oblong or narrowly cylindrical expanding before or with the leaves.

Stamens 4-8. Pistillate ovoid or subglobose: Ovary subtended by 2-4 bractlets. Fruit a globose or ovoid wax-coated drupe.

M. Gale L. Sp. 1021. An erect shrub 4-8 feet high with dark brown twigs: leaves deciduous, oblanceolate, obtuse and dentate at the apex, narrowed to a cuneate entire base, short-petioled, dark green and glabrous above, pale and puberulent or glabrous beneath, 1-3 inches long unfolding after the flowers; staminate aments linear-oblong, 6-10 lines long: pistillate aments ovoid-oblong, obtuse, about 4 lines long and 2 lines in diameter in fruit, their bracts imbricated; drupe resinous waxy, not longer than the 2 ovate persistent bractlets which clasp it on each side and are adnate to its base. Along the coast, Oregon to Alaska and the Atlantic States.

M. Californica Cham. Linn. vi, 535. An evergreen shrub or small tree 2-30 feet high of erect compact habit, leaves coriaceous, persistent usually, slightly tomentose beneath, dark green above, oblanceolate, 2-4 inches long, acute, attenuate below to a short petiole, entire, or serrate above the base: aments simple or somewhat compound, 3-5 lines long; the small very broadly ovate obtuse bracts more or less lacerately ciliate, especially near the base: staminate flowers few; stamens 5-15, the filaments united into an exerted panicle: bractlets usually 2, oblong, ciliate: fruit purple, papillose, thinly coated with grayish-white wax, 2 lines in diameter. In wet places along the coast, Washington to California.

ORDER XCII SALICACEÆ Lindl. Nat. Syst. ed. 2. 186.

Trees or shrubs with bitter bark, brittle twigs, alternate leaves with stipules and small dioecious flowers in axillary aments that appear with or before the leaves. Flowers solitary in the axil of each bract: the staminate consisting of one to numerous stamens inserted on the receptacle, subtended by a gland-like or cup-like disk: filaments more or less united: anthers 2-celled, the cells longitudinally dehiscent. Pistillate flowers of a sessile or short-stipitate 1-celled ovary subtended by a minute disk, with 2-4 parietal placentæ and numerous anatropous ovules. Style short, slender, or almost wanting. Stigmas 2, simple or 2-cleft. Fruit a 2-4-valved capsule. Seeds small, without albumen, covered with a coma of dense long silky hairs. Cotyledons plano-convex.

- 1 **Salix** Buds with a single scale: bracts entire: flowers with small glands: disk none: stamens few: stigmas short.
- 2 **Populus** Buds with several scales: bracts lacerate: flowers with a broad cup-shaped disk: stamens numerous: stigmas elongated.

1 SALIX L. Sp. 1021. (Willow.)

Trees or shrubs with terete branchlets and small flowers in aments. Buds covered with a single scale, with an adherent membrane within. Bracts of the aments entire. Disk gland-like, small or minute. Staminate aments dense, erect, spreading or drooping. Staminate flowers with 1-12, mostly 2, stamens, their filaments distinct or sometimes united. Pistillate aments usually erect or spreading. Ovary sessile or short-stipitate. Style filiform or wanting. Stigmas 2, entire or 2-cleft. Capsule mostly 2-valved.

§ 1 Trees. Bud-scales yellowish, falling before the maturity of the fertile aments. Filaments hairy below.

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S. nigra Marsh Arb. Am. 139. (1786). A tree with rough flaky brown bark, 50-120 feet high; stem slender, often crooked or leaning; leaves linear-lanceolate, tapering from the acute base to an extremely long point, often falcate, 4-6 inches long by 3-4 lines broad, closely serrate, smooth and green on both sides, the midrib prominent; stipules semicordate, often wanting; aments with leafy peduncles, elongated, the fertile becoming rather lax; scales entire or only slightly dentate, villous with crisp hairs; capsule ovate-conical, glabrous, brownish tawny, more or less pedicelled; styles very short; stigmas slightly notched. Along streams, eastern Oregon to California and the Gulf of Mexico.

S. amygdaloides Anders. Ofv. Handl. Vet. Akad. 1858, 114. A small tree 20-70 feet high, with light yellowish-brown flaky bark; leaves lanceolate to ovate-lanceolate, pubescent when young, glabrous when mature, dark green above, paler and slightly glaucous beneath, long-acuminate, 1.5 inches long by 5-12 lines broad, entire or more or less sharply serrulate, narrowed at base to short petioles; aments appearing with the leaves, terminal on short lateral leafy branchlets; the staminate 1-2 inches long, their bracts ovate, densely pubescent; stamens more than 2; filaments distinct, pubescent at base; pistillate aments loose, spreading, 2-4 inches long in fruit, their bracts lanceolate and densely pubescent; stigmas nearly sessile; capsule narrowly ovoid, acute, glabrous, at length about as long as its filiform pedicel. Along streams in the interior, Brit. Columbia to Oregon and Missouri.

S. congesta. *S. laevigata* var. *congesta* Bebb. A small tree 20-30 feet high with pale ash-colored very rough bark and yellowish branchlets; leaves lanceolate or oblanceolate to spatulate, 1-3 inches long, silky-lanate when young, at length glabrous above, entire or at length glandular serrulate, narrowed below to short petioles; aments solitary at the ends of short lateral branchlets, appearing with the leaves; staminate aments numerous, at length an inch long, the scales orbicular, tomentose; stamens 5; filaments pubescent with spreading hairs; pistillate aments spreading, oblong, or shorter, 6-10 lines long, the scales lanceolate; capsules glabrous, ovoid, acuminate, on slender pedicels nearly a line long. Along rivulets near the Klamath river and southward.

* * Petioles glandular.

S. lasandra Benth. Pl. Hartw. 336. A slender tree 20-80 feet high with dark brown rough bark; and smooth yellow branchlets; leaves lanceolate, obtuse to acute at base, conspicuously acuminate, finely serrulate, 2-8 inches long, sparsely pubescent, dark green above, pale or whitish and somewhat glaucescent beneath; stipules semilunar or oblong, dentate; aments appearing with the leaves from short lateral leafy shoots; staminate aments rather loosely flowered, 2-4 inches long; their lanceolate pubescent scales 2-3 lines long; stamens 5-8, filaments slender, much longer than the scales, slightly pubescent at base; pistillate aments 1-3 inches long, their pubescent lanceolate scales about a line long, deciduous; capsule acuminate-ovoid, 2 lines long on pedicels a line long. Common along streams, Brit. Columbia to California.

S. fendleriana Anders. Sal. Am. Bore. 115. A tree 30-60 feet high, with dark brown rough bark; leaves lanceolate, long-acuminate, crenulate, green and glabrous on both sides, 3-8 inches long, the short petioles and very base of the leaves glandular; stipules oblong, sometimes large; aments on leafy branchlets; staminate dense, 2-3 inches long, their scales pale, oblong, more or less dentate; stamens 5 or more; filaments hairy at base, longer than the scales; pistillate aments rather loose, the pale oblong scales hairy at base, deciduous; capsules glabrous, short-pedicelled; stig-

mas nearly sessile. Common on stream-banks, eastern Washington to California and New Mexico.

§ 2 Shrubs or small trees. Leaves linear to lanceolate, remotely denticulate to entire. Aments borne on short lateral leafy branchlets, often clustered. Scales pallid, somewhat deciduous. Stamens only 2.

S. fluviatilis Nutt. *Sylva* 1, 73. *S. longifolia* Muhl. not of Lam. A much branched shrub 2-12 feet high forming thickets, or sometimes tree-like and 20-30 feet high: leaves linear-lanceolate to linear-oblong, 2-4 inches long, silky-pubescent when young, glabrous when mature, entire or sparingly dentate, acuminate, shortly petioled: stipules minute or none: aments linear-cylindric; the staminate dense, 1-2 inches long, sometimes polygamous; stamens 2; filaments distinct, pubescent; pistillate looser, about 2 inches long in fruit, their scales deciduous: stigmas broad, sessile: capsule ovoid-conic, glabrous or silky, about 2 lines long. In moist soil along streams in the interior, Brit. Columbia to California and east to Missouri and Kentucky.

Var. tenerrima. *S. longifolia* var. *tenerrima* Henderson. "A smooth shrub 6-12 feet high with light bark up to the youngest branches: leaves shorter and narrower, $\frac{1}{2}$ -1 line wide on fructiferous branches, 1-2 lines wide on the sterile, glabrous or very early glabrate: pedicels slightly longer: capsule glabrous: scales glabrous save for the slight: ciliate edges. Shaded rocky banks of mountain rills Elmore Co. Idaho."

S. argophylla Nutt. *Sylva* 1, 71. *S. Hindsiana* Benth. A shrub or small tree 3-15 feet high forming thickets but not growing in clumps, each stem being distinct from any other: leaves narrowly lanceolate, 2-3 inches long, closely sessile, entire or rarely minutely and remotely denticulate, appressed silky-pubescent both sides: stipules, obsolete, or on young vigorous shoots sometimes minute ones occur; aments 1-2 inches long, on short leafy branchlets appearing after the leaves in spring and intermitently all summer; staminate aments 1-3 at the ends of the branchlets, the scales oblong, obtuse, glabrous on the back, crisp-hairy on the margins and toward the base, erose toward the apex: stamens 2, the filaments densely hairy: pistillate aments rather loosely flowered, 1-3 inches long, the lanceolate acutish scales subsistent, woolly except near the apex: capsule lanceolate, appressed silky when young, closely sessile: stigmas sessile. Along rivers, Brit. Columbia to California.

S. exigua Nutt. l. c. A low shrub or small tree 5-15 feet high: usually with a single trunk, rough bark and glabrous twigs: leaves narrowly lanceolate to oblanceolate, acute, subentire, 1-5 inches long, glabrate above, sparingly appressed-silky beneath, closely sessile: stipules none or minute: aments on leafy branchlets, solitary or 2-4 together: staminate aments 1-2 inches long, slender, the scales lanceolate, acute: capsule becoming glabrous, sessile: stigmas sessile. Along streams. Washington to California

S. sessilifolia Nutt. l. c. Shrubby or often tree-like 6-30 feet high, young shoots very leafy, hoary-pubescent, becoming glabrous and brown: leaves membranaceous, elliptical, acute at both ends, 1-5 inches long 1-2 inches wide, closely sessile, obscurely and remotely denticulate, hoary with rather long pubescence when young, glabrous when mature: aments borne upon lateral leafy shoots, 3-4 inches long often 3 together, very densely flowered: scales oblong or obovate, rounded or retuse at the apex, nearly or quite glabrous: stamens 2: lower half of filaments very hairy, upper half minutely puberulent: pistillate smaller, the scales narrower: capsule lanceolate, silky-pubescent when young, becoming nearly glabrous at maturity

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S. macrostachya Nutt. l. c. A shrub or small tree 3-18 feet high, often in dense thickets, with light brown bark and cinereous branches, the young branchlets villous: leaves 2-3 inches long, sessile, oblanceolate to elliptical, acute at both ends, more or less villous-pubescent, entire or nearly so: stipules obsolete: aments on short leafy lateral branchlets, appearing after the leaves, 1-2 inches long: lower half of the filaments crisp-villous: capsule closely sessile, clothed with long lax hairs: style evident; stigmas linear. Margins of ponds, Oregon to California.

§ 3 Shrubs or small trees. Scales of the aments persistent, darker at the apex.

S. Scouleriana Barratt in Hook. Fl. ii, 145. *S. flavescens* Nutt. A shrub or small tree 10-50 feet high, with light gray bark and cinereous branchlets: leaves oblanceolate to oblong or elliptic, obtuse to acute or acuminate, narrowed below to short petioles, entire or serrulate, 1-6 inches long, glabrous and dark green above, pale and more or less pubescent and becoming rusty in age beneath: stipules ovate to oblong, large and persistent on vigorous shoots: aments appearing long before the leaves, very densely flowered; staminate aments sessile, about an inch long and half as thick, the orbicular to oblong scales black or red at the apex, densely woolly with long white hairs: stamens 2, distinct; the filaments glabrous: pistillate aments short-peduncled, 1-2 inches long when mature, the scales oblong to lanceolate, silky with long white hairs: capsule oblong with a stout beak, pubescent, on pedicels a line or more long, maturing before the leaves appear; stigma sessile. Common from Brit. Columbia to California and the Rocky Mountains.

S. bella Piper Bull. Torr. Bot. Club xxvii, 399. A shrub or tree 6-12 feet high with slender erect branches and smooth gray bark: branchlets shining yellow, usually glabrous, very brittle: leaves lanceolate to oblong or oblong-obovate, acute, 1-3 inches long, green and glabrate above, densely silvery-woolly beneath, entire or nearly so, short-petioled: stipules lunate, usually persistent: aments appearing before the leaves; staminate sessile, short and thick, 6-12 lines long; scales acute, black, densely villous: stamens 2: pistillate aments short-peduncled, 6-18 lines long; scales black, obtuse, densely villous: capsules silky-hairy, nearly sessile: style about a line long. Along the Palouse river eastern Washington.

S. Geyeriana Anders. Sal. Monogr. 86, fig. 50. A shrub 10-15 feet high, the branchlets usually covered with a glaucous bloom: leaves lanceolate, acute at both ends 2-3 inches long by 4-6 lines wide, downy above, grayish beneath with soft silky hairs, entire: stipules none: aments at first small, subglobose, nearly equaled by the 3 or 4 silky bracts at their base, becoming short-peduncled in fruit: scales tawny, obtuse, sparingly villous: capsule tapering from an ovate base, silky-tomentose: pedicels slender, puberulent, 4-5 times as long as the nectary: stigmas sessile, bifid. Oregon to California and the Rocky Mountains.

S. Hookeriana Barratt l. c. 445. A large shrub or small tree 10-50 feet high, with dark rough bark and gray pubescent branchlets: leaves lanceolate to oblong or elliptic, 1-5 inches long, green and smooth above, densely tomentose beneath, entire, rounded at base, short-petioled: aments appearing before the leaves, the staminate very densely flowered, 1-3 inches long, the scales densely tomentose with long white hairs. Along the coast, Oregon and Washington.

S. rostrata Richardson Franklin Journ. App. 753. A much branched shrub 6-9 feet high, with elongated branchlets: leaves oblong to lanceolate

acuminate, glandular-serrulate, rounded or cordate at base, glabrous above, glaucous beneath 2-4 inches long, on stout petioles: stipules reniform, conspicuous: aments appearing with the leaves, on leafy peduncles; staminate aments narrower, densely-flowered, 2-3 inches long, the black hairy scales persistent: pistillate looser, the linear scales pale and pink-tipped: capsule pubescent, long-beaked: on slender, pedicels as long or longer than the scales: stigma sessile. Common along streams, Oregon to Brit. Columbia, and Hudson Bay.

S. lasiolepis Benth. Pl. Hartw. 335. ? A large shrub or small tree 15-40 feet high, with yellowish bark and erect branches: leaves oblong to oblanceolate, obliquely acute or acuminate, serrulate, shining green above, densely glaucous and somewhat pubescent beneath, petioled: stipules rarely present, triangular: aments appearing with or before the leaves; the staminate cylindrical, 1-3 inches long, short-peduncled; scales black, hairy: stamens 2, the glabrous filaments united at the base for half their length: pistillate aments small, 6-18 lines long, on short leafy peduncles: style about as long as the stigmas. Common along streams, Washington to California.

S. cordata Muhl. Neue Schrift, iv, 246. A shrub 5-12 feet high, the twigs puberulent or glabrous: young leaves pubescent; mature leaves oblong-lanceolate, green on both sides or paler beneath, acuminate narrowed, obtuse or subcordate at base, sharply serrulate with glandular teeth, short-petioled: stipules oblique, serrulate, usually large and persistent: aments bracted at the base appearing before the leaves: staminate about 1 inch long, the pistillate 1-2½ inches long in fruit: scales silky, persistent, stamens 2, filaments glabrous: style short: capsule narrowly ovoid, acute, glabrous, 2-3 lines long, short-pedicelled. In wet soil Brit. Columbia to California and Virginia to New Brunswick.

Var. angustata Anders. Monogr. Sal. 159. Leaves linear-lanceolate. Range of the type.

Var. Mackenziana Hook. Fl. ii, 149. A small tree with lanceolate or oblanceolate leaves. California to Oregon and Manitoba.

S. myrtilloides L. Sp. 1019. An erect glabrous shrub 1-12 feet high, with light brown terete twigs: leaves oblong, elliptic or somewhat obovate, obtuse or acute, entire, mostly narrowed at base 1-3 inches long, short-petioled, bright green above, pale or glaucous beneath, the margins slightly revolute: aments appearing with the leaves, leafy-bracted at base, rather dense, an inch or less long, or the pistillate longer in fruit: scales persistent, obtuse, slightly villous: stamens 2; filaments glabrous: style shorter than or equalling the stigmas: capsule oblong-conic, obtuse, glabrous, 2-3 lines long, much longer than the filiform pedicels which slightly exceed the scales. In bogs, Brit. Columbia to Oregon and New Jersey.

S. Barclayi Anders. Ofv. Handl. Vet. Akad. 1858, 125. ? A shrub 3-6 feet high with dark brown glabrous twigs, the young shoots pubescent: leaves obovate to oval or somewhat lanceolate, often short-acuminate, serrulate, bright green and glabrous above when mature, paler beneath, 1-2 inches long, short-petioled: stipules ovate, mostly acute, deciduous: aments appearing with the leaves, borne at the ends of short branchlets, densely flowered, spreading or erect: the staminate about an inch long, the pistillate 2-3 inches long in fruit: scales persistent, slightly villous: stamens 2; filaments distinct: capsule narrowly conic, glabrous, acute, 3 lines long: style longer than the stigmas. On wet banks in the highest mountains, Oregon to the Arctic regions.

S. Sitchensis Sanson Bong. Veg. Sitch. 162. A straggling ascending shrub 6-40 feet long, with light brown bark; branches slender, brownish,

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downy when young, soon smooth: leaves oblong-obovate to oblanceolate, acute, or the earliest obtuse with an abrupt point, narrowed at base into short petioles, dark green above except the whitish-pubescent midrib, covered beneath with a lustrous white and satiny tomentum, entire or obsolete crenate: stipules reniform, often wanting: aments appearing with the leaves, with a few small bracts at base, slender, densely flowered; the staminate 1-2 inches long, the obovate obtuse dark scales pubescent with long hairs; pistillate aments 12-18 lines long, the dark-colored scales pubescent: capsule ovate-conic, acute, densely white-tomentose: style elongated: stigmas scarcely emarginate, thick, erect. Common along streams, California to Alaska.

S. pellita Anders. Monogr. Sal. 139, fig. 72, g. A shrub with greenish-red to dark red shining twigs, when young, sometimes covered with a glaucous bloom: leaves numerous, narrowly oblanceolate, acute or acuminate, or the lower obtuse, $1\frac{1}{4}$ -2 inches long, 4-6 lines wide, the margins entire or obscurely crenate, revolute, dull green and thinly pubescent above, becoming glabrous, densely and persistently silvery-tomentose beneath: petioles slender, 2-3 lines long: stipules only on vigorous shoots, semi-cordate, 2-3 lines long: pistillate aments on short bractless peduncles, thick, very densely flowered, about an inch long: scales pilose, acute-tawny, dark at the apex: capsule tomentose, becoming glabrate, ovate-conical, acute, a line long, on short pedicels: style elongated; stigmas thick, entire, erect. Brit. Columbia to California.

S. Lemmonii Bebb Bot. Cal. ii, 88. A shrub 6-15 feet high: branches slender, at first covered with short appressed hairs, becoming smooth: leaves lanceolate, acute or acuminate at both ends, entire or remotely sub-serrate, silky-pubescent, when young, paler beneath, slender-petioled: stipules small, semi-ovate, acute, serrate, deciduous: aments oblong or cylindrical, rather densely flowered, appearing with the leaves, on short peduncles bearing 2-3 small acute leaf-like bracts: scales obovate, obtuse or somewhat acute, black, thinly pilose: capsule ovate-lanceolate, acute, grayish-tomentose, 2-3 lines long: style medium sized: stigmas erect, entire. Along streams, eastern Oregon to California.

S. glaucops Anders. in DC. Prodr. xvi, 281. I have neither specimens nor description of this species: it is a low caespitose shrub growing on the sides of high mountains, Idaho to Montana and Wyoming.

S. glauca var. *villosa* Anders. Sal. Bor. Am. 22. A diffuse shrub 3-7 feet high, with short and stout branches: leaves oblanceolate, acute or short acuminate, attenuate at base, 2-4 inches long, varying from soft-villous to scarcely pilose when young, at length glabrate and rigid, more or less glaucous beneath: stipules linear-lanceolate rather persistent: aments short-peduncled, the pistillate when mature sometimes very large, 2-3 inches long and $\frac{1}{4}$ inch thick: scales oblong-obovate, rather acute, brownish: capsule lanceolate, acuminate, tomentose, at length subglabrate, shortly pedicelled: style short or scarcely produced: stigmas bifid or entire. Mount Hood Oregon to California.

S. petrophila Rydb. Bull. N. Y. Bot. Garden i, 268. *S. arctica* var. *petrea* Anders. A dwarf creeping shrub with suberect branches only 2-4 inches long, leafy at the top: leaves lanceolate, tapering somewhat equally to the base and apex, an inch long, entire, green on both sides, slightly paler and prominently nerved beneath: aments terminal, erect, at length thick and densely flowered, an inch or two long: scales thin, brownish, sparsely pilose: capsule ovate-conical, 2-3 lines long, silky, subsessile: style very much elongated, slender: stigmas bifid, divaricate. On high mountains, eastern Oregon to California and the Rocky Mountains.

S. tenera Anders. in DC. Prodr. xvi, 288. I have not seen specimens

of this, it said to be nearly related to the preceding, differing in the narrow oblanceolate leaves, few-flowered aments and much shorter capsule: it grows on the high mountains of Washington to California, Utah and Montana.

S. saximontana Rydb. l. c. 161. *S. reticulata* Bebb, not L. A densely caespitose and intricately branched shrub 1-3 inches long above ground, with light yellow glabrous branches: leaves oblong or elliptic-oblong, commonly acutish at both ends, glabrous both sides, light green above, rather strongly veined and glaucous beneath, 9-12 lines long; petioles about 6 lines long, aments 6-12 lines long, somewhat loosely many-flowered: bracts cuneate-oblong, truncate, light yellow, glabrous: capsule conical, sessile, densely and finely white-tomentose: stigma nearly sessile. On high mountains, eastern Oregon to the Rocky Mountains.

S. vestita Pursh Fl. 610. A low shrub with 4-sided green twigs: leaves obovate, thick, mostly retuse or emarginate at the apex slightly crenulate, narrowed or rounded at base, dark green and glabrous above, persistently silky beneath, 1-2 inches long, shortly petioled: aments terminal, appearing after the leaves, peduncled: stamens 2; filaments distinct: capsule narrowly ovoid-conic, sessile, densely silky-tomentose, about 3 lines long. Eastern Oregon to Quebec and Labrador.

3 POPULUS L. Sp. 1034.

Trees or shrubs with scaly resinous buds, broad or narrow usually long-petioled leaves with minute fugacious stipules and small dioecious flowers in bracted aments. Bracts of the aments fimbriate or incised. Disk cup-shaped, oblique, lobed or entire. Calyx none. Staminate aments dense, pendulous, the flowers, with from 4-60 stamens, their filaments distinct. Pistillate aments sometimes raceme-like by the elongation of the pedicels. Ovary sessile. Style short. Stigmas 2-4, entire or 4-lobed. Capsule 2-, 3- or 4-valved.

P. ALBA L. Sp. 1034. A large tree with smooth light gray bark, 50-120 feet high and 2-6 feet in diameter: leaves broadly ovate or nearly orbicular in outline, acute or somewhat acuminate, truncate or subcordate at base, 3-5-lobed or irregularly dentate, 2-4 inches broad, densely white-tomentose when young, becoming glabrate and dark green above, persistently white-tomentose beneath, on terete petioles shorter than the blade. Escaped from cultivation in the Willamette valley.

P. balsamifera L. Sp. 1034. A large tree 50-80 feet high and 3-7 feet in diameter, the branches stout and spreading: leaves glabrous, broadly ovate, dark green and shining above, pale beneath, acute or acuminate, rounded or subcordate at base, crenulate, 3-5 inches long: petioles terete: aments and bracts somewhat pubescent: stamens 18-30: lobes of the stigma broad: capsule ovoid, 2-valved. In moist or dry soil, eastern Oregon to Alaska, Hudson Bay and the Eastern States.

P. angustifolia James Long's Exp. i, 497. A slender tree 40-70 feet high and 1-2 feet in diameter, the crown narrowly pyramidal with ascending branches and terete gray twigs: leaves glabrous, lanceolate, ovate-lanceolate or ovate, gradually acuminate or acute, narrowed, rounded or rarely subcordate at base 2-5 inches long, finely crenulate: petioles not flattened laterally, 3-6 lines long: staminate aments oblong-cylindrical, 1-3 inches long: lobes of the stigma broad: capsules ovoid, 2-valved. Eastern Oregon to Dakota and Arizona.

P. trichocarpa T. & G. Hook. Incon. t. 878. A large tree 50-200 feet

high and 2- and stout ovate to oblanceolate, base, 2-10 inches long, pale beneath, 1-3 inches long, diameter 3-4. Common al

P. deltoides and 5-8 feet when old: the apex, laterally, striate: stem loosely flow 4-5 lines long, streams, ea

P. tremula 6-30 feet high, diameter, with short acuminate at base, ed laterally, deeply 3-5-lobed, pistillate lobes about 3 lines across the c

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high and 2-8 feet in diameter, with thick dark longitudinally fissured bark and stout spreading branches: buds shining and viscid: leaves broadly ovate to oblong-lanceolate, acuminate, narrowed, rounded or subcordate at base, 2-10 inches long, finely puberulent when young, dark green above, pale beneath: petioles usually an inch or 2 long: staminate aments dense, 1-3 inches long, its bracts slightly villous: pistillate aments becoming 6-10 inches long in fruit, pubescent: capsule subglobose pubescent, 3-4 lines in diameter 3-valved: styles 3, broadly dilated and lobed: seeds light-colored. Common along streams, Brit. Columbia to California and the Rocky Mts.

P. deltoides Marsh Arb. Am. 106. A large tree 100-150 feet high and 5-8 feet in diameter, with grayish green bark somewhat rough when old: leaves glabrous, broadly deltoid-ovate, abruptly acuminate at the apex, crenulate, truncate at base, 4-7 inches long: petioles flattened laterally, stout, about as long as the blades: bracts glabrous, deeply firm-riate: staminate aments drooping, 3-5 inches long: pistillate aments loosely flowered, becoming 6-10 lines long in fruit: capsule ovoid, acute, 4-5 lines long, 2-4-valved, shorter than or equalling their pedicels. Along streams, eastern Washington to the Eastern States.

P. tremuloides Michx. Fl. ii, 243. Usually a shrub or small tree 6-30 feet high, but sometimes attaining a height of 100 feet and 3 feet in diameter, with smooth light green bark: leaves broadly ovate or orbicular, short acuminate, finely crenulate and ciliate, truncate, rounded or subcordate at base, 1-3 inches broad: petioles about as long as the blade, flattened laterally, causing the leaves to quiver in the slightest breeze; bracts silky, deeply 3-5-cleft into linear lobes: staminate aments 1-3 inches long, the pistillate longer, dense: stigma-lobes linear: capsule conic, acute, 2-valved, about 3 lines long. Common in moist places, California to Alaska and across the continent.

SUBCLASS 2 ENDOGENÆ.

Stems with the woody fibres scattered irregularly, not forming a separate zone of annual woody layers between the bark and pith. Leaves mostly parallel-veined, alternate, entire, sheathing at base. Floral envelopes usually in threes. Embryo with only one cotyledon.

SYNOPTICAL KEY TO THE ENDOGENOUS ORDERS.

A Herbaceous perennials with conspicuous perianth. Ovary inferior.

93 **Orchidacæ** Leaves mostly flat and not grass-like: flowers perfect, irregular: stamens and style coherent: anthers 1 or 2: capsule 1-celled, with 3 parietal placentæ: Seeds numerous, with obscure embryo and no albumen.

94 **Iridacæ** Leaves equitant and grass-like: flowers regular, perfect, spathaceous: stamens 3, at the base of the perianth: capsule 3-celled: embryo distinct, with albumen.

B Perianth regular or none. Ovary superior or nearly so.

* Perianth colored, at least the inner series: carpels united into a compound ovary: seeds with albumen.

95 **Smilacæ** Woody plants climbing by tendrils: flowers diœcious, 6-parted: anthers 1-celled: fruit a berry.

- 96 **Liliaceæ** Stems from bulbs, corms or rhizomes: anthers 2-celled: fruit a loculicidal or septicial capsule: embryo in copious albumen.
- 97 **Convallariaceæ** Leafy-stemmed herbs from rootstocks: anthers 2-celled: fruit a fleshy berry: embryo small in copious albumen.
- 98 **Melanthaceæ** Leafy-stemmed plants with rootstocks or bulbs: anthers 2-celled: fruit a 3-celled septicial or loculicidal capsule: seeds usually with tails or appendages.
- 99 **Pontederiaceæ** Herbaceous aquatic plants with spathaceous tubular flowers: ours with grass-like leaves, solitary axillary flowers and 1-celled 3-valved capsules.
- 100 **Araceæ** Ours acaulescent herbs with the flowers crowded upon a spadix with 4-lobed perianth, 4 stamens, 2-celled anthers and 2-celled 2-ovuled ovaries which become fleshy and coalescent in fruit.
* * Aquatic herbs: perianth none: ovary 1-celled, utricular or nut-like in fruit.
- 101 **Typhaceæ** Stems solid, terete, with linear leaves and creeping rootstock: flowers monœcious, in heads or crowded upon a spadix.
- 102 **Lemnaceæ** Very small stemless floating plants with disk-like fronds and inconspicuous flowers.
* * * Aquatic or marsh plants: perianth herbaceous or petal-like or none: carpels 1-several, distinct or separable: seeds without albumen.
- 103 **Vallisneriaceæ** Flowers axillary and mostly solitary, with tubular perianth: fruit indehiscent.
- 104 **Naladaceæ** Perianth of fertile flowers of 4 herbaceous valvate sepals or none: carpels 1-6, 1-ovuled.
- 105 **Scheuchzeriaceæ** Perianth of 4-6 segments in 2 series: carpels 3-6, 1-2-ovuled.
- 106 **Allismaceæ** Perianth-segments 6, distinct, 3 herbaceous 3 petal-like: carpels numerous, verticillate or capitate, becoming achenes.
* * * * Perianth of 6 equal persistent glumaceous segments; fruit a capsule.
- 107 **Juncaceæ** Flowers perfect: capsule loculicidally 3-valved: seeds with albumen.
* * * * Flowers in the axils of scales or glumes, without evident perianth: stamens 1-3: ovary 1-celled, 1-ovuled: seeds with albumen.
- 108 **Cyperaceæ** Stems solid, often triangular, with closed sheaths: glume single; perianth represented by bristles, or wanting: anthers attached by the base: fruit a spike of lenticular or triangular achenes.
- 109 **Gramineæ** Stems hollow, terete: sheaths split to the base: glumes in pairs: perianth represented by minute scales or none: anthers versatile: fruit a caryopsis or grain.

ORDER XCIII ORCHIDACEÆ Lindl. Nat. Syst. ed. 2, 336.

Perennial herbs with parallel-veined flat leaves and perfect irregular flowers in racemes or spikes, or solitary and terminal. Perianth superior, of 6 segments, the 3 outer similar or nearly so, 2 of the inner similar, the third inner one, called the lip, dissimilar often markedly so, usually larger. Stamens coherent with the style, forming an unsymmetrical column, with usually

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only the anther opposite to the lower sepal perfect and 2 rudimentary lateral ones, in *Cypripedium* the lateral ones perfect, the third sterile. Anthers 2-celled. Pollen more or less coherent in 1-4 masses, rarely wholly granular. Stigma oblique and concave, mostly viscous, the upper margin often produced into an erect beak. Capsule coriaceous or membranaceous, dehiscing usually by 3 placentiferous valves which separate from the persistent midveins of the carpels. Seeds very numerous, scobiform, without albumen.

TRIBE I Anther one, resting like a lid upon the column, deciduous. Pollen masses 4, smooth and waxy.

- 1 *Calypso* Scape solitary and 1-flowered, from a solid bulb, with a single green leaf: lip saccate: column broadly winged.
- 2 *Corallorhiza* Stems one to several from a branched coral-like root: leaves all reduced to scale-like bracts: flowers in a terminal raceme, spurred or gibbous at base: lip expanded or concave, bilamellate-crested: column semiterete.

TRIBE II Anther one, connate with the column and resting upon its face just above the stigma. Pollen masses 2, of coarse grains united by an elastic web.

- 3 *Habenaria* Stems one to several from a solid corm: flowers numerous, in a terminal raceme: lip flat, spurred.

TRIBE III Anther 1, erect and sessile or nearly so upon the top of the column, more or less covering and declinate upon the back of the stigma. Pollen masses 2 or 4, of loosely cohering grains.

- 4 *Gyrostachys* Stems one to several from fleshy fascicled roots: flowers numerous in a twisted spike: lip flat, the base embracing the short column.
- 5 *Peramium* Stem solitary from a somewhat creeping rootstock: flowers several in a terminal spike; lip saccate, entire, free from the column.
- 6 *Listera* Stem solitary from a fascicle of fleshy-fibrous roots with a pair of sessile leaves in the middle; flowers rather few, in a terminal raceme: lip flat, 2-lobed.
- 7 *Epipactis* Stems stout, leafy, several from fleshy-fibrous roots: lip concave, somewhat jointed in the middle and auriculate at base: anther sessile behind the beaked stigma.
- 8 *Cephalanthera* Stems stout, from a somewhat creeping rootstock: flowers in a terminal raceme: lip concave and auriculate at base: anther shortly stipitate: stigma beakless.

TRIBE IV Perfect anthers 2, lateral. Pollen pulpy-granular.

- 9 *Cypripedium* Stems leafy, from more or less creeping rootstocks: flowers mostly few, in a terminal raceme: lip an inflated sac.

Tribe 1 Malaxidæ Lindl. Orch. 3 Herbs with simple stems without green foliage, or a single green radical leaf. Anther one, terminal and resting like a lid upon the column, deciduous. Pollen masses 4, smooth and waxy.

1 CALYPSO Salisb. Par, Lond, t. 89.

Low herbs with a single bracted scape-like stem, solitary green radical leaf and a large terminal showy flower. Smaller lobes of the perianth similar and nearly equal: the lip comparatively large, saccate, with 2 short spurs below the apex, becoming inferior by the pedicel curving backward. Column erect broadly winged and petaloid, oval and concave, bearing the hemispherical anther on the summit. Pollen masses in 2 pairs, the lower smaller, compressed, sessile upon a nearly square membranaceous gland.

C. borealis Salisb. l. c. Stem 3-8 inches high with 2 or 3 membranaceous brownish-green sheaths and a linear bract at the summit, leaf broadly ovate or slightly cordate, 1-2 inches long, petioled: flowers drooping, pedicelled: sepals and petals lanceolate, acuminate, light rose-color, 6-9 lines long lip usually slightly longer, inflated saccate, brownish-pink mottled purple, the edge margined at the apex and bifid or entire nearly equalling the tooth-like spurs and with a tuft of (in ours white) hairs at base: column half the length of the petals: capsule oblong-cylindric, an inch long, about equalling the slender pedicel. In damp open forests California to Alaska and the Atlantic States: also in Europe.

2 CORALLORHIZA R. Br. Ait. Hort. Kew. ed. 2, v, 209

Scapose perennial herbs without green leaves from coral-like branched roots, the leaves all reduced to sheathing scales, and more or less showy flowers in terminal racemes. Sepals and petals ascending, the upper somewhat incurved, similar and nearly equal, but the lateral sepals oblique at base and either decurrent in a short spur adnate to the side of the ovary, or forming a projecting gibbosity above it: lip dilated and more or less recurved, flat or concave, with a pair of somewhat prominent longitudinal ridges near the base. Column semiterete and narrowly margined, broader at base, somewhat incurved, bearing the caducous anther on the summit. Pollen-masses in 2 pairs, distinct, sessile upon a short oblong gland. Capsules reflexed.

* Spur present: flowers small, yellowish-green or whitish, often tinged or mottled with purple.

+ Spur more or less prominent: sepals and petals 3-nerved: capsule oblong-cylindric.

C. multiflora Nutt. Journ. Acad. Philad. iii, 138, t. 7. Stems 8-20 inches high, purplish, clothed with several appressed scales: racemes 2-8 inches long, 10-30-flowered: flowers 6-9 lines high, brownish-purple, short-peduncled: petals and sepals somewhat connivent at base, linear-lanceolate, about 3 lines long: lip white spotted and lined with purple, oval or ovate in outline, deeply 3-lobed, crenulate, the middle lobe broader than the lateral ones, its apex curved, spur manifest, but wholly adnate to the ovary: column stout $\frac{2}{3}$ the length of the petals, the margins broader and somewhat thicker at base: capsule ovoid or oblong, 6-9 lines long, narrowed to a stout rather long pedicel. Rather common in open forests at low and middle elevations, Brit. Columbia to California and the Atlantic States.

C. Mertensiana Bong. Veg. Sitch. 165. Stems 6-20 inches high, dark red or purple, many-flowered: sepals and petals linear-lanceolate, 3-4 lines long, dark red: spur a line long, the lower half free from the ovary: rip

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oblong obtuse entire or with a tooth on one or both sides near the base, narrowed to a short claw, thin and concave, the ridges only slightly prominent: column nearly equalling the petals, slender, the narrow margins scarcely broader or thicker below: stigma projecting and cucullate: capsule 5-8 lines long, attenuate into the short slender pedicels, reflexed. Common in the high mountains, Alaska to California.

+ - Spur very short or not at all prominent: sepals and petals 1-nerved: capsule elliptic-oblong.

C. innata R. Br. Ait. Hort. Kew. ed. 2, v. 209. Stems slender, glabrous, 4-12 inches high, clothed with 2-5 closely sheathing scales: racemes 1-3 inches long, 3-12-flowered: flowers dull purple, about 6 lines long, on very short minutely bracted pedicels: sepals and petals narrow, about 3 lines long: lip shorter than the petals, oblong, whitish, 2-toothed or 2-lobed above the base: spur a sac or small protuberance adnate to the summit of the ovary: capsule oblong or somewhat obovoid, 4-6 lines long. In wooded districts, eastern Washington to Alaska and across the Continent: also in Europe.

* * Flowers larger, striate-veined, not spotted: spur none, the lateral sepals oblique and with the base of the column strongly gibbous over the top of the ovary: lip entire, more or less concave, somewhat fleshy.

C. varicata Lindl. Orch. 534. Stems stout, purplish, 1-2 feet high, clothed with several scarious bracts: racemes 2-6 inches long, 10-25-flowered: flowers brownish-purple: sepals and petals narrowly elliptic, striate with purple lines, 6-8 lines long: lip oval or obovate, entire or a little undulate, somewhat narrowed at base, about as long as the petals: capsule ellipsoid, reflexed 8-10 lines long. In open forests Brit. Columbia to California, Ontario and New York.

Tribe 2 Ophrydæ Lindl. Orch. 257. Flowers mostly spicate or racemose. Anther one, connate with the column and persistent upon its face immediately above the stigma. Pollen-masses 2, of coarse grains united by an elastic web, each mass attached by a stalk to a viscid gland.

3 HABENARIA Willd. Sp. Pl. iv, 44. (1804)

Leafy-stemmed plants with bulbous or fleshy-fibrous roots, entire mostly green leaves and rather small flowers in terminal bracted racemes or spikes. Perianth ringent: sepals and petals nearly alike, convergent, or the lower sepals spreading: lip flat and spreading, 3-lobed or entire, with a slender spur at base, without ridges or callosities: column very short. Anther persistent upon the face of the column immediately above the stigma, the cells parallel, or divergent at base. Pollen-masses one in each cell, of coarse grains united by an elastic web, each attached at base by a pedicel to an exposed viscid gland on the upper edge or at the side of the stigma.

* Stem mostly slender, from an ovate or oblong tuber, with 2-3 leaves at base and bracteate above: flowers numerous, small, greenish white, the lip scarcely exceeding the uniform 1-nerved sepals.

H. elegans Bolander Cat. Pl. St. Franc. 29. Stem rather stout, 1-3 feet high: leaves lanceolate, acuminate, 4-8 inches long: spikes usually dense, many-flowered, 4-8 inches long: the subulate acuminate bracts a

little shorter than the flowers: sepals and petals equal, about 2 lines long: sepals oblong, obtuse: petals ligulate and fleshy, obscurely 3-nerved; the lip similar, with a filiform spur equalling or exceeding the ovary, 3-5 lines long: pollen-masses large, half a line long: beak of the stigma prominent, broad and rounded: capsule oblong, nearly sessile. 3-4 lines long. In dry open forests, California to Brit. Columbia.

H. Unalaskensis Watson Proc. Am. Acad. xii, 277. Stem usually slender, 10-20 inches high: leaves narrowly lanceolate to linear, thin 2-6 inches long, often attenuate below: bracts ovate, acutish or rarely acuminate, not exceeding the ovary: spikes 4-6 inches long, rather loose: flowers unpleasantly fragrant; sepals, petals and lip nearly equal, about a line long, at first erect, becoming nodding by the curving of the ovary; sepals oblong, obtuse: petals thicker, lanceolate, acute: lip oblong, obtuse: spur clavate, shorter than the ovary: capsule oblong, sessile or nearly so, 3 lines long. On dry wooded hills, California to Unalaska.

* * Stem stouter, from a fusiform tuber, often tall, leafy throughout: sepals 3-nerved, the lateral ones oblique at base, the upper one broader: petals thin: lip fleshy, several-nerved.

+ Spur elongated, much longer than the sepals.

H. leucestachys Watson Bot. Cal. ii, 134. Stem stout 1-6 feet high bearing a many flowered dense or open spike of rather large pure white flowers: leaves lanceolate to linear, 2-18 inches long diminishing upward: bracts linear-subulate, acuminate longer than the ovary: lateral sepals oblong, the upper ovate-oblong, 2-3 lines long: petals lanceolate and sub-falcate, oblique at base, more or less connivent with the base of the sepals: lip 3-4 lines long, rhombic-lanceolate: spur narrow, 4-6 lines long: beak of the stigma very prominent, ovate, more than half the length of the connective: glands linear-oblong, vertical: capsule oblong, sessile, 6-9 lines long. In marshes, California to Alaska and Idaho.

H. dilatata Hook. Exot. Fl. ii, t. 95. Stem rather slender, 1-2 feet high: leaves lanceolate, 3-12 inches long: spikes 2-10 inches long, loosely flowered: bracts lanceolate, acuminate, the lower longer than the flowers, the upper shorter than the ovary: flowers white: sepals ovate, obtuse, nearly 3 lines long: lip entire, dilated or obtusely 3 lobed at base. 4-5 lines long, about equalling the blunt incurved spur: stigma with a trowel-shaped beak between the bases of the anther-cells: capsule sessile or nearly so. In marshes and wet woods, Oregon to Alaska and across the Continent.

H. aggregata. Stem rather slender, 1-2 feet high, growing in dense tufts: leaves linear to linear-lanceolate, acute or acuminate, 4-10 inches long, reduced to sheaths below: bracts linear-lanceolate, acuminate, 6 lines long, about equalling the ovaries: flowers 10-30, in a long loose spike, greenish-white: lateral sepals ovate, acuminate, about 3 lines long, obtuse, the upper broadly ovate, obtuse, equalling the lateral ones: petals lanceolate subfalcate, obtuse, 4-5 lines long: lip linear, 6 lines long equalling the slender spur and sessile ovary. In springy places along streams in the Coast Mountains of southern Oregon.

+ + Spur short, scarcely exceeding the sepals.

H. hyperborea R. Br. Ait. Hort. Kew. ed. 2, 193. Stem rather stout, 6 inches to 3 feet high: leaves ovate to lanceolate, 1-12 inches long: spike narrow, 3-8 inches long: sepals and petals ovate, obtuse, 2-3 lines long, upper sepal slightly crenulate at the apex, lip lanceolate, entire, obtuse, about 3 lines long: spur about equalling the lip, shorter than the ovary, blunt slightly incurved, sometimes clavate: glands small. In bogs and wet woods, Oregon to Alaska and across the Continent.

H. gracilis Watson Proc. Am. Acad. xii, 276. Stem usually slender,

HABENARIA
GYROSOPHORA

6-30 inches long
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Stem usually leafy, thin 3-6 lines long; rarely acuminate; flowers loosely; sepals oblong, spur clavate, 3 lines long.

Stem leafy throughout; upper one

1-6 feet high; flowers pure white; spreading upward; lateral sepals ovate and sub-ovate; beak of the sepals long; beak of the column, 6-9 lines

Stems 1-2 feet long, loosely branched; flowers ovate, obtuse, base. 4-5 lines long; narrow-shouldered or nearly so. Continent.

Growing in dense woods, 4-10 inches high; leaves acuminate, 6 lines long; long loose spike; flowers long, obtuse, petals lanceolate, equalling the sepals; streams in the

Stems usually slender, 2 inches long; flowers obtuse, 2-3 lines long; petals lanceolate, entire, longer than the sepals. In bogs

usually slender.

6-30 inches high: leaves oblong-lanceolate to lanceolate or linear, 2-6 lines long, gradually reduced upward and passing into the bracts of the narrow sparsely-flowered spike: flowers small, greenish yellow: lateral sepals ovate, obtuse, about 2 lines long, the upper one broadly ovate or nearly orbicular, equalling the lateral ones: petals lanceolate, a little longer than the sepals: lip linear, longer than the petals: spur short and sessile, dilated downward: capsule oblong, half-inch long. In mountain meadows, California to Alaska.

*** Stem slender and scape-like, with a pair of large green leaves at base: flowers comparatively large, greenish, the lip longer than the petals.

H. orbiculata Torr. Comp. 318. Scape stout, bracted, rarely bearing a small leaf, 1-2 feet high: leaves orbicular, spreading flat on the ground, green and shining above, silvery beneath, 4-7 inches in diameter: raceme loosely many-flowered: pedicels 5-8 lines long, erect in fruit: flowers greenish-white; upper sepal short and rounded, the lateral ones spreading, falcate-ovate, obtuse, 4-5 lines long: petals smaller. Lip oblong-linear, entire, obtuse, white, about 6 lines long: spur much longer than the ovary, often 18 lines long: anther-cells prominent, converging above: glands small, orbicular, about 3 lines apart. In rich woods. Washington and Idaho to Brit. Columbia and across the Continent.

Tribe 3 Neottieæ Lindl. Orch. 441. Stems mostly leafy and flowers spicate or racemose. Anther one, connate with the column and persistent upon its face immediately above the stigma. Pollen-masses 2, of coarse grains united by an elastic web, each mass attached at base by a stalk to a viscid gland.

4 GYROSTACHYS Pers. Syn. ii, 511. (1807.)

SPIRANTHES Richard.

Erect herbs with fleshy-fibrous or tuberous roots, leafy stems and small spurless flowers in 1-3-rowed more or less twisted spikes. Perianth ringent, oblique on the ovary: the lateral sepals somewhat decurrent, the upper and the petals coherent: lip sessile or nearly so, the base embracing and adherent to the column and with a callous protuberance on each side, the dilated summit spreading and undulate, usually entire. Column very short, oblique, terminating in a short erect stipe, bearing the ovate stigma on the face, the beak above usually acuminate and at length bifid by the separation of the oblong and viscid gland. Anther sessile or nearly so, at the base of the stipe behind, mostly acuminate. Pollen-masses 2, thin and powdery, becoming attached above the gland.

G. Romanzoffiana McM. Met. Minn. [171. *Spiranthes Romanzoffiana* Cham. Glabrous, rather stout 4-18 inches high, leafy, bracteate above: leaves oblong-lanceolate to linear: spike dense, 3-ranked, conspicuously bracted, 1-4 inches long: perianth white, about 4 lines long, curved, the sepals and petals all connivent; lip recurved, ovate-oblong, contracted below the narrower wavy-crenulate summit: callosities smooth, often obscure: the oblong-linear gland and very slender bifid beak $\frac{3}{4}$ of a line long: capsule oblong, 3-4 lines long. On wet banks California to Alaska and across the Continent.

G. porrifolia Kuntze. *Spiranthes porrifolia* Lindl. Glabrous, rather

slender, 6-18 inches high, leafy below, bracteate above: leaves oblong-lanceolate to lanceolate, 2-4 inches long, acute: spike dense, rather slender, 1-3 inches long: bracts acuminate from an ovate or oblong base, not surpassing the flower: perianth about 3 lines long; sepals and petals all connivent, linear: lip slightly recurved, not exceeding the sepals, callosities at the base very prominent and nipple-like, pointing downward. In wet places in the Coast Mountains of southern Oregon to California.

5 PERAMIUM Salisb. Trans. Hort. Soc. i, 310. (1812.)

GOODYERA R. Br. l. c. (1815.)

Herbs with bracted erect scapes from creeping rootstocks with fleshy-fibrous rootlets, all radical, often blotched with white, thick evergreen leaves and small flowers in terminal spikes. Lateral sepals free, the upper one united with the petals into a galea. Lip sessile, entire, roundish-ovate, concave or saccate, without callosities, its apex reflexed. Anther without a lid, erect or incumbent, attached to the column by a short stalk. Pollen-masses 2, attached to a small disk which coheres with the top of the stigma.

P. Menziesii Morong Mem. Torr. Bot. Club. v. 124. *Goodyera Menziesii* Lindl. Scapes and inflorescence pubescent, 6-15 inches high: leaves smooth, dark green blotched with white, ovate-oblong to lanceolate, acute, 2-3 inches long, narrowed into a short petiole usually somewhat reticulated with light greenish markings: spikes many-flowered, rather dense, somewhat secund: bracts ovate-lanceolate, equalling the ovary: perianth dull white, pubescent, 2-4 lines long: lip strongly concave and erect, narrowing above into the slightly spreading summit: column short and straight: anther acuminate: gland and bifid beak very narrow and elongated: capsule ovate-oblong, very nearly sessile, 4 lines long. In open forests, California to Alaska and Canada.

6 LISTERA R. Br. Ait. Hort. Kew. ed 2, 201.

Small herbs with fleshy-fibrous roots, simple stems with a pair of flat leaves near the middle and small flowers in a terminal raceme. Sepals and petals similar: lip free, longer than the sepals, flat and dilated, more or less deeply bifid: column free and naked, bearing the ovate anther at the back of the summit. Pollen-masses 2, powdery, united to a very minute gland upon the rounded and entire beak of the stigma.

L. cordata R. Br. l. c. Stem very slender 2-10 inches high: leaves broadly ovate 6-12 lines broad, truncate or somewhat cordate at base but abruptly contracted at the point of insertion, mucronate: racemes rather loose, 6-20 lines long, 4-20-flowered: bracts $\frac{1}{2}$ line long: flowers purplish or yellowish: sepals broadly ovate, about a line long: petals broadly oblong: lip narrow, often with a subulate tooth on each side at the base, fully twice as long as the petals, cleft to near the middle, the segments setaceous and ciliolate: column very short; capsule ovoid, 2 lines long. In damp places in forests, California to Alaska and across the Continent.

L. convallarioides Torr. Comp. 326. Stem slender, 4-10 inches high, glandular-pubescent above the leaves, rarely with a bract below the raceme: leaves smooth, round-oval or ovate, obtuse or cuspidate, slightly cordate or reniform at base, 3-9-nerved: raceme 1-3 inches long, loosely 3-12-flowered: flowers greenish-yellow, 3-4 lines long: sepals and petals

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linear-lanceolate, 2-3 lines long: lip broadly cuneate, with 2 obtuse lobes at the dilated apex, 4-5 lines long, generally with a tooth on each side at base: column elongated but shorter than the lip, a little incurved, with 2 short projecting wings above the anther: capsule obovoid, about 3 lines long. In wet places in forests, southern Oregon to California and the Atlantic States.

L. caurina Piper Eryth. vi, 32. *L. convallarioides* Hook. not Torr. Stem slender, 5-12 inches high, glabrous below, densely glandular-pubescent above the leaves: leaves obovate to oval, or elliptic-ovate, 1-4 inches long, thin, obtuse and slightly apiculate to acute, rounded or truncate at base: raceme loosely many-flowered: bracts 1-3 lines long, rhombic-ovate, acuminate, the lower sometimes 2-flowered and bifurcate: flowers dull yellowish, on slender pedicels 4-6 lines long: sepals and petals lanceolate to linear-lanceolate, about 2 lines long, spreading: lip about 3 lines long, narrowly oblong, dilated and rounded at the retuse apex, a slender or almost filiform tooth on each side at the base, with a papilla at the base of each tooth: column short, not stout: capsule ovoid, 3 lines long. In damp woods in the high mountains, Oregon to Alaska and Idaho.

7 EPIPACTIS R. Br. Ait. Hort. Kew. ed. 2, v, 201.

Tall herbs with fibrous roots, simple leafy stems and rather large flowers in terminal leafy-bracted racemes. Sepals and petals nearly equal: lip free, deeply concave at the base, without callosities, narrowly constricted and somewhat jointed in the middle, the upper portion petaloid. Column short, erect. Anther sessile behind the broad truncate stigma, on a slender jointed base, 2-celled, obtuse. Pollen-masses coarsely granular, becoming attached above to the gland capping the small rounded beak of the stigma.

E. gigantea Dougl. Hook. Fl. ii, 220, t. 202. Stem stout, leafy, 1-5 feet high, nearly smooth: leaves from ovate below to narrowly lanceolate above, 3-8 inches long, acute or acuminate, somewhat scabrous on the veins beneath: racemes pubescent: bracts large and foliaceous, lanceolate or linear-lanceolate, as long or longer than the flowers: pedicels slender, 2-4 lines long: sepals ovate-lanceolate, 6-8 lines long, the upper concave: petals slightly smaller: lip as long as the petals, the saccate base with erect wing-like margins, strongly nerved and the nerves callous tuberculate near the base, the dilated summit ovate-lanceolate, entire, somewhat wavy-crested: anther nearly 2 lines long: capsule oblong, 8 lines long, reflexed. In springy places along streams, California to Brit. Columbia.

8 CEPHALANTHERA Richard. Annot. 21.

Mostly leafy-stemmed herbs from creeping rootstocks, with flat leaves, or leafless, and middlesized flowers in bracted spikes. Sepals and petals nearly equal, connivent, the latter somewhat united and galeate. Lip free, concave, contracted and somewhat jointed in the middle. Column slender, elongated. Anther shortly stipitate, so as to be nearly or quite above the level of the top of the stigma. Pollen-masses not connected nor attached to a gland. Stigma wholly beakless.

C. Oregana Reichenb. f. Linnæ xii, 53. Whole plant white and without leaves, parasitic, 10-18 inches high, with 3-5 somewhat dilated sheaths below and usually a few free linear-lanceolate bracts above: raceme

rather short: floral bracts very small; flowers few to many, sessile or nearly so; perianth about 6 lines long, gibbous at base; sepals and petals oblong-lanceolate, nearly equal; lip a little shorter, the saccate base with broad wing-like margins, the nerves somewhat tuberculate-crested within, upper portion very broad and suborbicular, the nerves in the centre wavy-crested; column 2 lines long, about twice longer than the anther. In damp places in forests, California to Washington.

Tribe 4 Cypripediæ Lindl. Orch. 525. Stamens 3, the 2 lateral ones perfect, the other sterile and forming a dilated fleshy appendage above the terminal stigma. Pollen pulpy-granular.

9 CYPRIPEDIUM L. Sp. 951.

Glandular-pubescent herbs with coarse fibrous roots, flat many-nerved leaves with sheathing base and few large flowers in leafy-bracted racemes. Sepals spreading, the lateral often united into one under the lip; petals similar but usually narrower; lip an inflated sac, the incurved margin auricled near the base. Column very short, incurved, bearing at each side a 2-celled anther on a short filament. Stigma terminal, disk-like, broad and obscurely 3-lobed, covered above by the fleshy triangular and pedicelled sterile anther. Pollen pulpy-granular.

C. parviflorum Salisb. Trans. Linn. Soc. i, 77. Stems slender, 1-2 feet high, leafy: leaves oval or elliptic to lanceolate, 2-6 inches long; sepals and petals longer than the lip; petals usually twisted; lip 7-15 lines long, bright yellow, more or less marked with purple stripes, spots or blotches: sterile stamen triangular, yellow and purple spotted like the lip. In woods and thickets, Washington and Brit. Columbia to Newfoundland, Georgia and Missouri.

C. montanum Dougl. Lindl. Orch. 528. More or less roughly and glandular-pubescent, stout, 1-2 feet high, leafy: leaves ovate to broadly lanceolate, acuminate, 3-6 inches long; flowers 1-3, shortly-pedicelled: sepals and petals brownish, narrowly to linear-lanceolate, 18-30 lines long, the lower sepals united nearly to the apex; lip oblong, an inch long, dull-white veined with purple: sterile anther ovate-triangular to oblong-lanceolate, 4-6 lines long, on a slender filament, deeply channeled above, yellow with purple spots, somewhat longer than the stigma: capsule erect or nearly so, oblong, 10 lines long. In open woods, California to British Columbia and Idaho.

C. Californicum Gray Proc. Am. Acad. vii, 386. Rather rough pubescent: stems stout, 1-4 feet high leafy: leaves ovate-lanceolate, acute or acuminate, 3-6 inches long, the upper lanceolate and gradually reduced to foliaceous bracts of the long loose raceme: flowers 1-20, shortly pedicelled: sepals and petals greenish-yellow; sepals broadly oval, the lateral united to the apex, acute, 6-20 lines long, equalling the oblong-linear acutish petals; lip obovoid, white or light rose-color, veined with purple, 8-10 lines long, pubescent within at the base: sterile anther rounded and arching, nearly sessile, 2 lines long, equalling the roughened stigma: capsule reflexed, oblong, 8-15 lines long. Along streams and in springs, southern Oregon and northern California.

C. fasciculatum Kellogg in Herb. Watson Proc. Am. Acad. xvii, 380. Stems slender, 2-10 inches high, pubescent, scariously sheathed at base and bearing a pair of nearly opposite leaves near the middle, and a small lanceolate bract above: leaves ovate to nearly orbicular, 1-3 inches broad, obtuse or rounded to acutish, pale green and with 3 prominent ribs

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beneath: flowers solitary or several together in a small terminal cluster: sepals and petals lanceolate, acuminate, 6-12 lines long, greenish-brown, with brown veins, the lateral sepals wholly united or very nearly so; lip depressed-ovate, greenish-yellow with brown or purplish margins, 4-6 lines long: sterile anther oblong, obtuse, equaling the stigma. On dry open hillsides California to Washington.

ORDER XCIV IRIDACEÆ Lindl. Nat. Syst. ed. 2, 328.

Perennial herbs with equitant sheathing narrow leaves and few showy perfect flowers subtended by spathaceous bracts. Perianth of 6 segments or 6-lobed, its tube adnate to the ovary, the segments or lobes in 2 series, convolute in the bud, withering-persistent. Stamens 3, inserted on the base of the 3 outer segments or lobes of the perianth: filaments filiform, distinct or united: anthers 2-celled, extrorse. Style 3 cleft, its branches sometimes divided. Ovary inferior, mostly 3-celled, with numerous or few anatropous ovules in each cell becoming a 3-celled, loculicidally dehiscent capsule. Embryo straight in fleshy or horny albumen.

1 **Iris** Outer segments of the perianth recurved; the inner erect: branches of the style petal-like, opposite to the anthers: filaments distinct: seeds flattened.

2 **Sisyrinchium** Segments of the perianth similar, spreading: branches of the style filiform alternate with the anthers: filaments united: seeds globular.

1 IRIS L. Sp. 38.

Herbs with creeping or horizontal, often woody and sometimes tuber bearing, rootstocks, erect or ascending stems, ensiform or linear leaves and large flowers in terminal racemes. Perianth of 6 clawed segments united below into a tube, the 3 outer dilated, spreading or reflexed; the 3 inner usually narrower and erect. Stamens inserted at the base of the outer segments of the perianth, distinct: anthers oblong or linear. Style 3-parted, its base adnate to the tube of the perianth, its branches thin and petal-like, resting upon the outer segments of the perianth and covering the stamens, stigmatic at the thin apex, above which is a broad 2-parted crest. Ovules numerous, in 2 rows in each cell. Seeds horizontal, flattened, or more or less turgid.

* Stems leafy: leaves linear: bracts of the spathe closely approximate, foliaceous: tube of the perianth narrow, more or less elongated.

I. chrysophylla. Stems low and very slender, 2-8 inches high, from tender rootstocks: radical leaves linear, 6-18 inches long by 2-3 lines wide, light green, finely striate, thick and persistent for at least one winter: bracts lanceolate, long-acuminate, contiguous, 2-4 inches long: flowers 1-3, sessile or nearly so, yellow to white, with blue veins: perianth with filiform tube 2-3 inches long; outer segments 2-3 inches long, with long claw and broadly lanceolate blade, inner ones spatulate: filaments flat, bearded at base: capsule oblong or broader, nearly an inch long: seeds slightly compressed. In Pine woods, southern Oregon.

I. bracteata Watson Proc. Am. Acad. xx, 375. Stems rather stout, 6-12 inches high, covered with imbricated sheathing bracts 2-4 inches long; leaves solitary, evergreen, rigid 1-2 feet long, 6-8 lines wide, or sometimes much smaller, striate, one side green, the other glaucous with numerous stomata; bracts of the spathe approximate: 2-3 inches long, short-acuminate usually 2-flowered: perianth yellow, with a short funnelliform tube; outer segments oblong, naked, 2-3 inches long, the inner ones oblanceolate, somewhat shorter: capsule on exserted pedicels, ovate-oblong, an inch long. In open forests, about Waldo, southern Oregon.

I. Douglasiana Herbert, H. & A. Bot Beech. 395. Stems stout, 6-18 inches high; leaves linear, 12-30 inches long, 4-8 lines broad, thick and rather rigid; long acuminate, finely striate; bracts of the spathe lanceolate, 3-4 lines long, acuminate flowers several, somewhat paniced, on pedicels 6-18 lines long; perianth blue or purplish, the outer segments with a white centre veined with purple, its tube narrow, 6-12 lines long; capsule oblong, acutely triangular, 18-20 lines long; seeds nearly globular. Along the coast, southern Oregon to California.

* * Tube of the perianth short and funnelliform above the ovary.

Rootstock slender; stems leafy; leaves not evergreen; bracts foliaceous, separate and often distant.

I. tenuis Watson Proc. Am. Acad. xvii, 380. Rootstock very slender and creeping; stems 8-10 inches high, with 2 or 3 bract-like leaves 2-3 inches long, 2-flowered; the longer leaves of the sterile branches of the rootstock equalling the stem and 4-6 lines broad, acuminate and very acute: bracts contiguous or distant, 1-2 inches long, flowers white, lightly blotched and striped with pale yellow and purple; perianth tube 2-3 lines long, the segments naked, the outer 15 lines long, a little exceeding the emarginate inner ones: capsule depressed-globose, 6 lines in diameter, on pedicels as long or longer than the bracts. In the Cascade Mountains along the Clackamas river and its tributaries in Oregon.

I. tenax Dougl. Bot. Reg. t. 1218. Rootstock slender, usually short and forming dense tufts 6-18 inches in diameter; stems slender 6-12 inches high, bearing several sheath-like short leaves and a single purple flower: leaves very numerous, 12-20 inches long, much longer than the stems, about 2 lines broad acuminate and mostly very acute: bracts lanceolate, acute: 1-2 inches long: tube of the perianth very short, its outer segments 2 inches long or more, with oblong blade and broad claw, the inner ones spatulate and nearly as long; capsule oblong, 8-12 lines long, obtuse at both ends; seeds scarcely flattened, somewhat angled obtusely. Common in open places, Brit. Columbia to Oregon. There is a white flowered form with narrow perianth and narrower ovary but it has scarcely enough characters for a species.

+ + Rootstock stout; stems naked or nearly so, usually tall; bracts contiguous or rarely separated.

I. longipetala Herbert H. & A. Bot. Beech. 369. Stems stout, 1-1½ feet high, 3-5-flowered: leaves about as high, 3-5 lines broad; bracts foliaceous, large and acuminate, 3-4 inches long; flowers very large, bright lilac, on stout pedicels 1-2 inches long, the tube funnelliform, 3 lines long, outer segments 2½-3 inches long by 1-1¼ broad, narrowed to a short claw, white below and veined with violet, the midvein yellow; inner segments oblanceolate, 2 inches long; anthers shorter than the stigmas; style broadly crested; capsule oblong, narrowed at each end, 2 inches long; seeds flattened, nearly 3 lines long. In moist meadows, eastern Washington to California.

I. Missouriensis Nutt. Journ. Acad. Philad. vii, 58. Stems rather

slender, to 2-flowered bracts dilated pale blue, narrowed shorter, all or exceeding long, acute Washington

Perenn stems, minimal green spreading Stigmas 3-celled, or ovoid.

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slender, terete, naked or with 1 or 2 leaves, 6 inches to 2 feet high, usually 2-flowered; leaves two to three lines broad, mostly shorter than the stems: bracts dilated and scarious, 1-1½ inches long, acute or acuminate: flowers pale blue, on pedicels ½-2 inches long; tube of the perianth 3-4 lines long, narrowed below; outer segments 2-2½ inches long, the inner ones a little shorter, all with narrow claws: anthers not exceeding the filaments, equalling or exceeding the stigmas: capsule oblong, triangular or subterete, 1-2 inches long, acute at each end: seeds obovate, acute at base, 2 lines long. Eastern Washington to California and the Rocky Mountains.

2 SISYRINCHIUM L. Sp. 954.

Perennial herbs with short rootstocks, simple or branched stems, narrow grass-like leaves and showy flowers in small terminal clusters on filiform pedicels subtended by a pair of erect green bracts. Perianth 6-parted, the segments similar and spreading. Stamens 3, the filaments united, at least at base. Stigmas filiform, alternate with the stamens, involute. Ovary 3-celled, with several ovules in each cell. Capsule globose, oval or ovoid. Seeds subglobose or ovoid, smooth or pitted.

* Stems ancipital, usually branched: flowers blue: filaments united to the top: anthers short, sagittate: stigmas short.

S. bellum Watson Proc. Am. Acad. xii, 277. Stems 6-20 inches high, somewhat scabrous on the narrow margins, of a single node, or often with 2 or 3 nodes, each node bearing 1-4 peduncles: leaves a line or two wide, shorter than the stems: peduncles 2-4 inches long, usually about equaling the nodal bract: spathes of 2 nearly equal bracts 6-12 lines long, scabrous on the keel, 4-7-flowered: segments of the perianth broad-lanceolate, about 6 lines long, truncate but scarcely emarginate, shortly aristulate, light purple, darker below and yellow at base, somewhat pubescent as well as the ovary: staminal column 3 lines long, purplish, pubescent at base; capsule depressed-globose or ovoid, 2-3 lines long; the cells about 10-seeded: seeds irregularly and obtusely angled, roughened, ⅓ of a line in diameter. In wet places, Oregon to California.

S. segetum Bicknell Bull. Torr Bot. Club xxvi, 449. Rather pale green and somewhat glaucous, growing in close tufts: stems erect, slender, 4-11 inches high, simple: leaves 4-6 inches long, a line or less wide, sometimes roughish toward the setaceous or aculeate apex: spathes stiffly erect, the outer bract very slenderly attenuate, sometimes for fully half its length, 1-1½ inch long, subequal with or surpassing the inner one by ½ or more: flowers on very slender subspreading pedicels, deep violet-blue: segments of the perianth oblanceolate, obtuse aristulate, 6-7 lines long; capsule oblong or obovoid, transversely corrugated, many-seeded: seeds irregularly obovoid, less than a line long. On dry grassy plains, Washington and Oregon to Nevada.

S. angustifolium Mill. Gard. Dict. ed 7, 1859. Pale glaucous-green: stems slender 4-20 inches high, of a single node, or rarely forked: leaves rigid and often almost setaceous, 4-8 inches long, ¼-1¼ lines wide, shorter than the stem: spathes stiffly erect, the bracts very unequal, the outer one usually about twice as long as the inner: pedicels erect, about 8 lines long, shorter than the bracts: segments of the perianth oblanceolate, emarginate, 6-8 lines long, pale blue: capsule subglobose, 2-3 lines in diameter: seeds ½-¾ line in diameter. On grassy plains, Oregon to Brit. Columbia and Virginia.

Stems rather

S. occidentale Bicknell l. c. 447. Glaucous to pale glaucous-green, usually with a yellowish tinge: stems 7-12 inches high, stiff and erect, constricted just below the spathe: leaves firm and erect, very acute, much shorter than the stems, a line wide: spathes erect or slightly deflexed, the bracts often rather thin, the outer one mostly straight, the inner one more or less convex in outline; outer bract 1-2 inches long, longer than the inner one, attenuate, acute, hyaline-margined below: flowers 3-6, deep violet-blue, on erect exserted pedicels: capsule subglobose, about 3 lines high. Idaho to Nevada and N. Dakota.

S. septentrionale Bicknell l. c. 452. Pale and glaucous: stems 5-12 inches high growing in small tufts: leaves 5-8 inches long, stiff and erect, less than a line wide, mostly setaceous: spathes small, often partly double, one or more flowers arising from between the short proper spathes and the closely subtending slenderly prolonged outer bract; inner bract 10-12 lines long, mostly attenuate and acute; the outer bract 1-2 inches long: flowers very small, apparently not more than 3 or 4, on erect pedicels usually shorter than the inner bract: segments of the perianth 3-5 lines long, acuminate and short-aristate, not retuse, pale rose or violet: capsule subglobose, 2-3 lines long. Eastern Washington and Idaho to Assiniboia.

S. Idahoense Bicknell l. c. 445. Pale-green and glaucous: stems 10-18 inches high straight and erect, or somewhat flexuously curved, often twisted, mostly simple: leaves 5-15 inches high, varying from thin and somewhat lax to firm and closely erect, 1-2 lines wide, attenuate to somewhat abruptly acute: spathes often deflexed, long and narrow, the keel of one or both often serrulate or hispidulous; outer one $1\frac{1}{2}$ -3 inches long, commonly $\frac{1}{4}$ - $\frac{1}{2}$ longer than the inner one: flowers 3-6, on erect pedicels, deep violet-blue with rather small yellow eye: segments of the perianth 7-10 lines long: ovary glandular-puberulent: capsule globose or ovoid, 2-3 lines high. Washington to Idaho and California.

S. sarmentosa Suksdorf in Herb. Greene Eryth. iii, 121. Dull green and glaucous, growing in dense tufts: stems very slender, erect or ascending, 6-10 inches high, simple or with a leaf and branch or a tuft of leaves and branches near the top: leaves very narrow, equalling or shorter than the stems, attenuate, acute: spathes erect, the bracts very unequal, the outer one $1\frac{1}{2}$ -3 inches long, acuminate, rather abruptly acute, the inner one 6-18 lines long: flowers 1-3, bright blue: segments of the perianth 4-5 lines long, not emarginate but abruptly contracted into the short aristate tip: capsule thin-walled, subglobose, 2-3 lines high. Borders of wet meadows, Skamania Co. Washington.

* * Scapes with a solitary sessile spathe: filaments united only at base: anthers linear, sagittate.

+ Scapes 2-edged: flowers yellow: style very deeply cleft.

S. Californicum Ait. f. Hort Kew. iv, 135. Scapes broadly winged, 6-15 inches high: leaves much shorter than the scapes, 2-3 lines wide: bracts of the spathe more or less unequal, the longer about equalling the pedicels: flowers 3-7, bright yellow; segments of the perianth 4-6 lines long, 5-7-nerved, obtuse or acutish: anthers $1\frac{1}{2}$ lines long, about equalling the filaments: style cleft to below the middle, the linear branches as long as the anthers: capsule obovate-oblong, 4 lines long: seeds half a line in diameter. Along the coast, Vancouver Island to California, in various forms.

+ + Scapes compressed but not margined: flowers large, purple: style cleft at the apex.

S. grandiflorum Dougl. Lindl. Bot. Reg. xvi, t. 1364. Glabrous and bright green: scapes slender, 4-12 inches high, growing in dense tufts or

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solitary, leafy at base: leaves linear, 2-6 inches long, 1-2 lines wide: spathes 1-4-flowered, its bracts broad, very unequal, the outer 2-3 inches long, long-acuminate, inner one about an inch long, acute or short-acuminate, scarious-margined: flowers bright reddish-purple to white: segments of the perianth 6-10 lines long, cuneate-oblong, abruptly acute and often shortly acuminate: filaments broad at base, 3-6 lines long, much shorter than the style; anthers 2 lines long: capsule obovoid, 2-3 lines high. Common in moist places in the interior, California to Brit. Columbia.

ORDER XCV SMILACEÆ Vent. Tabl. ii, 146. (1799)

Shrubby or herbaceous climbing plants with alternate net-veined petioled leaves that develop stipular persistent tendrils by which the stem is secured to shrubs, and small dioecious flowers in axillary umbels. Perianth-segments 6, similar. Stamens mostly 6, distinct; filaments ligulate; anthers attached by the base, 2-celled, introrse. Ovary 3-celled, the cells opposite the inner segments of the perianth. Ovules 1 or 2 in each cell, orthotropous, suspended. Style very short or none: stigmas 1-3. Fruit a globose berry containing 1-6 seeds. Embryo small, in copious horny albumen.

1 SMILAX L. Sp. 1028.

Climbing plants with broad leaves and small greenish flowers in axillary umbels. Rootsock usually very large and tuberous. Flowers regular, perianth-segments distinct, deciduous, with the anthers inserted on their bases. Staminate flowers without an ovary: the pistillate usually with 1-6 abortive stamens. Embryo lying under a tubercle at the upper end of the seed.

S. Californica Gray in Herb. Watson Bot. Cal. ii, 186. Glabrous: stems woody, 4-20 feet long, terete or somewhat angled, naked or covered with weak spreading prickles: leaves broadly ovate, abruptly acute, somewhat cordate at base, 1½-4 inches long, thin and deciduous, roughish on the margins, on petioles about an inch long peduncles slender, flat, 2-3 times longer than the petioles: flowers 20 or less: segments of the perianth 4-9, green narrowly oblong, 5 lines long: fruit black, 2 lines in diameter. In thickets along streams, southern Oregon and northern California.

ORDER XCVI LILIACEÆ Adans. Fam. Pl. 42. (1763)

Scapose or leafy-stemmed plants from bulbs or rarely from rootstocks with various leaves and regular mostly perfect usually showy flowers mostly in umbels or racemes. Perianth parted into 6 distinct or nearly distinct segments, or these more or less united into a tube, inferior or partly superior. Stamens 6, hypogynous or borne on the perianth at the base of its segments: anthers 2-celled, mostly introrse. Ovary 3-celled, with few or numerous anatropous or amphitropous ovules in each cell. Style united: stigma 3-lobed or capitate. Fruit a loculicidal or septicidal capsule. Seeds various, winged or wingless. Embryo in copious albumen.

I Flowers with scarious bracts, a persistent perianth with

1-several-nerved segments, perigynous stamens with introrse anthers and an undivided mostly persistent style.

* Inflorescence umbellate upon a naked scape from a bulb or corm: fruit a loculicidal capsule: seeds more or less turgid, with close black testa.

+ Bulb mostly tunicated: bracts broad and spathaceous.

1 **Allium** Pedicels not jointed: perianth deeply parted; segments 1-nerved: filaments naked, in 1 row: style filiform, jointed upon the very short axis, seeds 1 or 2 in each cell.

+ + Root a coated corm: bracts several, distinct: capsule scarcely lobed, several-seeded.

2 **Brodiaea** Perianth funnelliform, not contracted at the throat nor saccate at base: stamens 6, in 1 or 2 rows, with winged or naked filaments, or 3 and alternate with as many staminodia.

3 **Brevoortia** Perianth deep scarlet with short yellowish lobes, the broad tube 6-saccate at base: stamens 3, with alternate broad truncate staminodia.

* * Flowers on subterranean pedicels, in a sessile umbel with long linear scarious bracts, upon a short rootstock: capsule loculicidal: seeds more or less turgid, with close black testa.

4 **Leucocrinum** Perianth white, salverform, with very narrow tube and several-nerved segments: stamens 6, in 1 row: leaves linear, flat.

* * * Root a bulb or corm: inflorescence racemous or paniculate: fruit a loculicidal capsule.

+ Flowers rather large, on jointed pedicels in a simple open raceme: segments several-nerved: capsule obovate or oblong: seeds black, several in each cell.

5 **Camassia** Scapes naked: flowers blue to white; segments distinct, spreading: seeds several, ovate, angled.

+ + Flowers small, racemes paniced: capsule triangular-obovate: cells 1-2-seeded.

6 **Hastingsia** Stems sparingly leafy, from tunicated bulbs: flowers white or greenish, numerous: perianth lax, scarious, the segments apparently 1-nerved: style short.

7 **Chlorogalum** Stem leafy, from a tunicated bulb: flowers white or pinkish, scattered; segments distinctly 3-nerved: style long.

II Pedicels not jointed. Floral bracts none or foliaceous. Flowers with distinct netted-veined and deciduous segments, hypogynous stamens with more or less extrorse anthers and usually deciduous styles united at least at base.

* Perianth-segments similar, naked: styles long.

+ Bulb scaly: stem simple, strict leafy and leafy-bracteate: anthers versatile: seeds flat, horizontal.

8 **Lilium** Bulb-scales lanceolate: segments of the perianth oblanceolate, with a linear nectariferous groove, usually spotted: style undivided.

9 **Fritillaria** Bulb-scales short, very thick: segments of the perianth lanceolate or broader, concave, often mottled; nectary a shallow pit: styles united, or distinct to the middle.

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Perenn lanceolate simple un linear mo gibbous at or united the base of oblong, v with a ver each cell, small. Ca obovoid an

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+ + Stem simple, low, from a small tunicated bulb: leaves linear, without veinlets: anthers attached by the base: seeds flat.

- 10 *Lloydia* Stem sparingly leafy, bearing a solitary flower with spreading persistent 3-nerved equal segments.

+ + + Stem low, 2-leaved, from an oblong corm: anthers attached by the base: seeds turgid.

- 11 *Erythronium* Leaves broad: perianth-segments oblanceolate, callous-toothed each side of the grooved nectary.

* * Outer segments of the perianth smaller, somewhat sepal-like; the inner broad and usually bearded: stigmas sessile.

- 12 *Calochortus* Stem usually lax or flexuous, from a coated corm: anthers attached by the base: capsule usually septical.

1 ALLIUM L. Sp. 294,

Perennial herbs mostly with tunicated bulbs, a peculiar odor, lanceolate or linear leaves and rather small flowers in a terminal simple umbel. Perianth of 6 nearly equal distinct lanceolate to linear more or less spreading 1-nerved segments that are often gibbous at base, and subtended by 2 or 3 membranous separate or united bracts. Pedicels not jointed. Stamens 6 inserted on the base of the segments: filaments filiform: anthers mostly ovate-oblong: versatile. Ovary sessile, subglobose, deeply 3-lobed with a very short axis: ovules mostly 2, 1-several, at the base of each cell, ascending: style filiform, jointed on the axis: stigmas small. Capsule obtusely 3-lobed, loculicidally dehiscent. Seeds obovoid and wrinkled, with thin black testa.

§ I Bulbs cespitose, narrowly oblong and crowning a more or less persistent rhizome, coats membranaceous without peculiar reticulation: spathes mostly 2-valved: scapes terete.

* Leaves terete and hollow.

A. *Schönoprasum* L. Sp. 301. Scapes stout, 1-2 feet high, from oblong bulbs: umbel subcapitate, densely many-flowered, erect: spathe 2-valved, its bracts broadly ovate: pedicels 1-3 lines long: flowers, rose-color, longer than the pedicels: segments of the perianth 4-6 lines long, lanceolate, acuminate: stamens included: filaments subulate: ovules 2 in each cell: capsule obtusely 3-lobed, about half as long as the perianth, not crested. Along rivers in moist or wet soil from the Columbia river to Alaska and the Great Lakes: also in Europe and Asia.

* * Leaves flat or channeled.

A. *cernuum* Roth. Roem. Arch. i, part 3, 40. Bulbs usually clustered on a short rootstock, narrowly ovoid, with a long neck, 1-2 inches long: scapes slender, slightly rigid, 6-20 inches high: leaves linear, channeled, or nearly flat, 1-4 lines broad, often equalling the scape: umbel loosely many-flowered, nodding: spathe 2-valved, the bracts lanceolate or shorter, deciduous: pedicels filiform, 8-15 lines long: flowers rose color to white, the segments 2-3 lines long, broad and acutish: stamens and style exerted: filaments filiform: ovules 2 in each cell: capsule 3-lobed shorter than the perianth, with 2 crests on the summit of each valve. On rocky banks and bluffs along streams, Oregon to Brit. Columbia and the Alleghany Mts.

A. *validum* Watson Bot. King 350. Scapes very stout, 1-2½ feet

high from a stout rhizome; leaves ample, 2-8 lines broad, often nearly as long as the scape: umbel often slightly nodding, with 2-4 bracts, densely many-flowered; pedicels rather stout, 4-8 lines long; flowers rose-color to nearly white; segments 3-4 lines long, narrowly acuminate: stamens and style usually exserted: capsule subglobose, not crested. In wet places in the mountains, Oregon to California and Nevada.

§ 2 Bulbs globose to ovoid, mostly solitary, not rhizomatous; coats fibrous or membranaceous. Leaves narrowly linear, flat or channeled. Scapes terete or nearly so. Umbels erect.

* Bulb-coats more or less fibrous: leaves several.

A. Geyeri Watson Proc. Am. Acad. xiv, 227. Scape slender, 10-25 inches high: bulb elongated: leaves 2-4, slender, 5-10 inches long, rather rigidly erect: spathe 2-valved; the bracts broadly lanceolate, acuminate, 6-10 inches long: umbel densely many-flowered: pedicels slender, 6-12 lines long, spreading or reflexed: segments of the perianth pale rose-color to white, about 4 lines long, lanceolate, acute or acuminate, strongly nerved, rigid in fruit, sometimes but little exceeding the stamens: capsule crested. In low meadows, Oregon and Washington to Idaho.

** Bulb-coats not fibrous: leaves 2-4, shorter than or about equaling the scape.

A. Douglasii Hook. Fl. ii, 184. Scape stout, 7-15 inches high: bulb ovate, about an inch long, the coats not reticulated: leaves 2, flat, 5-10 inches long, about 6 lines wide: flowers very numerous, in a dense globose umbel dark red, 3-4 lines long: segments lanceolate acuminate, scarcely exceeding the stamens ovary not at all crested. Eastern Washington.

A. madidum Watson l. c. 228. Scapes rather stout, 4-8 inches high: bulbs ovoid, 4-8 lines in diameter: leaves 2, thick and channeled, 3-6 inches long, 1-3 lines broad: spathe 2-valved, the bracts ovate to lanceolate, acute, 4-5 lines long: umbel usually many-flowered: pedicels 4-12 lines long, segments of the perianth pink to white, 4 lines long, ovate-oblong, acute, a little exceeding the stamens: cells of the ovary with two fleshy ridges at the summit. In wet places, eastern Oregon and Washington.

A. collinum Dougl. in Herb. I have no specimens of this, it is poorly described as follows. "Perianth-segments ovate-lanceolate, acute, 4 lines long, twice longer than the slender stamens and style: capsule very obscurely ridged toward the summit". Blue Mountains, Oregon.

A. scilloides Dougl. in Herb. This is equally obscure with the last. "Perianth-segments oblong-lanceolate obtuse, 3 lines long, a half longer than the stamens: ovary not at all crested. Priest's Rapids, Columbia river.

A. acuminatum Watson l. c. 196. Scape 3-10 inches high: bulb globose, 3-5 lines in diameter: leaves 2, terete, shorter than the scape: spathe 2-valved: bracts lanceolate, narrowly acuminate: pedicels 5-40, erect or ascending: segments of the perianth 5-7 lines long, lanceolate with acuminate recurved tips, dark rose-color to nearly white, rigid in fruit, a third longer than the stamens, the inner ones undulate-serrulate: capsule obscurely crested. Common on dry plains, Brit. Columbia to California.

Var. cuspidatum Fernald. "Perianth-segments smaller, abruptly cuspidate. Near Wawawai, Washington."

A. Bolanderi Watson l. c. 229. Scape very slender, 3-10 inches high: bulbs oblong, propagating by filiform runners; the one producing the scape remaining firm until the following season but not flowering again, but producing a new bulb that flowers the following season: leaves terete,

almost filiform, late, long a erect or asc long; the se twice as lon filiform, ad

A. attenuatum slender, 6-8-4, narrow spathe 2-valved, flowered: pedicels of the perianth shortly acuminate: stamens: capsule along bluffs,

A. serratum conspicuously 4 inches high: and often larger, 4-9 lines exceeding the to California

A. Nevillii ovoid, 3-6 lines long or exceeding abruptly acuminate: pedicels of the perianth white, 4 lines long, exceeding the side near the

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A. macrocarpum round-ovate, long, 1-2 lines acuminate, 5-6 that recurved, acuminate, about the ovary Blue Mountains

A. trilobatum 4 inches high: somewhat flattened bracts broadly acuminate, segments of the perianth about 4 lines long: the stamens: capsule Oregon to California

§ 3 Bulbs mostly with the coats fibrous, lanceolate, thick, the inner margin of the perianth 2-valved

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A. attenuifolium Kellogg Proc. Calif. Acad. 110, f. 34. Scape rather slender, 6-20 inches high: bulb globular, 3-5 lines in diameter: leaves 2-4, narrow and becoming convolute-filiform above the sheathing base: spathe 2-valved; the bracts short and abruptly acute: umbel densely many-flowered: pedicels filiform, 8-15 lines long, spreading or recurved: segments of the perianth pale rose-color to white, oblong-ovate to broadly lanceolate, shortly acuminate, about 4 lines long, usually inflexed, exceeding the stamens: capsule globose, distinctly 6-crested. In moist or wet places along bluffs, usually growing in dense masses, western Oregon to California.

A. serratum Watson Bot. King 487, t. 37, fig. 4. "Bulb-coats conspicuously transversely serrate-reticulate; scapes usually slender, 4-12 inches high; leaves very narrowly linear; umbel usually many-flowered and often large, the spreading pedicels 9-15 lines long; sepals pink or crimson, 4-9 lines long, usually broad and acuminate, erect or recurved, exceeding the stamens; capsule slightly crested.—Quite variable." Idaho to California.

A. Nevii Watson l. c. 231. Scape slender, 3-8 inches high: bulb ovoid, 3-6 lines long: leaves two, channeled, less than a line wide, equaling or exceeding the scape: spathe 2-valved; the bracts ovate, rather abruptly acuminate, 4-6 lines long: umbel rather loosely few-several-flowered: pedicels slender, 4-8 lines long, erect or ascending, segments of the perianth white to rose-color, ovate-lanceolate, long-acuminate, about 3 lines long, somewhat keeled, the midnerve dark red, but little if at all exceeding the stamens: capsule depressed-globose, with a thick crest on each side near the summit of each cell. On top of high hills, eastern Oregon.

* * * Leaves one or two, greatly exceeding the short scape: capsule not crested or very obscurely so.

A. macrum Watson l. c. 233. Scape 1-4 inches high, slender: bulb round-ovate, 3-5 lines in diameter: leaves two, slightly falcate 3-6 inches long, 1-2 lines wide: spathe two-valved; the bracts lanceolate, abruptly acuminate, 5-8 lines long: pedicels slender 4-8 lines long, erect to somewhat recurved: segments of the perianth white to pinkish, lanceolate, acuminate, about 3 lines long, scarcely exceeding the stamens and style: cells of the ovary bordered by a thick obtuse ridge. In moist places in the Blue Mountains of Oregon and Washington.

A. tribracteatum Torr. Pac. R. Rep. iv, 148. Scape slender, 1-4 inches high: bulb ovoid to oblong, 4-8 lines long: leaves usually two, somewhat falcate, 5-6 inches long, $\frac{1}{2}$ -3 lines wide: spathe 3-valved; the bracts broadly ovate to almost orbicular, abruptly acuminate: umbel densely many-flowered: pedicels 4-6 lines long erect or ascending: segments of the perianth oblong or almost linear, obtuse or barely acute, about 4 lines long, deep rose-color with darker veins, but little longer than the stamens: capsule not crested. On top of Table Rock, Jackson County Oregon to California and Utah,

§ 3 Bulbs ovoid, not rhizomatous, the membranaceous coats mostly without reticulation. Leaves 2, broadly linear, flat and falcate, thick. Scapes stout, much compressed and more or less wing-margined, low and mostly shorter than the leaves. Spathe 2-valved.

A. Watsoni. Scape slender, 2-3 inches high, narrowly margined: bulb ovoid, 4-6 lines in diameter: leaves 4-6 inches long, about 2 lines wide: bracts of the spathe lanceolate to ovate, acuminate, about 6 lines long: umbel rather loosely several- to many-flowered: pedicels erect or ascending, 4-8 lines long: segments of the perianth lanceolate, acute, 3-4 lines long, light rose-color to pink, with dark mid-nerves, slightly exceeding the stamens. In open places in the Coast Mountains of middle Oregon. Dedicated to the late Sereno Watson, who in 1881 recognized it as an undescribed species but did not publish it for want of good material. Specimens from the Blue mountains of Oregon appear to be of this species.

A. Cusickii Watson Proc. Am. Acad. xiv, 228. Scape 3-4 inches high: bulb ovoid, 5-6 lines in diameter: leaves falcate, 4-6 inches long, 2-4 lines wide: bracts of the spathe ovate, acuminate, 6-8 lines long: pedicels slender, 8-12 lines long: segments of the perianth broad lanceolate, gradually acuminate, 5-6 lines long, nearly white to pink, distinctly gibbous at base nearly twice as long as the stamens: cells of the ovary shortly apiculate. Union County, Oregon.

A. falcifolium H. & A. Bot. Beech. 400. Scape stout, prominently winged, 2-6 inches high: leaves narrowly lanceolate, 2-6 inches long, 4-6 lines wide, strongly falcate: bracts of the spathe broadly lanceolate to ovate, gradually acuminate, 6-8 lines long: umbel loosely many-flowered: pedicels rather stout, 6-18 lines long, erect or ascending: segments of the perianth with broadly lanceolate base and long attenuate somewhat spreading tips, rose-color to pink, gibbous at base, minutely serrulate, 7-8 lines long, nearly twice as long as the stamens: capsule acute, with 3 short narrow central crests. On dry rocky ridges, southern Oregon to California.

A. anceps Kellogg Proc. Am. Acad. ii, 109, fig. 32. Scapes 2-4 inches high, somewhat flattened and margined: leaves longer than the scape, 2-5 lines wide: umbel rather densely many-flowered: pedicels very slender, 6-9 lines long, erect or spreading: segments of the perianth very narrowly lanceolate, acuminate, lax, scarcely gibbous at base, nearly white with purple midveins, 3-5 lines long, little longer than the stamens and style: cells of the capsule with two broad obtuse crests. Eastern Oregon to Nevada and California.

A. pleianthum Watson l. c. 233. Scape slender, 3-5 inches high: leaves falcate, 5-7 inches long, 2-5 lines wide: bracts of the spathe broadly ovate, acute and shortly acuminate: umbel rather loosely many-flowered: pedicels slender, 8-15 lines long, erect or ascending: segments of the perianth lanceolate, acuminate, gibbous at base, white to light rose-color, about 5 lines long, nearly twice as long as the stamens: ovary and capsule prominently 6-crested. On high hills in the John Day Valley, eastern Oregon.

A. crenulatum Wiegand Bull. Torr. Bot. Club xxvii, 135. Scape 2-3 inches high, the wings crenulately roughened: leaves 2-3 inches long, about a line wide, recurved, the margins crenulate: bracts of the spathe ovate-oblong, acute, about 5 lines long: umbel few-flowered: pedicels shorter than the flowers: segments of the perianth pink, lanceolate, acutish, 4 lines long, twice as long as the stamens: ovary 6-crested at the summit. In loose ground near the summit of the Olympic Mountains, Washington.

A. Tolmiei Baker Bot. Mag. under t. 6227. Scapes 3-5 inches high, conspicuously winged, smooth: leaves falcate, 4-6 inches long by 3-4 lines wide: bracts of the spathe broadly ovate, abruptly acuminate, 6-8 lines long: umbel rather densely few- to many-flowered: pedicels slender, 5-8 lines long, erect or spreading: segments of the perianth light rose-color to white, lanceolate, acute, about 5 lines long twice as long as the stamens: ovary very obscurely crested. On rocky ridges, eastern Oregon and Washington to Utah.

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A. simillimum Henderson Bull. Torr. Bot. Club xxvii, 355. Scape 1-2 inches high from the ovoid bulb, slender, flattened and very narrowly winged: leaves 4-5 inches long, less than a line wide, falcate to recurved: bracts of the spathe broadly ovate, acute or acutish: umbel 6-9-flowered: pedicels slender, 1-2 lines long: segments of the perianth narrowly oblong, obtuse, delicately denticulate with spreading papillae half way up, pinkish-white with strong green midnerve, $\frac{1}{2}$ - $\frac{1}{2}$ longer than the stamens: filaments dilated at base and adnate for $\frac{1}{2}$ their length: ovary slightly crested. On Seeseh Peak, Idaho.

2 BRODIAEA Smith Trans. Linn. Soc. x, 2. Including HOOKERA Salisb. and TRITELIA Lindl.

Perennial herbs with slender scapes from fibromembranaceous-crested corms bearing a several-bracted umbel of few to many blue, purple, white, or yellow flowers on jointed pedicels. Perianth persistent, funnelform, often narrowly so, not contracted at the throat nor saccate, or but slightly so, at base. Segments of the perianth one-nerved. Stamens 3, inserted on the throat opposite the inner segments and alternate with as many staminodia, or six in one or two rows with the filaments naked or appendaged. Style persistent, about equalling the anthers, with short diverging entire stigmas. Ovary three-celled, with 3-8 ovules in each cell. Capsule ovate to oblong, more or less attenuate above. Seeds angled, black.

§ 1 EUBRODIAEA Watson Proc. Am. Acad. xiv, 236. Perianth broadly funnelform, the tube mostly shorter than the limb. Stamens in one row. Anthers attached by the base.

* Segments of the perianth 2-3 times longer than the tube: stamens 3, alternate with as many staminodia.

B. grandiflora Smith Trans. Linn. Soc. x, 2. Scape smooth, 3-10 inches high: leaves about a line broad, thick and somewhat terete, about as long as the stem: pedicels 1-10 or more, $\frac{1}{2}$ -3 inches long: perianth varying from purple to light rose-color, 10-20 lines long: segments of the perianth linear-oblong, obtuse or acutish, strongly 1-nerved: filaments rather slender, 1-2 lines long, the anthers twice as long: staminodia ligulate, entire, obtuse, whitish about equalling the anthers: capsule sessile, narrowed at base, oblong, attenuate into the short rigid style; cells 6-8-seeded: seeds a line long. Common in open places, California to British Columbia.

B. minor Watson Proc. Am. Acad. xiv, 236. Scapes very slender, 3-6 inches high, smooth, bearing an umbel of 2-6 rays an inch or two long: perianth 7-14 lines long; anthers oblong, 2 lines long shorter than the broadly ligulate usually emarginate staminodia: capsule obovoid, sessile or nearly so, 3 lines long, acute, the cells 3-seeded: seeds a line long. Oregon to California.

B. congesta Smith l. c. 2, t. 1. Scapes slender, 2-4 feet high, smooth: leaves carinate, glaucous, 6-18 inches long, 4-9 lines wide: umbel densely few- to many flowered, often produced into a short dense raceme: pedicels 1-3 lines long: perianth 8-10 lines long, bluish-purple, the oblong lanceolate segments twice as long as the tube: anthers very nearly sessile, deeply emarginate at each end, 2-3 lines long: staminodia deeply cleft, exceeding the anthers: capsule sessile, ovate, 6 lines long including the short thick style: cells several-ovuled, usually 1-seeded: seed 2 lines long. Common

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B. multiflora Benth. Pl. Hartw. 339. Scape 1-2 feet high, somewhat scabrous: umbel not produced; staminodia entire, broad and obtuse, about equalling the anthers: seeds several in each cell. From the Sacramento valley to Oregon.

* * Flowers subcapitate; the segments little longer than the tube, stamens 6, the inner with a free lanceolate appendage on each side; the outer ones naked.

B. capitata Benth. l. c. Scapes 1-2 feet high: leaves a foot long or more, sometimes longer than the scape, 2-10 lines wide, carinate, usually glaucous: flowers few to many, nearly sessile or on pedicels 2-6 lines long: perianth rather broadly funnelform. 6-10 lines long, from blue or purple to white: inner anthers nearly sessile, linear, 2 lines long, slightly shorter than the oblong-lanceolate appendages; the outer smaller, on short naked filaments broadly dilated at base: capsule ovoid, sessile, about 3 lines long, beaked by the slender style nearly as long: seeds several in each cell, 2 lines long. On dry open ridges, southern Oregon to California.]

§ 2 TRITELIA Lindl. Bot. Reg. as genus. Segments of the perianth equalling or shorter than the tube. Stamens in 2 rows, with more or less distinctly versatile anthers. Capsule stipitate.

B. Douglasii Watson l. c. *Tritelia grandiflora* Lindl. Scape 1-3 feet high, smooth, erect and usually stout: leaves 15-18 inches long, 2-8 line wide, carinate: umbel subcapitate, usually many flowered: pedicels 1-1½ lines long: perianth 8-12 lines long, dark blue; the tube subsaccate at base, about as long as the ovate obtuse lobes: anthers oblong, a line long, the lower 3 inserted on the throat opposite the outer segments attached near the base and erect on very short filaments; the upper 3 inserted on the inner segments, attached near the middle and versatile on short free filaments which form below prominent wings within the tube: style slender, about 3 lines long: capsule ovoid, about 4 lines long, on a stipe nearly as long: seeds several in each cell. On sandy plains, eastern Oregon and Washington to Wyoming and Utah.

B. Howellii Watson l. c. 301. Scape 1-3 feet high: leaves 8-12 inches long, 1-4 lines broad: umbel usually few-flowered subcapitate: flowers white with light blue base to light blue, 8-10 lines long; the broad tube longer than the oblong-ovate obtuse lobes: stamens in 2 rows, the lower inserted on the throat opposite the 3 outer segments, on very short deltoid filaments, the upper inserted at the base of the inner segments, with broadly winged filaments about 2 lines long; anthers all attached near the middle, nearly 2 lines long: capsule oblong, attenuate upward into the style, the cells about 6-seeded. On dry plains, eastern Washington and Oregon near the base of the Cascade Mountains.

§ 3 CALLIPRORA Stamens in 1 row, with deltoid or wing-dilated filaments and versatile anthers. Capsule stipitate.

B. lactea Watson l. c. 235. Scape usually slender, 1-3 feet high, smooth or scabrous: leaves 6-8 inches long 2-6 lines wide: umbel subcapitate, few- to many-flowered: pedicels ½-2 inches long: perianth white with green mid-nerve, 4-8 lines long, the short and broad tube not half as long as the oblong obtuse segments: stamens in one row, inserted on the base of the segments, with broad deltoid filaments and short anthers attached a little below the middle: style slender, 3-4 lines long: capsule subglobose, on a stipe 1-2 lines long. Common in wet places and moist meadows, California to Brit. Columbia and Idaho.

B. Bridgesii Watson l. c. 237 Scape slender, 6-18 inches high: leaves

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6-8 inches long, 2-3 lines wide, usually falcate: pedicels 10-20, $\frac{1}{2}$ -2 inches long: perianth blue or purplish to nearly white, 12-15 lines long, the tube very narrow and longer than the segments: stamens inserted on the throat; the nearly equal filaments dilated downward, the free portion 1-2 lines long: anthers linear, 2 lines long: capsule ovoid, 4 lines long, shorter than the stipe, beaked by the very slender style: seeds 2-3 in each cell, $1\frac{1}{2}$ lines long. On dry ridges in the Coast Mountains, southern Oregon to California.

B. Hendersoni Watson Proc. Am. Acad. xxiii, 266. Scapes 6-18 inches high, smooth: leaves as long or longer than the scape, 2-6 lines wide: umbel subcapitate, few- to many-flowered: pedicels slender, 1-2 inches long: perianth an inch long, yellow with blue mid veins, the funnelliform tube nearly as long as the lanceolate segments: stamens inserted at the base of the tube, the filaments adnate to it and winged below, the free portion slender and half as long as the segments: anthers small, oblong, attached near the base: ovary subglobose, on a stipe as long as the tube of the perianth, beaked by the slender style. On dry ridges, southern Oregon.

3 BREVOORTIA Wood Proc. Philad. Acad. 1867, 82.

Scapose herbs from coated corms, with all radical leaves and showy flowers on jointed pedicels in subcapitate umbels. Perianth persistent, broadly tubular, shortly 6-saccate at the truncate base, slightly constricted above, the short segments usually erect, faintly one-nerved. Stamens 3, inserted on the throat opposite the inner segments, alternate with 3 very broad truncate coronalike staminodia: filaments very short, naked: anthers attached by the base, emarginate at each end. Ovary stipitate, with elongated persistent style: cells 4-6-ovuled. Capsule triangular-ovate, acuminate. Seeds angled, black.

B. Ida-Mata Wood l. c. Scape slender, 1-3 feet high: leaves 1-2 feet long or more, 2-4 lines wide carinate, glaucous: umbel 6-15-flowered: pedicels 6-12 lines long or more: perianth 1-1 $\frac{1}{2}$ inches long, dark red, the segments ovate, 2-3 lines long, bordered with greenish yellow: anthers oblong, equalling the segments; staminodia a half shorter, yellow: capsule on a stipe 2-3 lines long, ovate-oblong, attenuate upward into the somewhat persistent style: seeds 2 lines long. Along the coast and in the mountains, southern Oregon to California.

4 LEUCOCRINUM Nutt. Gray Lyc. N. Y. 110. (1837.)

Low acaulescent herbs with short rootstocks, narrow leaves surrounded at base by scarious bracts, and a central sessile umbel of white flowers, the pedicels and ovaries underground, sheathed by the floral bracts. Perianth salverform, persistent, the segments several-nerved. Stamens 6: filaments filiform, inserted below the throat: anthers linear, attached near the base, introrse. Ovary sessile, ovate-oblong: style persistent, elongated and filiform-tubular, the orifice somewhat enlarged and slightly 3-lobed: ovules several in each cell. Capsule triangular-obovate subcoriaceous loculicidally dehiscent. Seeds obovate, strongly angled, with a dull black testa.

L. montanum Nutt. in herb. Gray l. c. Leaves 8-15, flat and rather thick, 4-8 inches long, 1-3 lines wide, the underground portion 1-3 inches long, broad, surrounded by scarious acutish bracts; inner bracts very narrow: flowers 4-8, on pedicels 6-18 lines long from the summit of the

rhizome: tube of the perianth 1-3 inches long; segments 6-9 lines long; anthers 2-3 lines long; capsule somewhat wrinkled, truncate above 3-4 lines long; seeds 4-6 in each cell. In mountain valleys, eastern Oregon to California, Nebraska and Dakota.

5 CAMASSIA Lindl. Bot. Reg. t. 1486. (1832.)

Perennial herbs with scapose stems from tunicated bulbs, flat leaves and rather large blue to white flowers in simple bracted racemes on jointed pedicels. Perianth of 6 distinct 3-7-nerved persistent segments. Stamens 6, inserted on the base of the perianth, shorter than its segments; filaments filiform-subulate; anthers introrse, versatile. Ovary sessile, with several ovules in each cell. Style filiform, slightly 3-lobed at the apex, the base persistent. Capsule 3-lobed and angled, thick-membranaceous, loculicidally 3-valved. Seeds several in each cell, often more or less compressed or angled, with thin black testa.

C. esculenta Lindl. l. c. Scape rather stout, 1-2½ feet high, from an ovoid bulb ½-1½ inches in diameter; leaves 10-12 inches long, 3-8 lines wide, usually attenuate above and nearly as long as the scape; bracts subulate, 1-2 inches long, acuminate; pedicels shorter than the bracts; perianth somewhat oblique, one of the outer segments turning downward, all of the others upward, dark to light blue, the outer ones narrowly lanceolate nearly an inch long, the inner ones broader and abruptly contracted at base to a short claw not twisted over the young capsule but loose at its base, stamens nearly equalling the segments, with oblong anther 1-2 lines long; ovules 16-18 in each cell; capsule oblong obovate, somewhat narrowed at base, rather obtusely angled, 6-12 lines long. Common in wet meadows, Brit. Columbia to California and the Rocky mountains.

C. Leitchii Watson Proc. Am. Acad. xx, 376. Scape rather slender 1-2 feet high; leaves about a foot long, 4-6 lines wide, the edges involute at the apex and thus apparently attenuate; bracts scarious or colored, or the lowest ones green, linear-lanceolate, often longer than the bracts; perianth regular or nearly so, dark blue; the segments rather broadly lanceolate, an inch or more long, but little longer than the stamens, connivent over the young capsule and at length deciduous together; capsule oblong-obovate, slightly emarginate at the apex, usually 8-10 lines long and shorter than the pedicels; seeds obovate, dull. In wet meadows in the Cascade Mountains Oregon and Washington.

C. Cusickii Watson l. c. xxii, 479. Bulbs clustered (1-12), large. 1-2 inches thick or more, and bearing 8-20 large glaucous leaves 12-18 inches long, 6-18 lines wide; stem 2-3 feet high; pedicels 6-12 lines long or more; flowers large, pale blue, the narrow segments 3-5-nerved, persistently spreading; capsule oblong, abruptly acute, transversely veined, 6-8 lines long; seeds obovate, shining. On slopes of the Eagle Creek Mountains, eastern Oregon.

C. azurea Heller Bull. Torr. Bot. Club. xxvi, 547, under *Quamasia*. Scape 14-16 inches high from a deep seated bulb, glabrous, sparingly leafy below; leaves about ¾ the length of the scape below the inflorescence, 2-3 lines wide, somewhat glaucous beneath; pedicels slender, 10-12 lines long; bracts about as long as the pedicels, bluish or straw-color, chaffy lanceolate, tapering into a long slender acumination, prominently veined; perianth bright blue, about an inch long, the segments persistent, about 2 lines wide, 5-nerved; capsule about ¾ inches high, 3 angled; seeds shining black. On grassy plains near Montesano Washington

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C. Howellii Watson. l. c. 135. Scapo rather slender, 16-24 inches high, from an ovoid bulb about an inch in diameter: leaves 6-8, 12-18 inches long, 2-6 lines wide: raceme many-flowered, 12-18 inches long: bracts filiform-subulate, 6-12 lines long: pedicels slender, spreading, 6-18 lines long, longer than the bracts: perianth dark blue or purple, the lanceolate segments 8-10 lines long, regular, opening about 2 P. M. remaining open until sunset, then closing over the ovary and not opening again, at length deciduous: capsule broadly triangular-ovate, very obtuse, 3 lines long, the cells 2-3-seeded seeds ob-void, shining, a line long. On a gravelly plain east of Grant's Pass, southern Oregon.

6 HASTINGSIA Watson Proc Am. Acad. xiv, 217.

Perennial herbs with scape-like sparingly branched stems from coated bulbs, rather numerous all radical flat narrow leaves and numerous small whitish flowers in somewhat branched racemes on jointed pedicels. Perianth lax, lobes somewhat scarious but persistent, of 6 distinct oblong ovate 3-nerved segments. Stamens 6 adnate to the base of the segments: anthers linear-oblong, versatile. Ovary ovoid, very shortly stipitate: the cells 2-ovuled. Style short, persistent. Seeds oblong, with black shining testa.

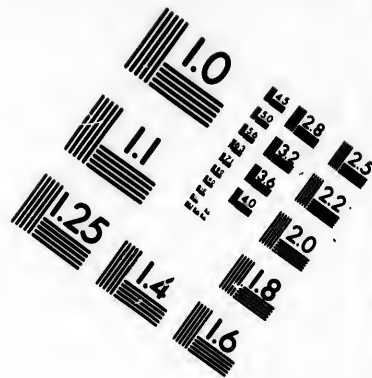
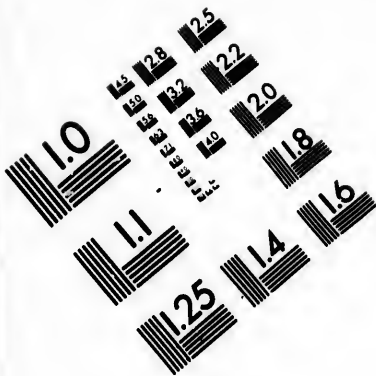
H. alba Watson l. c. 242. Bulbs membranously coated, or the outer somewhat fibrous: stem often stout, erect, 1-2½ feet high: leaves 12-18 inches long, 2-6 lines wide, attenuate above: raceme simple or sparingly branched, densely many-flowered: bracts narrowly acuminate, pedicels 1-2 lines long, shorter than the bracts: segments of the perianth about 2½ lines long, oblong, obtuse, white or tinged with green or pink, prominently 3-nerved: stamens about equalling the perianth: capsule broadly ovoid, 3 lines high, very shortly stipitate: seeds oblong, 2 lines long. On dry hillsides, southern Oregon to California.

H. bracteosa Watson l. c. xx, 377. Bulb narrowly oblong, membranously coated: stem 1-3 feet high, often stout: leaves 12-20 inches long, 1-4 lines wide, acuminate above: racemes simple or sparingly branched, loosely many-flowered: bracts filiform-subulate from a broad base, 6-10 lines long or more: pedicels ascending, about 2 lines long: segments of the perianth dull white, lanceolate, acuminate, 4-5 lines long, prominently 3-nerved: stamens about half as long as the segments: mature fruit not seen. In marshes near Waldo southern Oregon.

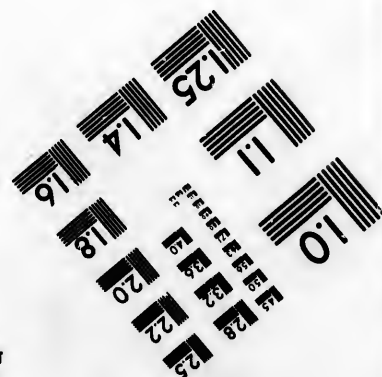
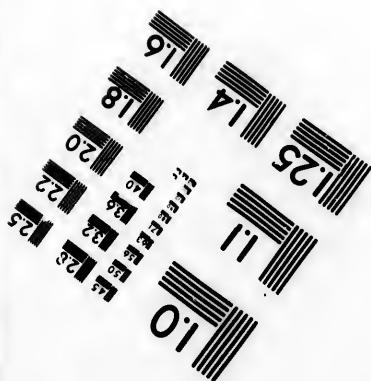
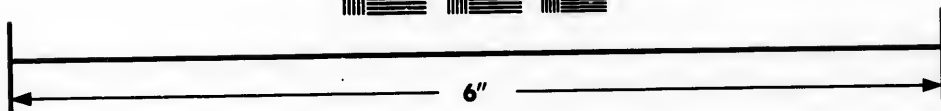
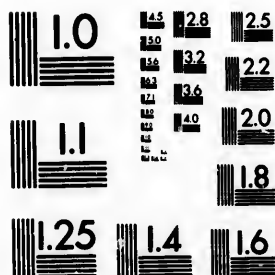
7 CHLOROGALUM Kunth Enum. iv, 683.

Coarse herbs with fibrous or membranous coated bulbs, narrow radical leaves, scape-like stems paniculately branched above and small scarious-bracted flowers on jointed pedicels. Perianth white or pinkish, of 6 distinct oblong or narrowly ligulate more or less spreading segments with 3 close but distinct nerves down the middle, at length twisted over the ovary and persistent. Stamens 6, a little shorter than the segments, inserted on and adnate to their bases: anthers versatile. Ovary sessile or nearly so, with a pair of ascending ovules in each cell. Style filiform, slightly 3-cleft at the apex, deciduous. Capsule thick-membranaceous, broadly turbinate, 3-lobed, loculicidally dehiscent. Seeds 1 or 2 in each cell, obovate, with a close thin somewhat rugose blackish testa.





**IMAGE EVALUATION
TEST TARGET (MT-3)**



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C. pomeridianum Kunth l. c. Bulb oblong-ovoid, 2-4 inches in diameter, densely covered with coarse brown fibres: stem and spreading panicle 1-6 feet high: leaves 6-18 inches long, 3-10 lines wide, carinate, glaucous, the margins strongly undulate; the cauline one or two much shorter and attenuate: flowers numerous, scattered, in a much branched open panicle: bracts lanceolate, 1-2 lines long, acuminate: pedicels slender, 6-10 lines long: segments of the perianth white with purple veins, 8-10 lines long, linear, opening only in the afternoon and closing over the ovary in the night: capsule 3 lines high, the valves pinnately nerved: seeds $1\frac{1}{4}$ -2 lines long. On dry ridges, southern Oregon to California.

8 LILIUM L. Sp. 302.

Herbs with simple leafy stems from scaly bulbs, with flat sessile whorled or scattered leaves and usually large flowers in foliaceous-bracted racemes or subumbellate clusters. Pedicels not jointed. Perianth funnelliform, of 6 distinct equal deciduous segments with a nectariferous groove toward the base. Stamens 6, hypogynous, included: anthers linear to oblong, versatile, extrorse, longitudinally dehiscent. Ovary sessile, many-ovuled. Style long, clavate, deciduous: stigma 3-lobed. Capsule coriaceous, loculicidally dehiscent, somewhat 6-angled. Seeds numerous, flat, horizontal, in 2 rows in each cell, with brownish thin testa.

* Flowers white to purplish or red: segments of the perianth with long narrow claws, the tips spreading but not revolute.

L. Washingtonianum Kellogg Proc. Calif. Acad. ii, 13. Bulb large, somewhat rhizomatous and oblique, 2-12 inches long, the scales imbricated, lanceolate, 2-3 inches long, not jointed: stem terete, 1-7 feet high, glabrous or somewhat scabrous: leaves in several whorls of 6-18, the upper and lower usually scattered, oblanceolate, acute or acutish, 3-5 inches long, 8-15 lines wide, more or less undulate: flowers one to many, very fragrant, white, becoming purplish with age, often finely dotted with purple, horizontally declinate on stout nearly erect pedicels 1-4 inches long; segments 3-4 inches long, 3-10 lines wide, the upper third spreading; stamens a little shorter, with yellow anthers 5-6 lines long: capsule obovate-oblong, truncate, obtusely angled or sometimes narrowly winged, 1-1 $\frac{1}{2}$ inches long. In loose soil on dry open mountain ridges, Oregon to California.

L. rubescens Watson Proc. Am. Acad. xiv, 256. Bulb smaller, but little oblique, 1-3 inches in diameter, the thick lanceolate scales about an inch long: stem stout, 1-7 feet high, smooth: leaves glabrous, glaucous beneath, undulate or flat, the lower scattered the upper in 3-7 whorls, oblanceolate, acute or acutish, 1-4 inches long, 6-12 lines wide: flowers usually several, on ascending pedicels 1-3 inches long, pale lilac to white, becoming rose-purple, somewhat dotted with brown, segments 1 $\frac{1}{2}$ -3 inches long, the upper third spreading: stamens and style a third shorter: anthers two to three lines long: ovary wing-angled, attenuate downward, half inch long. On wooded hillsides, southern Oregon to California.

L. Bolanderi Watson l. c. 377. Bulb small, ovoid, one to two inches in diameter, the thick lanceolate scales 1-1 $\frac{1}{2}$ inch long: stem rather stout, six inches to four feet high, one- to several-flowered: leaves verticillate in one to four approximate whorls, lanceolate to obovate, obtuse to acute, often apiculate, glaucous beneath, one to two inches long: flowers one to several in a subumbellate cluster, somewhat nodding on erect pedicels 1-4 inches long, segments lanceolate, one to two inches long, three to six lines wide, acute, dull purplish-red outside, bright red dotted with maroon inside, the upper third spreading: stamens and style about two thirds as

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* * Flowers yellow, orange or reddish, mostly conspicuously spotted; segments of the perianth usually revolute.

L. parvum Kellogg l. c. 176. Bulb small, the thick jointed scales one half to one inch long, upon a branching rhizome: stem slender, two to six feet high: leaves scattered or in whorls, lanceolate to linear, acute or acuminate, two to six inches long, an inch or less wide: flowers few to many, erect or nearly so on slender pedicels two to four inches long, yellow or orange and usually dotted with purple within, reddish above; segments one to two inches long, more or less spreading or the tips recurved, pubescent toward the apex: stamens an inch long about equalling the style; anthers oblong, one to two lines long: capsule subspherical, 7-9 lines long, truncate above. In the mountains at 4000-8000 feet altitude, southern Oregon and northern California.

C. pardalinum Kellogg l. c. 12. Rhizome thick and branching, forming mat-like masses of roundish bulbs, the scales jointed near the base: stem slender, 3-7 feet high: leaves usually in 3-4 whorls of 9-15, scattered above and below, narrowly lanceolate and sharply acuminate, 3-7 inches long, 2-12 lines wide, thin and faintly-nerved, glabrous and glaucous: flowers few to many, racemose or the lower in whorls, on stout pedicels 2-10 inches long: segments of the perianth 2-3 inches long, 6-9 lines wide, lanceolate, strongly revolute, bright orange-red with lighter orange centre and large purple spots on the lower half: stamens 1½-2 inches long: with red anthers 4-5 lines long: style little exceeding the anthers: capsule narrowly oblong, with acutish angles, 1-1½ inches long, umbilicæte at the summit. In springy places, Southern Oregon to California.

L. Columbianum Hansen. Baker Gard. Chron. 1871, 1257. Bulb small ¾-2 inches in diameter with lanceolate acute closely appressed scales about an inch long: stem slender, 2-6 feet high: leaves in whorls of 3-9 or more, the upper and lower often scattered, usually oblanceolate, 1-6 inches long, 9-15 lines wide, usually acute, the lower often obtuse, smooth: flowers few to many, on slender curving more or less divergent pedicels 3-6 inches long: segments of the perianth 1½-2 inches long, 4-6 lines wide, strongly revolute, bright orange thickly dotted with purple within: stamens about equalling the style, with yellow oblong anthers 2-3 lines long: capsule short-oblong, about an inch long, acutely 6-angled. Common from Brit. Columbia to California and Idaho.

L. Purdyi Waugh. *L. Bakeri Purdy Eryth. v. 104*. Bulb ovoid about an inch in diameter the lanceolate acute, scales closely appressed: stem 2-6 feet high, rather stout, terete, smooth: leaves lanceolate, mostly in whorls: flowers 1-10: segments of the perianth 1½ inch long, 5 lines wide acute: lower half of segments forming a closely constricted tube from which the upper half spreads rotately, tips not recurved, orange red, the lower portion thickly dotted with maroon spots, very fragrant: stamens a little shorter than the segments, equalling or exceeding the style: capsule about an inch long acutely 6-angled. In sandy woods along Puget Sound, Washington to Brit. Columbia.

9 FRITILLARIA L. Sp. 303.

Perennial herbs with simple leafy stems from scaly bulbs, flat leaves and mostly large nodding flowers in terminal leafy-bracted racemes. Perianth campanulate to funnelform, of 6 distinct equal concave deciduous segments with a smooth shallow nectariferous pit near the base. Stamens 6, inserted on the base of the

segments, included: filaments slender: anthers oblong, versatile, extrorse, dehiscent laterally. Ovary sessile or nearly so, many-ovuled. Styles slender, usually exceeding the stamens, united to the middle or throughout, deciduous. Capsule membranaceous, obtusely or acutely 6-angled or 6-winged, loculicidally 3-valved. Seeds numerous, horizontal, flat, in 2 rows in each cell, with thin light brown testa.

F. recurva Benth. Pl. Hartw. 340. Bulb-scales thick, 3-4 lines long or less: stem rather stout, 1-2 feet high, bearing 1-9 narrow funneliform flowers: leaves linear-lanceolate, 2-4 inches long, usually in two whorls of four to eight each near the middle of the stem: segments of the perianth narrowly oblanceolate, scarlet outside, yellow spotted with scarlet within, 1-1½ inch long, 4-5 lines wide, the tips recurved; nectary obscure: stamens and style a little shorter than the segments: style slender distinct above; stigmas linear: capsule obscurely angled. On dry hillsides, southern Oregon to California.

F. lanceolata Pursh Fl. 230. Bulb of thick scales three to six lines long: stem usually stout, 6-18 inches high: leaves lanceolate; to linear-lanceolate, 2-5 inches long, obtuse, usually in a whorl of 5 near the middle of the stem: flowers 1-15, mottled purple and greenish yellow, broadly campanulate, only rather slender recurved pedicels, segments of the perianth narrow oblong-lanceolate, strongly arch, with a large oblong nectary, about an inch long: stamens 6-8 lines long: style distinct to the middle: stigmas linear: capsule short and thick, broadly winged. Common in copses Brit. Columbia to California and Idaho.

F. glauca Greene Eryth. 1, 153. Bulb of few thick scales: stem 2-3 inches high, rather stout: leaves 2-4, scattered, oblong-lanceolate, 1-3 inches long, thick, glaucous: flowers 1-3, open campanulate, purple marked with greenish yellow: segments of the perianth oblong-lanceolate, obtuse, 8-10 lines long, about four lines wide, with large oblong nectaries: stamens about six lines long, the filaments dilated downward; anthers oblong, little more than a line long: styles distinct to the middle; stigmas linear: capsule short, acutely angled. On barren slopes near Waldo, southern Oregon.

F. atropurpurea Nutt. Journ. Acad. Philad. vii. 54. Bulb of numerous thick scales half-inch long or less: stem usually slender, 8-20 inches high: leaves 6-20, linear, scattered on the upper part of the stem or somewhat verticillate, two to three inches long: flowers on slender pedicels, dull purple with more or less green, open campanulate; segments broadly lanceolate 6-9 lines long spreading, with obscure nectaries: stamens about four lines long: style slender, distinct to the middle, with linear stigmas: capsule broadly obovate acutely angled. From the Blue Mountains of Oregon to California and Nebraska.

F. pudica Sprengle Syst. ii, 64. Bulb of numerous very small rounded scales: stem 2-10 inches high: leaves 3-8, linear to narrowly oblanceolate, scattered or somewhat verticillate, 2-4 inches long: flower usually solitary, nodding, yellow or orange, sometimes tinged with purple, narrow-campanulate: segments of the perianth 5-9 lines long, oblong-spatulate, obtuse, somewhat spreading: stamens nearly equalling the style, 6-8 lines long: anthers 2 lines long: styles connate to the top; stigma shortly 3-lobed: capsule oblong to subglobose, 6-12 lines long, obtusely angled. Common in the interior, Brit. Columbia to California and Utah.

10 LLOYDIA Salisb.

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and whitish flowers in terminal racemes or solitary. Perianth of 6 distinct equal persistent segments with a transverse margined nectariferous fold above the base. Stamens 6, inserted at the base of the segments: filaments subulate-filiform: anthers versatile, oblong, rounded at the apex, deeply perforated at the emarginate base for the insertion of the filament, dehiscent along each margin. Ovary triangular, 3-celled, the ovules numerous, in two rows in each cell, horizontal, anatropous. Style persistent, with shortly 3-lobed stigma. Capsule chartaceous, loculicidally 3-valved at the apex. Seeds flat, with a brown membranously margined testa and very small embryo.

L. serotina Reichenb. Fl. Excurs. 102. Stem slender, erect or ascending, 2-5 inches high: radical leaves filiform, equalling or exceeding the stem, triangular to teretish, the cauline ones short and diminishing upward, linear-lanceolate, somewhat sheathing: flowers erect, usually solitary: segments of the perianth oblanceolate, obtuse, obscurely pitted at base, 4-5 lines long, white with 3 purplish lines: capsule obovate, obtusely angled, 4 lines long. Eastern Oregon to the Rocky Mountains and the Arctic coast.

11 ERYTHRONIUM L, Sp. 305.

Low herbs from membranous-coated corms with 2-3 apparently radical flat leaves and one to several large flowers in a terminal raceme. Perianth broadly funnelform, of 6 distinct nearly equal lanceolate deciduous segments that are mostly revolute from near the base, the inner usually auriculate below and callous-toothed on each side of a nectariferous groove. Stamens 6, hypogynous, with rather short slender filaments and linear anthers attached by the base and longitudinally dehiscent. Ovary nearly sessile, many-ovuled. Style slender, entire with short 3-lobe stigma, or 3-cleft and the stigmas at length revolute, deciduous. Capsule membranaceous, obtusely triangular, loculicidally 3-valved. Seeds in two rows in each cell, ascending, with brown or black rugulose testa somewhat loose at the apex.

E. grandiflorum Pursh Fl. 231. Scape stout, 1-2 feet high: leaves broadly lanceolate, 4-6 inches long, acute and shortly cuspidate, pale green, not mottled: segments of the perianth bright yellow with whitish base; outer ones lanceolate, obtuse; inner ones narrower, acuminate, with 4 stout hyaline teeth at base, all strongly revolute, 1½-3 inches long: style clavate; the stigmas at length distinct and recurved. In the mountains of eastern Oregon to Brit. Columbia and the Rocky Mountains.

Var. parviflorum Watson Proc. Am. Acad. xxvi, 129. Scape usually 8-12 inches high: leaves oblong-lanceolate; flowers smaller, the segments 12-15 lines long. In the mountains California to Brit. Columbia and the Rocky Mountains.

E. revolutum Smith in Rees' Cyc. Scape 10-12 inches high, 1-3-flowered: leaves narrowed below to a usually narrow petiole, 2-6 inches long, conspicuously marked with dark brown and white: segments of the perianth narrowly lanceolate, acuminate, 18 lines long, 3-4 lines wide, strongly revolute, white to pinkish-rose outside, golden-orange deepning to a dark purple inside, the 3 inner auricled and with 4 blunt teeth: anthers about 4 lines long, bright yellow: stigmas at length distinct and recurved.

Near the coast, Vancouver Island to Oregon. *E. Johnsoni* Bolander Eryth. iii, 127, appears to be a pink-flowered form of this species.

E. giganteum Lindl. Bot. Reg. t. 1786. Scape 6-18 inches high, 1-6 flowered: leaves broadly lanceolate, or in poorly developed specimens narrower, green mottled with brown and white, 4-6 inches long, mostly acute and shortly apiculate, rather abruptly narrowed below to a short and broadly margined petiole: outer segments of the perianth lanceolate, acuminate, $1\frac{1}{4}$ -2 inches long, 4-6 lines wide; inner ones a little wider and more acuminate, all cream-color marked with yellow and orange near the base, strongly revolute; the inner ones auricled and 4-toothed at base: style clavate, about as long as the stamens, the stigmas distinct and at length strongly revolute. On stony ridges, western Washington to Calif.

E. montanum Watson Proc. Am. Acad. xxvi, 130. Scape slender, 6-18 inches high, 1-3 flowered: leaves broadly lanceolate to almost ovate, more or less abruptly contracted at base into a winged petiole, the blade 2-4 inches long, pale green, not mottled: segments of the perianth pure white with orange base, often turning pinkish in age, 1-1 $\frac{3}{4}$ inches long, broadly lanceolate, slenderly acuminate, the inner ones with small teeth at base: style clavate, much longer than the stamens; the stigmas distinct and at length spreading. On grassy slopes in the highest parts of the Cascade Mountains in Oregon and Washington.

E. citrinum Watson Proc. Am. Acad. xxii, 480. Corm oblong, 1-2 inches long, 4-6 lines in diameter; scape rather stout, 6-10 inches high, 1-9 flowered, the flowers approximate and all opening at near the same time: leaves very broadly lanceolate, 4-6 lines long, obtuse and very shortly apiculate, attenuate at base to a very short petiole, the margins more or less undulate, green marked with dark brown and white: segments of the perianth broadly lanceolate, obtuse, 12-15 lines long, bright lemon-color with orange base, the tips drying pinkish, strongly revolute, the teeth at the base of the inner ones thin: filaments not dilated downward: style rather thick shorter than or barely equalling the stamens: the stigmas coalescent by the edges: capsule, an inch long, very obtuse. On dry ridges in pine woods, near Deer Creek southern Oregon.

E. Hendersoni Watson l. c. 479. Scape slender, 6-12 inches high, 1-3 flowered: leaves lanceolate to oblong, obtuse and very shortly apiculate, narrowed below to a short petiole, the blade 3-6 inches long, green mottled with white and brown: segments of the perianth lanceolate, obtuse, 12-18 lines long, purple with very dark base bordered above with yellow; the inner ones auricled above the very short claw, the auricles fleshy and subsaccate, the 2 scales subglobose-inflated: filaments purple, very slender and attenuate upward, thrice longer than the brownish anthers: style narrowly clavate, shorter than or about equalling the stamens, the triangular cupulate stigma very shortly 3-lobed. Common in the Rogue river valley, southern Oregon.

E. Howellii, Watson l. c. 480. Scape rather slender, 6-18 inches high, 1-3 flowered: leaves oblong-lanceolate to lanceolate, 3-8 inches long, an inch or less wide usually acute and shortly apiculate, green mottled with white and brown: segments of the perianth lanceolate, 18 lines long, straw-color to white, with orange base, often drying pinkish: the inner narrowed downward, without auricles or scales: stamens white, the filaments very slender: style slightly clavate, shorter than the stamens; the cupulate stigma faintly 3-lobed. In dry open woods near Waldo southern Oregon.

12 CALOCHORTUS Pursh Fl. 240.

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C. Maveanus Leichtlin Baker Journ. Linn. Soc. xiv, 305. Stem flexuous 3-10 inches high, usually branched and 3-10-flowered: leaves glaucous, exceeding the stem, 4-6 lines wide: bracts lanceolate, an inch long or more: sepals ovate-lanceolate acute or acuminate, purplish: petals a little longer, white, or purplish at base, 6-8 lines long, broadly obovate, acute, somewhat pitted and arched, the broad naked claw covered above by a transverse semicircular scale, the rest of the surface more or less densely covered with long erect white or purplish hairs: anthers lanceolate, acuminate, 2 lines long: capsule oblong-elliptic, acutish. Near the coast, southern Oregon to California.

Var. roseus Purdy Proc. Calif. Acad. 3d ser. ii, 121. Bulbs with mahogany-colored coats: flowers tinged with rose. Southern Oregon.

C. elegans Pursh Fl. 240. Stem very slender, 4-8 inches high 1-4-flowered: leaf lanceolate, acuminate, 2-4 lines wide, exceeding the stem: bracts about half the length of the pedicels, acuminate from a base 2 lines wide: sepals ovate, acute, greenish-white outside, purplish at base: petals obovate, obtuse, whitish, or slightly tinged with green, with a purple spot on the claw, thickly covered with rather short soft hairs, except a band around the margins, which are white on the upper and purple on the lower portion; scale narrow, ascending, deeply fringed, covering about ½ the width of the claw: anthers long-acuminate: capsule elliptical, rounded at each end. In pine woods, eastern Washington and Idaho.

C. Lyallii Baker l. c. *C. elegans* var. *nanus* Wood. Stem slender, 3-10 inches high, umbellately 3-5-flowered: leaf lanceolate, 4-6 lines wide, acute, often ½ longer than the stem: bracts lanceolate, long acuminate, about an inch long: sepals oblong-lanceolate short acuminate, 6-10 lines long, greenish-purple, strongly arched below, the pit thus formed dark purple inside: petals light yellow to nearly white with purplish base, longer than the sepals, often an inch broad, triangular-ovate, finely erose, rounded and often shortly acuminate at the apex, strongly arched below, the scale broad and covered with retrorse hairs, the portion above the scale pubescent with short soft hairs except a narrow belt around the apex: filaments broad, abruptly narrowed at the apex: anthers lanceolate, long-acuminate above, 4 lines long: capsule elliptical 10-12 lines long nodding. On grassy slopes on the highest parts of the Cascade Mountains, Oregon to Brit. Columbia.

C. Lobbii Purdy l. c. 122. Stem 3-5 inches high: leaf 3-5 lines wide, longer than the stem, abruptly acute: sepals ovate-lanceolate, acute, greenish with a dark spot below, 6-8 lines long; petals a little longer, white tinged with green, broadly rhombic-ovate, very deeply pitted, the pit showing as a prominent knob on the back, hairy above the gland: scale very narrow, deeply bordered with long feathery fringe and concealed in the recess of the pit: filaments subulate; anthers oblong, acuminate, ending in a hooked cusp: capsule narrowly beaked. Only known from Mount Jefferson, Oregon.

C. uniflorus H. & A. Bot. Beech. 398, t. 94. Stem low, flexuous, usually branched, 4-12 inches high, umbellately 1-9-flowered: leaves 1-2, 4-6 lines wide, exceeding the stem: bracts linear-lanceolate, long and conspicuous: flowers open-campanulate, on flexuous pedicels 3-10 inches long: sepals ovate-lanceolate, acuminate, greenish-lilac; petals cuneate, somewhat truncate, erose-denticulate, 10-12 lines long, lilac to rose-color, often with a purple spot on each side of the scale, sparingly hairy immediately above the gland, otherwise naked; gland shallow, not pitted; scale narrow, triangular: filaments slender; anthers obovate, obtuse, 2 lines long: capsule elliptical nodding. In wet meadows, southern Oregon to California.

C. Tolmiei H. & A. l. c. Stem erect or ascending, 6-18 inches high, usually branched: leaf 4-8 lines wide, shorter than or exceeding the stem: bracts foliaceous, long acuminate, 1-4 inches long: flowers broadly campanulate; sepals oblong-lanceolate, acuminate, 6-10 lines long, purplish; petals yellowish purple, cuneate-obovate, a little longer than the sepals, rounded and acutely apiculate at the summit, deeply pitted near the base, pubescent with long crisped purple and white hairs; the gland without scale but the upper circular edge with a dense fringe of reflexed hairs: anthers lanceolate, acute, 2-3 lines long: capsule elliptical, acute at both ends 10-15 lines long, nodding. On dry grassy plains, Willamette valley Oregon to northern California.

C. Purdyi Eastwood Proc. Calif. Acad. 3d ser. i, 137, pl. xi, figs. 8a & 8b. Stem 8-16 inches high, rather stout, erect, branching, 2-many-flowered: leaf linear-lanceolate, acuminate, about 8 inches long, 4-6 lines wide: bracts foliaceous, acuminate: sepals from elliptical to narrowly ovate, abruptly acuminate, green tinged with purple outside; petals broadly obovate-cuneate, acute or rounded at the apex, creamy-white or tinged with purple, the inner surface bearded all over with white and purple hairs, somewhat arched by the narrow semicircular gland, the shallow pit covered by a densely hairy narrow scale: anthers lanceolate, abruptly acuminate: capsule elliptical, 1½ inches long, nodding. On grassy hillsides, Willamette valley Oregon.

C. apiculatus Baker Journ. Linn. Soc. xiv, 305. Stem stout, erect, 12-18 inches high: leaf 6-12 inches long, 3-9 lines wide: bracts linear, acuminate, 1-3 inches long: sepals lanceolate, greenish-white, acute, 6-9 lines long; petals straw-color, broadly obovate, an inch long, sparingly hairy above inside, distinctly pitted, the pit densely hairy and without scale: anthers 4 lines long, acuminate: capsule 12-15 lines long, narrowly oblong, nodding. Lake Pend Oreille Idaho.

C. nitidus Dougl. Trans. Hort. Soc. vii, 277, t. 9, fig a. Stem 1-2 feet high, rather stout, stiffly erect: leaf linear-lanceolate, 8-13 inches long, 3-6 lines wide: bracts lanceolate, long acuminate, 1-2 inches long: flowers large, open-campanulate; sepals lanceolate, long-acuminate 16-18 lines long, hyaline-margined on one side; petals very broadly ovate, as long as the sepals, white or straw-color to lavender, with an Indago spot near the centre, rounded above, sparsely bearded except a broad belt at the summit, gland small, rounded, densely matted with short hairs: anthers linear-oblong, 6-8 lines long, obtuse at both ends: capsule round to broadly elliptic, 8-10 lines long, with short stout beak, erect. Powder river Mountains, eastern Oregon to Nevada.

C. Nuttallii T. & G. Pac. R. Rep. ii, 124. Stem slender, 3-15 inches high, umbellately 1-5 flowered: radical leaf linear, deeply channeled, cauline 1-3, narrow, glaucous, the margins revolute: bracts long-acuminate, 1-2 inches long: sepals ovate-lanceolate, with scarious margins, yellowish within, with or without a dark spot at base which is sometimes hairy, 10-12 lines long, much shorter than the petals, acute; petals broadly obovate-cuneate with rather narrow claw, 1½ inches long, abruptly acute or

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C. Howellii Watson Proc. Am. Acad. xxlii, 266. Bulb large, 6-12 lines in diameter, very deep-seated: stem stiffly erect, 1-2 feet high, umbellately 1-3-flowered, sometimes branched: radical leaf about a foot long, 4-6 lines wide, cauline leaf narrow, 3-6 inches long, long acuminate: bracts long acuminate from a broad base, 1-2 inches long: flowers open-campanulate: sepals broad lanceolate, acuminate, about 6 lines long, one margin hyaline, purplish outside: petals cuneate-obovate rounded at the apex, 1-1½ inches long, white with dark base, sparsely bearded with short crisp hairs inside: gland transversely oblong, densely covered with yellow hairs: anthers oblong, acute and apiculate, about 3 lines long: capsule elliptical, 8-10 lines long, erect. In moist places near Waldo southern Oregon.

*C. longibarbatu*s Watson l. c. xvii, 381. Stem slender, 10-15 inches high, strictly erect, umbellately one- to several-flowered: radical leaf broadly linear, acute, nearly as long as or longer than the stem: cauline linear and bract-like: bracts linear-lanceolate, acuminate, 1-2 inches long: sepals rather narrowly lanceolate, acuminate, 8-10 lines long, greenish lilac within: petals lavender-color, lighter below with a dark-purple circular band above the gland, cuneate-obovate, about an inch long, the apex rounded to almost truncate, denticulate: gland small, roundish, covered with dense matted brown hairs with some long silky hairs above and beside it, the margins not ciliate: filaments slender, dilated downward, 2-3 times as long as the narrowly ovate obtuse anthers: capsule elliptical, 8-10 lines long, erect. In low grassy grounds, eastern Oregon and Washington near the base of the Cascade Mountains.

*C. pavonaceu*s Fernald Bot. Gaz. xix, 335. Stem slender, strictly erect, 1-2 feet high: radical leaf lanceolate, not channeled, 1-1½ feet long, cauline bract-like, 3-4 inches long: bracts subulate, 1-3 inches long: sepals purplish, ovate-lanceolate, acuminate, an inch long: petals cuneate-obovate, 15-18 lines long, lavender-color to purple, with a circular band above the small round gland which is covered with densely matted yellow hairs, the margins sparsely ciliate, the lower third sparingly bearded with silky hairs: filaments slender, winged; anthers 3-5 lines long, shorter than the filaments: capsule elliptical, acutely angled and strongly beaked, erect. In low meadows near Pullman, Washington.

*C. macrocarpu*s Dougl. Trans. Hort. Soc. vii, 276, t. 8. Stem stout, erect and rigid, 1-2 feet high, one- to several-flowered: radical leaf deeply channeled, a foot or more long; cauline 3-5, narrow and convolute, 3-6 inches long: sepals lanceolate, acuminate, 15-18 lines long, purplish with a dark base inside, sometimes spotted and hairy, with a broad scarious margin: petals cuneate-obovate, 1½-2 inches long and half as wide, purple, with a greenish line down the centre, the lower third above the gland sparingly bearded with glandular hairs: gland oblong, densely hairy: anthers lanceolate, obtuse 4-6 lines long, about as long as the filaments: capsule lanceolate, attenuate upward, 1-2 inches long, erect. On dry or sandy plains in the interior, California to Brit. Columbia.

ORDER XCVII CONVALLARIACEÆ Link. Handb. i, 184.

Scapose or leafy-stemmed plants with simple or branched rootstocks or bulbs, mostly broad parallel-veined leaves and numerous or solitary flowers in terminal racemes or panicles. Perianth inferior, 4-6-lobed or parted. Stamens 6, hypogynous, or borne on the perianth: anthers introrsely or exextrorsely

or laterally dehiscent. Ovary 1-3-celled: ovules anatropous or amphitropous. Style slender or short: stigma mostly 3-lobed. Fruit a fleshy few- to numerous-seeded berry. Embryo small, in copious albumen.

- 1 **Vagnera** Leaves alternate: flowers small, in a simple terminal raceme or panicle, six-merous: filaments subulate.
- 2 **Unifolium** Leaves alternate: flowers small, in a simple terminal raceme, four-merous: filaments filiform.
- 3 **Streptopus** Leaves alternate, sessile: flowers small or middle-size, six-merous, extra-axillary: filaments flattened, short and broad.
- 4 **Disporum** Leaves alternate: flowers middle-size, in terminal fascicles, six-merous: filaments filiform or somewhat flattened, longer than the anthers.
- 5 **Clintonia** Leaves all radical: flowers middle-size, six-merous in a terminal umbel: filaments filiform.
- 6 **Scillopsis** Leaves a pair upon an otherwise naked stem: flowers middle-size, umbellate upon a very short peduncle, tri-merous: filaments filiform-subulate.
- 7 **Trillium** Leaves 3, whorled at the summit of the otherwise naked stem: flowers large, solitary and terminal, tri-merous: filaments short.

1 VAGNERA Adans. Fam. Pl. ii, 496. (1763)

SMILACINA Desf. (1807)

Herbs with simple leafy stems, broad mostly sessile alternate leaves and small white flowers on jointed pedicels in terminal bracteate racemes, or panicles. Perianth persistent of 6 distinct, 1-3-nerved segments. Stamens 6: filaments subulate, inserted at the base of the segments: anthers versatile, introrse. Ovary sessile, ovate, 3 celled, with 2, usually collateral ovules in each cell. Style short and thick, 3-lobed at the summit, persistent. Fruit a globose 1-3-seeded berry. Seeds subglobose, with thin testa and horny albumen.

* Flowers panicled, very small: stamens exceeding the oblong-lanceolate segments of the perianth.

V. amplexicaulis Greene. *Smilacina amplexicaulis* Nutt. Stems several from a stout elongated rootstock, 1-3 feet long ascending, covered with a short spreading pubescence: leaves ovate to lanceolate 3-7 inches long, strictly sessile and amplexicaul or sometimes with a very short dilated clasping petiole, acute, rounded at base: usually pubescent with very short stiff hairs: panicle sessile or shortly peduncled, 2-9 inches long: pedicels solitary usually less than a line long: segments of the perianth less than a line long: filaments more or less broadly subulate, often broader than the segments: style nearly as long as the ovary: berries light red, finely dotted with purple, 2-3 lines in diameter, usually 1-seeded: seed whitish, 1½ lines broad. In the Coast ranges, Brit. Columbia to California.

V. racemosa Morong Mem. Torr. Bot. Club, v, 114. *Smilacina racemosa* Desf. Stems often stout, erect or ascending, somewhat angled, finely pubescent above or nearly glabrous, 1-3 feet high, from a thick fleshy rootstock: leaves oblong-lanceolate to oval, sessile, or the lower ones short-petioled, 3-8 inches long, 1-3 inches wide, acuminate, finely pubescent

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* * Flowers larger, in a simple few-flowered raceme: stamens shorter than the segments.

V. sessilifolia Greene. *Smilacina sessilifolia* Nutt. Stems slender, usually flexuous above, 10-18 inches high, from slender creeping rootstocks: leaves lanceolate, 2-6 inches long, acute or acuminate, sessile and clasping, usually flat and spreading, more or less pubescent. racemes 3-9-flowered, sessile or shortly peduncled, the solitary pedicels 2-7 lines long: segments of the perianth lanceolate, 3-4 lines long, twice as long as the stamens: filaments subulate: style about a line long, as long as the ovary: berries usually black when mature, globose, 3-5 lines in diameter, 1-3-seeded: seeds brown sub-ovoid 1½ lines in diameter. In damp forests, Brit. Columbia to California.

V. stellata Morong l. c. *Smilacina stellata* Desf. Stems rather stout, erect, glabrous, 8-20 inches high, from a stout fleshy rootstock: leaves lanceolate to oblong-lanceolate, sessile and somewhat clasping minutely pubescent beneath 2-5 inches long, 6-18 lines wide, obtuse to acute or acuminate: raceme sessile or short peduncled, 6-20-flowered: pedicels 1-4 lines long, usually shorter than the flowers: segments of the perianth oblong, obtuse, 4-5 lines long, ½ longer than the stamens: style about 2 lines long, as long as the ovary: berries green with 6 black stripes or black, 3-5 lines in diameter. Along streams in the interior, Brit. Columbia to California and the Eastern States.

2 UNIFOLIUM Adans. Fam. Pl ii, 54. (1763)

MAIANTHUM Wiggs. *Prim. Fl. Hols. 14.* (1730.)

Low herbs with slender rootstocks, erect simple few-leaved stems, alternate petioled leaves and small white flowers in terminal minutely bracted racemes. Perianth of 4 distinct segments. Stamens 4, inserted at the base of the segments, with filiform filaments and short introrse anthers. Ovary sessile, 2-celled, rarely 3-celled, with a pair of ovules in each cell. Style 2-lobed or 2-cleft. Berries globose, 1-4-seeded.

U. dilatatum. *Maianthemum bispicum* var. *dilatatum* Wood. Glabrous: stem 2-12 inches high, erect: leaf of the sterile shoots round-cordate, 2-4 inches in diameter, acute or shortly acuminate, on a slender petiole 2-8 inches long: cauline leaves usually 2, cordate to sagittate, with large rounded auricles, 2-4 inches long, on slender petioles: often with a subulate bract on the peduncle: raceme 1-3 inches long, many-flowered: pedicels spreading, 1-2 lines long, often 2-4 together: segments of the perianth oblong, obtuse, about a line long, at length-reflexed: stamens shorter than the segments: style stout, about a half line long: berries red, globose, about 3 lines in diameter, 1-4-seeded: seeds ovate, brown, 1½ lines long. In wet places along mountain streams. California to Alaska.

3 STREPTOPUS Michx. Fl. i, 200. (1803.)

Branching herbs with stout or slender rootstocks. thin sessile alternate leaves and rather small flowers on slender solitary simple or forked extra-axillary peduncles. Perianth narrowly cam-

panulate, of 6 distinct deciduous segments. Stamens 6: filaments short, deltoid or subulate, inserted on the base of the segments: anthers sagittate, acute or acutely attenuate above, attached on the inner side near the base, with nearly lateral dehiscence. Ovary sessile, 3-celled, with numerous ovules in each cell. Style filiform, deciduous, with 3-lobed or 3-cleft stigma. Fruit a many-seeded berry. Seeds oblong, with close thin brownish testa.

S. amplexifolius DC. Fl. France iii, 174. Rootstock short, stout, horizontal, covered with fibrous roots: stem stout, 1-3 feet high, dichotomously branched: leaves lanceolate, 2-5 inches long, 1-2 inches wide, acuminate, cordate-clasping at base, glabrous, glaucous beneath: peduncles 1-2 inches long, 1-2-flowered bent or twisted at about the middle: segments of the perianth greenish-white, 4-6 lines long, narrowly lanceolate, acuminate, the tips spreading or recurved: anthers subulate-pointed: stigma simple, obtuse or truncate: berry oval, 8-9 lines long, yellow or red. Along mountain streams, California to Alaska and across the continent.

S. roseus Michx. Fl. i, 201, t. 18. Stems simple or sparingly branched, 6-30 inches high, from a short stout rootstock covered with fibrous roots: branches sparingly pubescent: leaves lanceolate-ovate to ovate, 2-4 inches long, rather abruptly acuminate, sessile by a broad rounded or slightly cordate clasping base, the margins finely ciliate: peduncles 6-12 lines long, one rarely two-flowered: segments of the perianth lanceolate, acuminate, 4-6 lines long, the tips spreading, purple to rose-color: anther-cells each apiculate: style 3-cleft, the spreading branches stigmatic along the inner side: berries globose or ovate, 5-6 lines in diameter. In damp woods, Oregon to Alaska and the Eastern States.

S. brevipes Baker Journ. Linn. Soc. xiv, 594. Stems mostly simple, smooth, 6-12 inches high, from very slender rootstocks: leaves lanceolate, 1-3 inches long, tapering from below the middle to an acuminate apex, sessile but not at all cordate at base, very minutely or not at all ciliate: peduncles 3-6 lines long: segments of the perianth linear-oblong, about 4 lines long, less than a line wide, more than twice as long as the stamens: berries globose. In damp places in the Cascade Mountains of Washington,

4 DISPORUM Salisb. Trans. Hort. Soc. i, 331. (1812.)

PROSARTES D. Don. (1840.)

Branching herbs, scaly-bracted below and leafy above, with running rootstocks, sessile alternate somewhat oblique leaves and rather small flowers in terminal few-flowered umbels. Perianth narrowly campanulate, of 6 distinct deciduous segments. Stamens 6, hypogynous: filaments filiform or somewhat flattened, longer than the oblong or linear extrorse anthers. Ovary sessile, 3-celled, mostly with 2 suspended ovules in each cell. Style slender, entire or with 3 short stigmas, deciduous. Fruit a 3-6-seeded berry. Seeds globose, with close testa and horny albumen.

* Perianth broad and gibbously truncate at base: stamens included, with elongated filaments: style 3-cleft: berries acute.

D. Menziesii B. & H. Gen. iii, 832. *Prosartes Menziesii* D. Don. More or less woolly-pubescent: stems 1-3 feet high, diffusely much branched: leaves ovate to lanceolate, acuminate, rounded or sometimes slightly cordate at base, 2-6 inches long: flowers in fascicles of 2-5, on slender pedicels 6-10

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* * Leaves acute or shortly acuminate, mostly cordate and clasping: perianth narrow and less gibbous at base: style entire.

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D. Hookeri B. & H. l. c. *Prosartes Hookeri* Torr. More or less rough-pubescent with short spreading hairs: stems slender, 1-2 feet high, diffusely branched: leaves ovate, mostly deeply cordate, rough on the margins and nerves beneath, 1-3 inches long, the uppermost very oblique: flowers 1-3 in the fascicles: segments spreading above, 4-6 lines long, narrowed at base: stamens equalling or a little exceeding the perianth: ovary narrow, more or less pubescent: style entire, exerted, glabrous; berries usually somewhat pubescent, obovate, obtuse, 4 lines long, 6-seeded. In the Coast Ranges, southern Oregon to California.

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er side: berries
egon to Alaska

D. trachyandrum B. & H. l. c. *Prosartes trachyandra* Torr. More or less pubescent with minute stiff hairs: stem slender, 12-18 inches high: leaves ovate to oblong, acute or somewhat acuminate, but slightly or not at all cordate, 1-2 inches long: flowers 1-3 in the fascicles: segments of the perianth lanceolate, acute, 4-5 lines long, $\frac{1}{2}$ longer than the stamens, narrowed at base: anthers minutely hispid: ovary glabrous: berries smooth, with a short stout beak. In the mountains of southern Oregon and northern California.

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e lanceolate, 1-3
ate apex, sessile
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ut 4 lines long,
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D. Oregana B. & H. l. c. *Prosartes Oregana* Watson. Stem 1-3 feet high, diffusely much branched, woolly-pubescent above: leaves ovate or orbicular to oblong, more or less acuminate, distinctly cordate at base, 2-4 inches long: flowers usually 1-2 in the fascicles, funnelform: segments of the perianth about 6 lines long, lanceolate, narrowed toward the base to a broad claw: filaments filiform with a dilated base, about 8 lines long: anthers a line long: style filiform, exceeding the stamens: berries ovate, scutish, pubescent, 5-8 lines long, 3-6-seeded. Common in forests, Oregon to Brit. Columbia.

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D. trachycarpum B. & H. l. c. *Prosartes trachycarpa* Watson. Pubescent, at least when young: stem 1-2 feet high, rather sparingly branched: leaves ovate or oval to oblong-lanceolate, 2-4 inches long, acute or short acuminate, rounded or subcordate at base: flowers 1-3 in the fascicles, narrow campanulate: segments of the perianth narrowly oblong or oblanceolate, 6-7 lines long: stamens about equalling the perianth: style slender, exceeding the stamens: berries roughened, depressed-globose or somewhat ovoid, 4-5 lines in diameter, 3-18-seeded. In the mountains of eastern Oregon and Washington to Nebraska and Manitoba.

← ← Anthers much longer than the very short filaments.

D. Don. More
much branched:
slightly cordate
er pedicels 6-10

D. parvifolium B. & H. l. c. *Prosartes parvifolia* Watson. More or less pubescent with spreading hairs: stem 6-12 inches high, densely much branched: leaves ovate to ovate-lanceolate, more or less abruptly acute, minute, very acute, slightly cordate at base, 6-18 lines long: flowers 1-6 in the fascicles, narrow campanulate: segments of the perianth lanceolate, acute or somewhat acuminate, 4-6 lines long, white, twice as long as the stamens: filaments about a line long, shorter than the lanceolate acute anthers: ovary small, slightly pubescent: style slender, slightly exerted: berries not seen. In the Coast and Siskiyou Mountains of southern Oregon and northern California.

5 CLINTONIA Raf. Journ. Phys. 102, 1819.

Scapose herbs with slender rootstocks, few broad apparently radical many-nerved leaves and white or red flowers umbellate upon a scape-like peduncle. Perianth campanulate, of 6 distinct several-nerved equal deciduous segments. Stamens 6, inserted on the base of the segments, with filiform filaments and oblong to linear versatile anthers, attached on the inner side and laterally dehiscent. Ovary sessile, 2-3-celled, with 2 to several ovules in each cell. Style slender, deciduous, slightly 2-3-lobed at the summit. Fruit a smooth few- to many-seeded berry. seeds somewhat compressed or angled, with smooth crustaceous brownish testa.

C. uniflora Kunth Enum. v. 159. More or less villous-pubescent throughout: stems 1-2 inches long, mostly under ground: leaves lanceolate or oblanceolate to oblong-obovate, acute or shortly apiculate, attenuate below to a sheathing petiole, 4-8 inches long by 1-2 wide: peduncle shorter than the leaves, 1- rarely 2-flowered: segments of the perianth white, oblanceolate, obtuse, 8-12 lines long $\frac{1}{2}$ longer than the stamens: style about equalling the stamens: berries blue, oblong, 4-6 lines long, the cells 6-10-seeded. Common in damp forests in the mountains, California to Alaska.

C. Andrewsiana Torr. Pac. R. Rep. iv, 150. Nearly glabrous, the inflorescence more or less pubescent: stem stout, 2-6 inches long, mostly under ground: leaves usually 4-6, broadly oblong to oblanceolate, shortly apiculate narrowed below to short petioles or sessile, 6-12 inches long, 2-4 inches wide; peduncle 1-2 feet high, usually with a foliaceous bract: flowers deep rose-color, numerous in a terminal umbel and one or more lateral umbellate fascicles: pedicels slender, unequal, 4-12 lines long: perianth gibbous at base, 4-7 lines long: stamens a half shorter, about equalling the style: filaments pubescent: berries 4-5 lines long, the cells 8-10-seeded. In Sequoia forests near the coast, southern Oregon to California.

6 SCOLIOPIS Torr. Pac. R. Rep. iv, 145.

Nearly acaulescent glabrous herbs with short fibrous-rooted rhizomes, a pair of thin apparently radical leaves subtended by scarious sheaths and few flowers on long pedicels in a nearly sessile umbel. Perianth of 6 distinct deciduous segments, the 3 outer lanceolate, several-nerved, the 3 inner narrower and 3-nerved. Stamens 3, inserted at the base of the 3 outer segments, with filiform-subulate filaments, and oblong 2-celled extrorse anthers. Ovary sessile, strongly triquetrous, 1-celled, the thickened angles placentiferous, with about 10 ascending ovules in 2 rows upon each placenta. style very short, persistent: stigmas linear, deeply channeled down the inner side. Fruit a thin-walled several-seeded capsule bursting irregularly. Seeds oblong, slightly curved, longitudinally sulcate-striate, with thin close light-colored testa.

S. Hallii Watson Proc. Am. Acad. xiv, 272. Rhizome short, with numerous long fleshy-fibrous roots: stem not rising above the ground: leaves broadly lanceolate, acute, 3-6 inches long, 1-2 inches wide, narrowed below to sheathing petioles: pedicels 1-8, very slender, 2-3 inches long; outer segments of the perianth lanceolate or oblanceolate, 3-4 lines long, $1\frac{1}{2}$ lines wide, narrowed to a claw below, yellowish green speckled with red outside, striped with purple inside, bent outward near the middle, the

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upper half spreading or deflexed: inner segments linear-spatulate, shorter than the outer ones, incurved and connivent over the stigmas: filaments 1-2 lines long, about half as long as the ovary. On moist mossy banks along mountain streams, western Oregon.

7 TRILLIUM L. Sp. 339.

Glabrous erect herbs with short tuber-like rhizomes, short simple stems bearing scarious sheaths at base and 3 flat leaves in a whorl around a single large flower at the summit. Perianth of 6 distinct persistent segments: the 3 outer narrow, green and sepal-like; the 3 inner broader and usually white or red. Stamens 6, hypogynous; with short filaments and linear, mostly extrorse, anthers. Ovary sessile, 3-6-angled or lobed, 3-celled, with several to many ovules in each cell. Styles 3, stigmatic along the inner side. Fruit a 3-celled or imperfectly 1-celled many-seeded berry-like capsule. Seeds ovate, with close thin testa.

T. petiolatum Pursh Fl. 544. Stem 3-4 inches high, often scarcely exerted above the basal sheaths: leaves with ovate-elliptic to reniform blade 3-6 inches wide, on stout petioles as long or longer: flower sessile; sepals oblong-lanceolate, acute, about an inch long: petals dark purple, narrowly oblanceolate, scarcely longer than the sepals, 2-3 lines wide: anthers 6-8 lines long, dark purple: styles 5-6 lines long, recurved; ovary shortly beaked. On rich hillsides and in copses, eastern Oregon and Washington to Idaho.

T. chloropetalum. *T. sessile* var. *chloropetalum* Torr. in part. *T. sessile* var. *Californicum* Watson. Rhizome oblong to obovate, usually erect, about an inch long: stem 6-18 inches high: leaves broadly rhombic-ovate truncate, usually marked with whitish blotches, 2-6 inches long, often broader than long, obtuse, closely sessile: flower sessile: sepals elongated-oblong, obtuse, 10-12 lines long, 3 lines wide: petals white, oblanceolate, obtuse, 1-1½ inches long 3-4 lines wide, erect: anthers nearly sessile, white, about 6 lines long, longer than the stigmas. In wet copses, western Oregon to California.

T. ovatum Pursh Fl. 245. Rhizome oblong 1-2 inches long, horizontal: stem stout, 1-2 feet high: leaves rhombic-ovate, 3-8 inches long, usually acuminate, cuneately narrowed at base, sessile: peduncle slender, 1-3 inches long: sepals lanceolate, acute 1-2 inches long, 3-4 lines wide: petals broadly lanceolate, acute, 1½-2½ inches long, 4-12 lines wide, white, soon changing to rose-color and dark red: stamens 3-8 lines long; anthers yellow: styles slender, recurved or revolute at the apex. Common in wooded districts, California to Brit. Columbia.

T. rivale Watson Proc. Am. Acad. xx, 378. Rhizome oblong, 6-10 lines long, horizontal: stem slender, 2-10 inches long, erect or ascending, leaves ovate, obtuse and apiculate to acute or acuminate, 1½-3 inches long: rounded or subcordate at base, on petioles 4-10 lines long: flower on a slender usually declined peduncle 1-3 inches long: sepals broadly lanceolate, acute to acuminate 6-10 lines long: petals broadly lanceolate to ovate, acute to acuminate, narrowed below to a claw, but little longer than the sepals, white, speckled with purple near the centre: stamens about equaling the short recurved stigmas: capsule slightly if at all lobed. On rocky banks in the Coast Mountains, southern Oregon and adjacent California.

ORDER XCVIII MLANTHACEÆ R. Br. Prodr. i, 272.

Leafy-stemmed herbs with rootstocks or bulbs, broad or

grass-like leaves and perfect, polygamous or dioecious flowers in terminal racemes, panicles or umbels. Perianth of 6 distinct or nearly distinct mostly persistent segments. Stamens 6, borne on the base of the perianth-segments. Anthers small, 2-celled or confluent 1-celled, cordate or reniform, mostly extrorsely dehiscent. Ovary 3-celled, superior or partly inferior, with few to numerous anatropous or amphitropous ovules in each cell. Styles 3, distinct or more or less united. Fruit a mostly septicial few- to many-seeded capsule. Seeds commonly appendaged. Embryo small, in copious albumen.

* Leaves not rigid nor equitant: flowers usually polygamous: anthers 1-celled, peltate after opening.

- 1 **Veratrum** Stems tall and stout, from a thick rootstock: leaves broad, strongly nerved and plicate.
- 2 **Stenanthella** Stem erect, from a coated bulb: leaves linear, keeled: flowers in paniced racemes: perianth nodding, its segments acuminate, without glands.
- 3 **Zygadenus** Stem erect, from a coated bulb: leaves linear: inflorescence racemose or subpaniculate: perianth erect, the segments not acuminate, glandular at base.
* * Flowers perfect, on bracteolate pedicels in a simple raceme on an equitant-leafy stem from a creeping rootstock: anthers 2-celled, introrse: seeds numerous.
- 4 **Tofieldia** Flowers involucrate with 3 scarious united bractlets: filaments naked; style short: capsule ovate, 3-beaked: seeds horizontal, not caudate.
- 5 **Abama** Bractlets linear: filaments woolly: style none: capsule oblong, attenuate upward: seeds ascending, caudate at each end.
* * * Stems stout, very leafy, from a thick rhizome: leaves very narrow, rigid and rough-margined: flowers perfect, on naked pedicels in a simple dense raceme.
- 6 **Xerophyllum** Flowers white, on long pedicels: segments 5-7-nerved: seeds few, not appendaged.

1 VERATRUM L. Sp. 1044.

Tall perennial herbs with thick rootstocks, broad strongly veined plicate leaves and rather large flowers in a terminal pubescent panicle, the lower flowers mostly staminate only. Perianth of 6 distinct similar segments. Stamens free, with subulate filaments and cordate confluent 1-celled anthers that are peltate after opening. Ovary sessile, 3-celled. Styles distinct, stigmatic at the apex. Capsule membranaceous, 3-beaked by the persistent diverging styles, septicial to the base. Seeds several in each cell, ascending, compressed and margined or winged, with close thin whitish testa.

V. virida Ait. Hort. Kew. iii, 422. Stems stout, 2-7 feet high, very leafy: leaves broadly elliptical and acute, or the upper ones lanceolate and acuminate, 3-9 inches long: branches of the simple panicle slender, more or less drooping: bracts foliaceous, lanceolate, usually nearly equalling the

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V. Californicum Durand Journ. Philad. Acad. iii, 103. ? Stems very stout, 3-10 feet high, very leafy: lower leaves broadly oval, 6-12 inches long, 4-8 inches wide, obtuse to acute; the uppermost ones lanceolate, much reduced and bract-like: branches of the panicle slender, ascending: bracts ovate-lanceolate to subulate, shorter or several times longer than the pedicels: segments of the perianth greenish-white, lanceolate, obtuse, attenuate at base, 8-10 lines long, entire, or denticulate above, slightly adnate to the ovary: stamens 3-5 lines long: ovary glabrous: capsule an inch or more long. In swamps, Washington to California and Colorado.

V. caudatum Heller Bull. Torr. Bot. Club xxvi, 588. by the description does not differ from the above except in glabrous leaves: it grows in wet meadows, Chehalis County, Washington.

2 **STENANTHELLA** Rydberg Bull. Torr. Bot. Club xxvii, 530.

Erect glabrous herbs with coated bulbs, few narrow leaves and perfect flowers in bracted racemes or panicles. Perianth of 6 distinct lanceolate acuminate subequal marcescent segments without glands or distinct claw. Stamens 6, shorter than the perianth-segments and inserted on their bases, free. Anthers reniform, confluent 1-celled and peltate after opening. Ovary ovoid, superior. Styles 3. Capsule 3-beaked, septicidal to the base. Seeds oblong, winged.

S. occidentalis Rydb. l. c. 531. *Stenanthium occidentale* Gray. Bulb oblong-ovoid, 4-6 lines in diameter: stem slender, 10-20 inches high: leaves linear-lanceolate, acuminate, 6-12 inches long, 3-12 lines wide: raceme simple, or branched at base: bracts somewhat scarious, broadly lanceolate, acuminate, 3-12 lines long: pedicels slender, spreading or recurved, longer than the bracts: flowers campanulate, nodding: segments of the perianth brownish-purple, 6-8 lines long, oblong to lanceolate, acuminate, the tips spreading or recurved: capsule at length strictly erect, 6-8 lines long, attenuate into the elongated slender styles: seeds linear, flat, winged, 3-4 lines long. On rocky banks and bluffs, Oregon to Brit. Columbia and Idaho.

3 **ZYGADENUS** Michx. Fl. i, 213. (1803.)

Erect herbs with coated bulbs, leafy stems, linear leaves and rather small white or yellowish flowers in terminal glabrous panicles or racemes. perianth of 6 distinct similar marcescent segments bearing 1 or 2 glands just above the narrowed base. Stamens free from the perianth-segments and about equalling them in length: anthers cordate or reniform, confluent 1-celled. Capsule 3-lobed and 3-celled, the cells not diverging, dehiscent to the base. seeds several or numerous in each cell, oblong or linear, angled.

* Flowers rather large, mostly perfect.

Z. elegans Pursh Fl. 241. Stem 6 inches to 3 feet high: leaves glaucous, 2-6 lines broad: raceme simple, or sparingly branched below, often few-flowered: bracts ovate-lanceolate, usually purplish: perianth adnate to the base of the ovary, its segments broad, oval or obovate, obtuse, 4-5 lines

the inner abruptly contracted to a broad claw; gland obcordate: styles about 2 lines long: seeds oblong, angular, not margined, 2 lines long. In moist places, eastern Oregon to Alaska and Illinois.

Z. Douglasii Torr. Pac. R. Rep. vii, *Z. Fremonti* Watson. Stem rather stout, $1\frac{1}{2}$ - $2\frac{1}{2}$ feet high: leaves 6-12 lines wide, nearly as long as the stem: bracts mostly green, ovate, acuminate, 6-15 lines long; pedicels stoutish, 1-2 inches long, exceeding the bracts: perianth-segments white or yellowish, free from the ovary, 5-7 lines long, the outer not clawed, the inner contracted to a broad claw: glands irregular, toothed on the upper margin: stamens about half as long as the segments: styles about a line long: capsule 6-12 lines long: seeds less than 2 lines long. Along the coast, southern Oregon to California.

* * Flowers smaller, polygamous.

Z. paniculatus Watson Bot. King 343. Stem usually stout, 1-2 feet high: leaves 6-8 inches long, usually all sheathing, roughish on both sides, mostly falcate: raceme usually paniced, many-flowered: bracts mostly scarious, shorter than the pedicels: segments of the perianth 1-2 lines long, oblong, acute, rather abruptly contracted to a claw: gland not very definitely margined, often reaching nearly to the middle of the blade: stamens equalling or longer than the segments: capsule oblong-ovate, 6-12 lines long. On dry foothills, eastern Oregon and Washington to Montana and Nevada.

Z. venenosus Watson Proc. Am. Acad. xiv. 279. Stem rather slender, 8-30 inches high: leaves 4-15 inches long, 2-3 lines wide, scarious, the cauline not sheathing: racemes usually simple, with narrow scarious bracts: perianth free from the ovary, its segments triangular-ovate to elliptical, obtuse or rarely acutish, 2-3 lines long, all abruptly contracted to a short glandular claw, the blade rounded or subcordate at base: gland extending slightly above the claw, with a well defined irregular margin: stamens longer than the segments: capsule 4-6 lines long: seeds $1\frac{1}{2}$ - $2\frac{1}{2}$ lines long. Common in meadows, California to Brit. Columbia and Utah.

Z. intermedius Rydb. Bull. Torr. Bot. Club, xxvii, 535. Stem rather stout, 1-2 feet high: leaves scarious on the margins and midrib, 6 inches or more long, 3-5 lines wide, keeled and sometimes conduplicate, all with conspicuous scarious sheaths at base: raceme rather long: segments of the perianth 3-4 lines long, obtuse, the outer ones broadly ovate and acute or rounded at base, short-clawed, the inner oblong, subcordate at base, with a claw half a line long: gland almost semi-orbicular, the upper margin toothed but thin and not well defined. Idaho to Montana and Utah.

Z. gramineus Rydb. l. c. Stem slender. 8-14 inches high: leaves narrowly linear, scarious on the margins and midrib, 4-8 inches long, 1-3 lines wide, conduplicate and somewhat falcate, all with distinct scarious sheaths surrounding the stem: racemes rather short: bracts scarious, lanceolate, long-acuminate: outer segments of the perianth broadly ovate, obtuse, acute at base and very short-clawed, inner ones ovate obtuse, subcordate at base, with a claw about a line long: gland almost semi-orbicular, the upper edge toothed but thin and not well defined: capsule elongated-ovoid, 4-5 lines long. Idaho to Alberta and Nebraska.

4 TOFIELDIA Huds. Fl. Angl. ed. 2, 157. (1778.)

Perennial herbs with short running rootstocks, fibrous roots, erect stems, linear somewhat 2-ranked and equitant leaves clustered at the base and small perfect white or greenish flowers in a terminal bracted raceme, the flowers usually involucrate by 3

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T. glutinosa Pers. Syn. i, 399. Stem viscid-pubescent with black glands, 6-20 inches high, bearing 2-4 leaves near the base: radical leaves tufted, 3-7 inches long, 1-8 lines wide: raceme oblong, the upper flowers first appearing: pedicels commonly clustered in 3's, ascending viscid-pubescent, becoming 2-6 lines long in fruit: involucre bracts minute, united nearly or quite to their apices, borne just below the flower: segments of the perianth oblong, mostly obtuse, about 2 lines long, membranous: capsule oblong, about 3 lines high, 3-valved: seeds tailed at both ends. In mountain marshes, Oregon to Alaska and across the Continent.

T. intermedia Rydb. Bull. Torr. Bot. Club, xxvii, 528, Stem slender, about a foot high, viscid-pubescent with black glands above, leafy below: leaves 3-10 inches long, ¾-3 lines wide: raceme dense, 6-12 lines long: bracts broad ovate: pedicels usually 3 together, a line or less long: involucre bracts 3, broadly triangular, united for ¾ their length: segments of the perianth oblong, about a line long, acute, bright white, drying yellowish: capsule ovoid, about 3 lines long: seeds appendaged. In mountain marshes, Oregon to Alaska.

T. occidentalis Watson Proc. Am. Acad. xiv, 283. Stem stout, 1-3 feet high, glandular above, sparingly leafy below: leaves 2-12 inches long, numerous: raceme 1-2 inches long, dense: pedicels 2-3 together, 2-3 lines long, viscid below the involucre bracts which are united to the middle: segments of the perianth oblong, about 3 lines long: capsule obovate, 3-4 lines long, long-beaked: seeds angular-ovate, with loose white spongy testa and a slender tail at the outer end nearly as long as the body. In marshes, northern California to the Cascade Mountains in Washington.

5 ABAMA Adans. Fam. Pl. ii, 47. (1763.)

NARTHECIUM Juss. Gen. 47. (1789.)

Perennial herbs with creeping or horizontal rootstocks, fibrous roots, erect simple stems, linear grass-like leaves and small perfect flowers in terminal bracted racemes, the pedicels bracteolate near the middle. Perianth of 6 distinct persistent segments. Stamens 6, hypogynous, distinct: filaments subulate, pubescent: anthers linear, attached by the base, introrse. Ovary sessile, linear-oblong, 3-celled, many-ovuled, attenuate upward to the small slightly lobed stigma. Capsule thin-chartaceous, loculicidally 3-valved. Seeds numerous ascending from near the base, small and linear, with thin transparent testa, and a long bristle-like tail at each end.

A. Californica Heller. *Narthecium Californicum* Baker. Rootstocks slender, with scarious scales at the nodes: stems slender, densely tufted, 10-20 inches high: radical leaves 5-6 inches long, 1-2 lines wide, cauline

2 or 3, short: raceme loose, becoming 3-15 inches long, 30-40-flowered: pedicels 3-6 lines long, twice longer than the linear-lanceolate bracts and bractlets: segments of the perianth 3-4 lines long, a third longer than the stamens, bright yellow: filaments woolly except near the top: capsule exerted, the cells 10-15-seeded. In marshes in the Coast Mountains, southern Oregon and northern California.

6 XEROPHYLLUM Michx. Fl. i, 210. (1803.)

Tall perennial herbs with thick short woody rootstocks, coarse fibrous roots, simple erect leafy stems, narrow linear serrulate persistent leaves and many small white flowers in a terminal raceme. Perianth of 6 distinct several-nerved persistent segments. Stamens 6, inserted at the base of the segments, with filiform-subulate filaments and rounded extrorse laterally dehiscent anthers. Ovary sessile, ovate, 3-lobed, with 1-2 pairs of ovules in each cell. Capsule chartaceous, loculicidally dehiscent to the base, and sometimes also septicial. Seeds 2-4 in each cell, ascending, oblong, somewhat triangular-flattened, with thin longitudinally wrinkled, rather light-colored testa.

X. tenax Nutt. Gen. i, 235. Rootstock often an inch thick or more: stems stout, 2-6 feet high, leafy below: radical leaves numerous, 1-3 feet long, about 2 lines wide. flat above, rather rigid; cauline leaves shorter, scattered, gradually reduced upward: racemes at first dense, elongating and becoming 1-2 feet long: lower bracts foliaceous and serrulate, the upper scarious and often upon the lower part of the pedicel: pedicels an inch or two long, erect in fruit: segments of the perianth 4-5 lines long, scarcely equalling the stamens: styles 2 lines long: capsule broadly ovate, acute, nearly 3 lines long, 3-valved: seeds narrowly oblong. Common in the high mountains, California to Brit. Columbia and Idaho.

X. Douglasii Watson Proc. Am. Acad. xiv, 284. "Pedicels shorter, (6-15 lines long): flowers smaller, the segments (2½ lines long) exceeding the stamens: styles a line long: capsule cordate-ovate, 2 lines long, 6-valved, the abruptly acute cells separating and then dehiscing: seeds shorter and broader. Oregon to Montana."

ORDER XCIX PONTEDERIACEÆ Dumort. Fam. 59. (1829)

Perennial aquatic or bog plants with grass-like or petioled thick leaves and perfect more or less irregular solitary or spiked flowers subtended by leaf-like spathes, Perianth free from the ovary, corolla-like, 6-parted. Stamens 3 or 6, inserted on the tube or the base of the perianth: filaments filiform, dilated at base or thickened at the middle: anthers 2-celled, linear-oblong or rarely ovate. Ovary 3-celled with the placentæ in the axis, or 1-celled with 3 parietal placentæ. Style filiform or columnar, with terminal entire or minutely toothed stigma. ovules anatropous, numerous, sometimes only one of them perfect. Fruit a many-seeded capsule or 1-seeded utricle. Embryo central, cylindrical, in copious albumen.

1 HETERANTHERA R. & P, Prodr. Fl. Per. 9. (1794.)

Herbs with creeping, ascending or floating stems, grass-like or petioled leaves and small yellow, white or blue flowers subtended

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