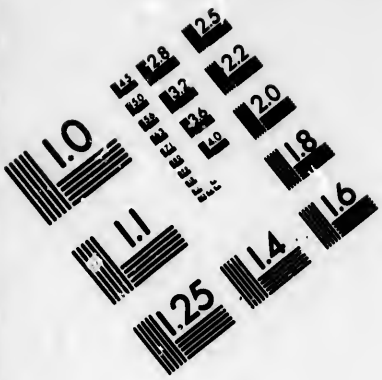

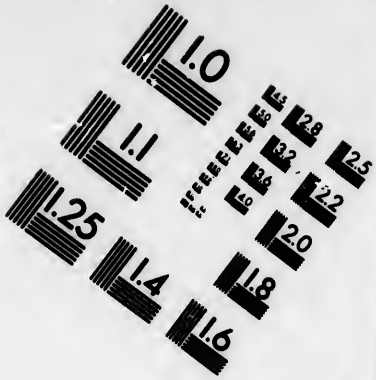

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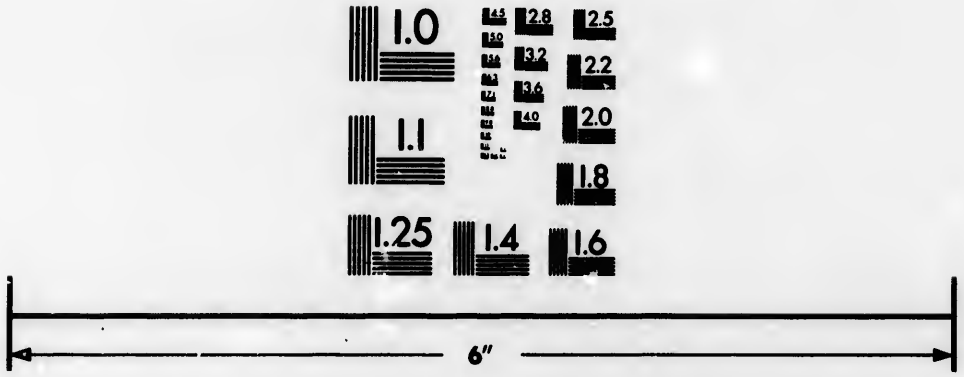

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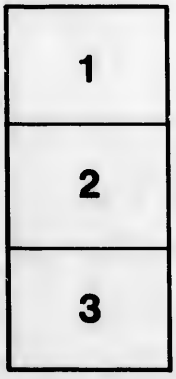

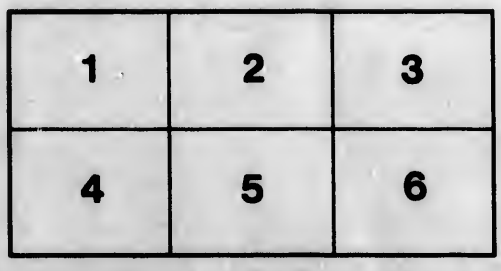

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CONTAINING

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.

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April 1st, 1898.

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calyx and stamens 5; petals wanting: fruit black, 3-lobed, 3 lines long, equalling the pedicels. Eastern Washington to California, east to Canada and New England.

§ 2 FRANGULA Brongn. l. c. Seeds and nutlets convex on the back, the raphe lateral; flowers mostly perfect, in pedunculate cymes.

R. Californicus Esch. Mem. Acad. Petr. x, 281. A spreading shrub 4-18 feet high; young branches somewhat tomentose: leaves ovate-oblong to elliptical, 1-4 inches long, 6-18 lines broad, acute or obtuse, mostly rounded at base, denticulate or nearly entire, persistent: peduncles with numerous mostly abortive flowers in subumbellate fascicles: calyx usually 5-cleft; petals very small, broadly ovate, emarginate: fruit very dark purple, 3-4 lines in diameter, 2-3-lobed and 2-3-seeded; pulp thin. From Klamath lake, Oregon, to southern California.

R. occidentalis Howell P. C. Pl. Coll. 1887. Erect shrub 2-10 feet high: smooth throughout or the young branches and petioles minutely scabrous: leaves coriaceous, yellowish-green, elliptical, acute to obtuse or retuse, obscurely repand-dentate, 1-2 inches long by 6-15 lines broad, persistent: peduncles with numerous flowers in subumbellate fascicles: calyx usually 5-cleft, the deltoid lobes with a raised callous down the centre: petals small, orbicular, 2-lobed at the summit: fruit black when mature, obscurely 3-lobed; pulp moderately thick. On gravelly hillsides and plains, along the eastern base of the Coast Mountains near Waldo, Josephine Co., Oregon.

R. Purshiana DC. Prodr. ii. 25. CASCARA. A tree 20—50 feet high: young branches tomentose: leaves elliptical, 2-7 inches long by 1-3 inches broad, mostly acute, obtuse or cordate at base, denticulate pubescent beneath, thin, deciduous: flowers perfect, comparatively large, in a somewhat umbellate cyme; sepals 5; petals 5, small, 2-lobed, embracing the very short stamens: styles united to the summit; stigmas 3: fruit black, turbinate, 3-seeded. Common from Brit. Columbia to California west of the Cascade Mountains.

CEANOTHUS L. Gen. n. 267.

Shrubs or small trees with petioled simple leaves and perfect flowers in lateral and terminal dense thyrsoid panicles or corymbs. Calyx 5-cleft, with acute connivent lobes, the upper part at length separating by a transverse line the tube remaining; disk thick, adnate to the turbinate or hemispherical tube and to the ovary. Petals 5, longer than the calyx, saccate and arched, on long claws. Stamens 5, exserted; filaments filiform; anthers, ovate, 2-celled. Styles 3, more or less united below, diverging above. Fruit subglobose, 3-lobed, surrounded at base by the adnate calyx-tube, soon dry, the 3 crustaceous nutlets at length separating and dehiscent by the inner suture. Seeds convex on the back.

§ 1 CEANOTHUS proper. Leaves all alternate, 3-ribbed from the base or pinnately veined, glandular-toothed or entire. Fruit not crested.

* Leaves 3-ribbed from the base.

+ Erect shrubs, the branches not rigidly divaricate nor spiny: leaves usually large, more or less serrate: inflorescence thyrsoid.

++ Inflorescence on leafless lateral shoots from wood of the previous

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season's growth.

C. sanguineus Pursh Fl. 167. A stout shrub 4-12 feet high with terete reddish branches: leaves thin, 1-4 inches long, ovate to elliptical, finely serrate, pubescent beneath, on slender petioles 6-15 lines long, deciduous: whole inflorescence white, 1-4 inches long, pubescent, the numerous flowers fascicled on the sides and at the ends of the short lateral branches: style shorter than the stamens, 3-lobed. Common on rocky hillsides, Brit. Columbia to northern California and Montana.

++ Inflorescence on lateral shoots of the previous year's growth or terminal on leafy shoots of the present season's growth.

C. velutinus Dougl. Hook. Fl. 1, 125, t. 45, (MOUNTAIN BALM). A smooth shrub 2—6 feet high, with terete green branches, cespitose, often decumbent at base, the branches somewhat pendulous; leaves orbicular-elliptical or elliptical-ovate, obtuse, subcordate, glandularly crenate above, serrulate, coriaceous, glabrous and shining above, (as if varnished and exuding a fragrant balsamic substance), velvety-canescent and strongly 3-ribbed beneath, 2—3 inches long, on petioles, 6—8 lines long, persistent; panicles axillary, thrice compound, elongated, on rather long peduncles; flowers white; styles as long or longer than the stamens. Common in mountainous districts, Brit. Columbia to eastern Oregon and the Rocky Mountains.

C. laevigatus. *C. velutinus var. lævigatus* T. & G. Fl. 1, 686. (SMOOTH MOUNTAIN BALM). A large shrub 8—15 feet high with smooth terete green erect branches: leaves orbicular to elliptical, 2—4 inches long, subcordate, finely glandular-serrate, dark green and shining above the whole upper surface glandular and exuding a balsamic fragrant substance, paler but smooth and prominently 3-ribbed beneath, thick-coriaceous, persistent: panicles axillary, compound, rather small, the peduncles but little if any longer than the leaves: flowers white. In forests, Vancouver Island to Northern California, near the coast.

C. Californicus Kell. Proc. Cal. Acad. 1, 55. *C. integerrimus* of recent authors not of H. & A. Bot. Beech. 329: *C. thyrsiflorus var. macrothyrsus Torr.* Bot. Wilkes 263. A slender branching shrub, 2—10 feet high, young branches more or less angled and pubescent: leaves thin, oblong to broadly lanceolate, 1—3 inches long, more or less serrulate toward the apex, pubescent with minute appressed hairs, on slender petioles 2—6 lines long, deciduous: flowers blue to white, fascicled on terminal and axillary peduncles from wood of the present season's growth; bracts ovate, shortly acuminate, 1—2 lines long: pedicels slender, 4—6 lines long: styles shorter than the stamens, united to near the summit. On dry open hillsides, from the Columbia river to California.

C. thyrsiflorus Esch. Mem. St. Petersb. Acad. x. 285. An erect shrub or small tree 6—15 feet high with strongly angled branches: leaves lanceolate, finely dentate, 1—2 inches long, on short petioles, deciduous: flowers blue, in dense subcompound racemes, terminating the usually elongated and somewhat leafy peduncle. Puget Sound to California, near the coast.

++ Erect shrubs, the branches usually rigid and spinose: leaves rather small: flowers in simple racemes or clusters.

C. divaricatus Nutt. T. & G. Fl. 1, 266. A straggling shrub with terete, often pruinose branches: leaves oblong-ovate to ovate, 4—15 lines long, rounded at base, lucid, somewhat obtuse, minutely and glandularly serrulate, pubescent beneath, somewhat coriaceous, on petioles about 2 lines long, persistent: flowers blue to white, in subsimple often elongated racemes 1—4 inches long. Southern Idaho to

outhern California.

C. cordulatus Kell. Proc. Cal. Acad. ii, 124, fig. 39. A densely ces-itose erect shrub with intricate branches and spinose branchlets, 4—6 eet high, hirsutely pubescent with short erect or spreading hairs and inereous: leaves oval to elliptical or oblong, 6—12 lines long, rounded r subcordate at base, finely glandular-serrulate, densely tomentose eneath, somewhat coriaceous on slender petioles 3—6 lines long, de-iduous: flowers white, in racemes or fascicles: styles united to ear the summit, shorter than the stamens. In the mountains of outhern Oregon and California.

§ 2 CERASTES Watson l. c. Leaves mostly opposite, 1-ribbed, ith numerous straight parallel veins, very thick and coriace-us, spinosely toothed or entire. Flowers in sessile or short-ped-ncled axillary clusters. Fruit large, with 3 horn-like or warty rocesses below the summit.

C. cuneatus Nutt. l. c. An erect shrub 2—12 feet high with rigid tricate branches; the young branches white with a villous tomen-m, at length smooth and whitish: leaves cuneate-obovate or ob-ng, rounded or retuse above, entire or rarely few-toothed, minutely mentose beneath, on short rather slender petioles: flowers white or rely light blue, in rather loose axillary fascicles. On dry hillsides, om the lower Willamette (the original locality,) to Lower California.

C. pumilis Greene Eryth. i, 149. A rigid depressed much branched der shrub: branches 6—18 inches long, rooting at the nodes and rming mats 1—3 feet in diameter: leaves cuneate-oblong to obo-te, 2—6 lines long, entire to spinose-dentate, but mostly 3-toothed at e apex, very minutely white-tomentose between the veins beneath, ry short petioled: flowers bright blue to white, fascicled at the ends short lateral branches; pedicels filiform, 6—8 lines long; sepals ate, spreading, nearly a line long; styles united to the top, shorter an the stamens. On dry hillsides, about Waldo, Josephine Co., Ore-n.

C. prostratus Benth. Pl. Hartw. 302. (MAHALA MATS). Glabrous, ostrate, the branches rooting and repeatedly subdivided, the whole rming a close mat 2—8 feet in diameter: leaves 3—12 lines long, ob-te or oblong-cuneiform, obtuse or truncate, with 2 or 3 pairs of rse spinose teeth above the middle, on short slender petioles: flow-dark blue to white, clustered at the ends of short stout peduncles: it large, with erect horns. In open pine forests, Washington to Cal-rnia.

ORDER XXIII VITACEÆ Lindl Nat. Syst. ed. 2, 30.

Mostly climbing shrubs with simple or compound leaves, upper ones opposite the racemes or thyrsoid panicles of all flowers, or tendrils. Calyx minute, nearly entire or 5-thed. Petals 4 or 5, inserted upon the outside of an annu-disk, inflexed, valvate in the bud, caducous. Stamens as ny as petals and opposite them, inserted on the surface of disk. Ovary 2 celled, with two collateral ovules in each . Style short or none: stigma simple. Fruit a globose, stly pulpy berry, often by abortion 1-celled. Seeds anatro-s, erect, with a hard testa. Embryo much shorter than the ny or fleshy albumen: radicle slender. Cotyledons lanceo-or subulate.

1 VITIS Tourn. Inst 613. L. Gen. n. 284. (GRAPE.)

Woody vines, climbing by tendrils that are opposite to leaves, with acid juice, mostly simple opposite leaves and small greenish flowers in compound racemes or panicles that are opposite the upper leaves. Calyx very small, entire or 4-5-toothed or -lobed, the tube filled with a fleshy annular disk which bears the 4 or 5 thick caducous petals and the distinct stamens. Fruit a more or less pulpy berry.

V. Californica Benth. Bot. Sulp. 10. Stems often 1–2 inches in diameter below, climbing trees to the height of 20–30 feet: leaves round-cordate with a deep and narrow sinus, 2–3 inches long, nearly as broad, obtuse, rather coarsely serrate and often somewhat 3-lobed, tomentose or canescent, especially beneath: fruit 4 lines in diameter, in rather large clusters, purple, covered with bloom: seeds broad. Along streams, from the Umpqua Valley, Oregon, to southern California.

ORDER XXIV ACERACEÆ J. St. Hil. Expos. Fam. ii, 15.

Trees or shrubs with opposite palmately lobed or pinnately 3–5-foliolate (rarely alternate and entire) leaves without stipules and small flowers in lateral or terminal racemes or fascicles that are often by abortion polygamous or dicœcious. Sepals 6, rarely 4–9, more or less united, imbricate in the bud. Petals as many as sepals and alternate with them, inserted around a commonly lobed hypogynous disk, sometimes wanting. Stamens usually 8, sometimes 3–12, distinct inserted on the disk; anthers introrse or versatile. Ovary 2-lobed, composed of 2 united carpels each containing 2 collateral ovules, or a single 2-ovuled carpel. Styles more or less combined, stigmatose on the inside or the stigma almost sessile. Fruit composed of 2, rarely 3 or 4, indehiscent samarioid carpels, finally separable from the filiform axis the wing thickened at the lower margin or a cartilaginous follicle. Seeds 1 or 2 in each cell, erect, with little or no albumen. Embryo curved or nearly straight, with foliaceous cotyledons variously folded upon each other.

1 **Acer.** Leaves opposite, palmately lobed or rarely divided: flowers in racemes or fascicles, polygamous.

2 **Forsellesia.** Leaves alternate, simple and entire: flowers solitary terminating short axillary branches or spur-like fascicles, perfect.

1 ACER Tourn. Inst. 615, L. Gen. 1155. (MAPLE.)

Trees or shrubs with opposite mostly palmately lobed leaves and small flowers in terminal racemes, umbel-like corymbs or fascicles. Calyx colored, usually 5-lobed. Petals 5, sometimes wanting. Stamens 3–12, usually 8, inserted with the petals upon a lobed hypogynous disk. Styles 2, elongated. Ovary 2-lobed, rarely 3- or 4-lobed, and as many celled, with a pair of ovules in each cell, becoming in fruit a double, rarely triple or quadruple, samara that is separable at maturity into 1-seeded indehiscent winged nutlets.

* Flowers in racemes: body of the fruit hispid.

A. macrophyllum Pursh Fl. 267. (LARGE LEAVED MAPLE). A tree 50—90 feet high, 1—3 feet in diameter: leaves 6—12 inches long, nearly as broad, cordate with a deep sinus, deeply 3—5-cleft, the segments cleft into 3—5 sinuate, acute lobes, pubescent beneath when young: flowers yellow, fragrant, in crowded pendent racemes 3—6 inches long, appearing after the leaves: calyx petaloid, campanulate, the broad obovate segments 2—3 lines long: petals obovate, about equalling the sepals: stamens 8—12 exserted, filaments hirsute at base style longer than the stamens, deeply 2-lobed: fruit densely hispid, the glabrous wing 1½—2 inches long. In mountain ravines and river bottoms, Brit. Columbia to California and Idaho.

* * Flowers in loose umbel-like corymbs or fascicles: fruit smooth.

A. glabrum Torr. Ann. Lyc. N. Y. ii. 172. (SMOOTH MAPLE). A shrub or small tree 6—30 feet high, 2—8 inches in diameter, glabrous throughout except the bud scales which are densely villous inside: leaves round-cordate with shallow sinus, 2—4 inches broad, nearly as long, more or less deeply 3-lobed or parted, the ovate acuminate lobes doubly serrate with acuminate teeth, conspicuously veined and reticulated: flowers few, greenish-yellow, somewhat corymbose, on short 2-leaved branchlets, appearing after the leaves: calyx campanulate, deeply 5-cleft, the spatulate segments about 2 lines long: stamens 8, shorter than the spatulate petals: fruit very smooth, with slightly spreading wings, about an inch long. Along streams and on the highest mountains, Vancouver Island to California and the Rocky Mountains.

A. circinatum Pursh Fl. 266. (VINE MAPLE). A large shrub 10—30 feet high, usually declined and somewhat viny: leaves round-cordate with a narrow shallow sinus, 3—5 inches long nearly as broad, 7—9 lobed nearly to the middle, the acute lobes doubly and sharply serrate, villous beneath and on the veins above when young, becoming glabrate: flowers in loose 10—20-flowered terminal corymbs; calyx dark red, deeply 5-lobed or parted, the ovate acute sepals 2—3 lines long, spreading: petals greenish white, about half as long as the sepals, ovate, acute, erect: stamens 8, exserted: style short; ovary villous: fruit 10—16 lines long, the wings spreading at right angles to the pedicels. In forests and along streams, Alaska to California, west of the Cascade Mountains.

2 FORSELLESIA Greene Eryth. 1, 206.

GLOSSOPETALON Gray Pl. Wright. ii, 29, t. 12. not Schreber.

Low and rigid shrubs with slender spinescent branches, and small alternate simple entire leaevs, which separate in age by an indistinct articulation from a dilated scale-like minutely 2-stipulate base; the setaceous-subulate stipules adnate to the scales, and small solitary flowers, terminating short axillary branchlets, or spur-like fascicles. Calyx deeply 4—5-cleft, persistent, its flat base within filled by an 8–10-lobed perigynous disk; petals 4 or 5, inserted on the margin or under the edge of the disk, somewhat withering-persistent. Stamens 8 or 10 inserted at the sinuses of the disk, shorter than the calyx; filaments subulate, persistent: anthers didymous. Ovary 1-celled, of a single ovoid carpel, with style extremely short or none, and a depressed entire or obscurely 2-lobed stigma. Ovules 2, collateral or nearly so inserted on the ventral suture barely above the base of the

cell, ascending, anatropous. Fruit a firm-coriaceous follicle opening down the ventral suture, 1–2-seeded.

F. spinescens Greene l. c. *Glossopetalon spinescens Gray l. c.* A smooth rigidly branched shrub 2–3 feet high: leaves oblong to spatulate, narrowed below on slender pedicels 2–4 lines long, acute or obtuse: flowers on slender pedicels 2–4 lines long: lobes of the calyx oblong, a line or more long: petals white, 4–5 lines long, spatulate, attenuate below to a short slender claw: stigma nearly sessile, 2-lobed; ovary acute; fruit not seen. Bluffs of Snake river (Cusick).

ORDER XXV. ANACARDIACEÆ. Lindl. Nat. Syst. ed. 1.

Shrubs or trees with resinous or milky juice, simple or compound leaves without stipules, and small flowers in axillary or terminal panicles. Flowers usually regular, perfect, dioecious or polygamous. Sepals usually 5, distinct or more or less united, mostly persistent. Petals of the same number as the sepals, or wanting, inserted into the disk which lines the bottom of the calyx. Stamens as many as sepals, or twice as many, or more, sometimes part of them sterile; filaments distinct, sometimes alternately shorter, inserted with the petals. Ovary solitary, free, or rarely adhering to the calyx, 1-celled, or with 1 or 2 abortive cells; ovule solitary, on a funiculus which rises from the base of the cell. Styles 3, rarely 4, distinct or combined. Fruit a 1-seeded indehiscent drupelet. Seed erect or suspended, anatropous, without albumen. A large order, represented here only by the genus

RHUS L. Gen. n. 361.

Shrubs or small trees with alternate leaves and small polygamous or polygamo-dioecious flowers in axillary and terminal bracteate racemes or panicles. Calyx small, 4-6-parted, persistent, imbricated in the bud. Petals 4-6, imbricated in the bud. Stamens as many or twice as many as petals, with subulate filaments, inserted under the edge of the disk. Fruit a dry drupelet. Seed pendulous upon a slender seed-stalk arising from the base of the cell.

* Flowers polygamous or dioecious; panicled, developed with or after the leaves.

R. glabra L. Sp. 1, 265. (SUMACH). An erect shrub 4—12 feet high, smooth and glaucous when young: leaves oddpinnate; leaflets 13–31, petiolulate, oblong to lanceolate, acuminate, acutely serrate 1—3 inches long: inflorescence terminal, thyrsoid, hirsute: sepals broadly subulate, about a line long: petals oblong, a little longer than the sepals: drupelets clothed with crimson acid hairs: seeds smooth, about a line long. In ravines and along streams, eastern Oregon to Brit. Columbia and the south Atlantic States.

R. toxicodendron L. Sp. 266. Stems erect, 1—3 feet high; leaves trifoliolate, pubescent; leaflets rhomboid, acuminate, entire or toothed, the lateral ones more or less oblique: panicles axillary; racemes subsessile; flowers mostly dioecious: fruit white, subglobose, smooth, persistent. Along small streams, eastern Oregon to the Atlantic States.

R. diversiloba T. & G. Fl. i, 218. (Poison Oak). Stems erect and shrubby or climbing by rootlets attached to the bark of trees; 2—20 feet high, usually somewhat pubescent: leaves usually 3-foliolate rarely 5-foliolate; leaflets ovate, obovate or elliptical, 1—3 inches long, obtuse or acutish, 3-lobed or coarsely toothed, (rarely entire), the lobes and teeth rounded: panicles pedunculed: flowers dioecious: fruit white, 2—3 lines in diameter, falling soon after maturing. In forests and rocky hillsides, Brit. Columbia to California.

* * Flowers polygamo-dioecious, in short scaly-bracted spikes preceding the leaves.

R. trilobata Nutt. T. & G. Fl. i, 219. A shrub 2—5 feet high, diffusely branched, more or less pubescent, at length nearly glabrous: leaves trifoliolate: leaflets sessile, cuneate-obovate or rhomboidal, 1—2 inches long, coarsely toothed above and often 3-lobed, the segments obtuse: spikes of small yellowish flowers 4—6 lines long, approximate at the ends of the branchlets: fruit somewhat viscid, 2—3 lines in diameter, globose, bright red; nut smooth. On gravelly plains and hillsides, along streams, southern Oregon to California and the Rocky Mountains.

Order XXVI. LEGUMINOSÆ Bœrh. Hor. Acad. ii, 22.

Herbs shrubs or trees with alternate usually compound stipulate leaves, and usually showy flowers in axillary or terminal racemes or spikes, rarely solitary or capitate. Sepals united into a 5-cleft or 5-toothed calyx, the lobes often unequal or variously combined, the odd one inferior. Petals 5, sometimes by abortion fewer or wanting, perigynous or hypogynous, irregular and unequal, or sometimes regular, distinct or variously cohering, the odd one superior. Stamens mostly 10, diadelphous (9 and 1) or monadelphous, sometimes distinct or numerous, inserted with the petals. Ovary simple, solitary, very rarely two or more, free from the calyx, the style protruding from the upper or ventral suture: stigma simple. Fruit a 1-celled 2-valved pod (legume), or sometimes a drupe. Seeds solitary or several, heterotropous or anatropous, sometimes with an aril or large caruncle: albumen none. Embryo straight or with the radicle bent back along the edge of the cotyledons. Cotyledons thin and somewhat foliaceous, or thick and fleshy. Ours are all of

Suborder Papilionaceæ L.

Sepals imbricate or rarely somewhat valvate in the bud. Corolla papilionaceous or otherwise more or less irregular, rarely wanting Stamens 10, rarely fewer, inserted with the petals into the bottom of the calyx, or perigynous. Radicle bent back upon the edge of the cotyledons, or straight. Leaves simple or simply compound. Flowers usually perfect.

Tribe I. Podalyrieæ. Herbaceous or suffrutescent plants with palmate, or pinnate or simple leaves and papilionaceous flowers. Stamens 10, distinct; anthers uniform. Embryo incurved or inflexed, or often straight.

1. **Thermopsis.** Herbs with conspicuous stipules, digitately trifoliolate

leaves and yellow flowers in racemes.

TRIBE II. GENISTEÆ. Herbs or shrubs with palmately compound or simple leaves and various colored flowers in racemes or solitary. Stamens 10, monadelphous: anthers of two forms. Radical, incurved or inflexed.

2. **Lupinus.** Herbs, rarely shrubby, with various colored flowers in racemes: leaves digitate, mostly of more than 3 leaflets: calyx deeply bilabiate: upper petal with recurved sides; keel falcate: pods large, straight.

3. **Ulex.** Spinescent shrubs with inconspicuous simple leaves and yellow axillary flowers.

4. **Cytisus.** Shrubs with green, often angular branches, palmately or pinnately trifoliolate leaves and solitary or racemose yellow flowers.

TRIBE III. TRIFOLIEÆ. Mostly low herbs with palmately or pinnately trifoliolate, rarely 5–7-foliolate leaves and axillary or terminal, racemose, spicate, capitate or umbellate inflorescence. Corolla papilionaceous. Calyx 5-lobed. Stamens diadelphous (9 and 1).

5. **Medicago.** Herbaceous or rarely shrubby plants with palmately trifoliolate leaves and axillary peduncles: petals free from the stamens, deciduous: pods 1–several-seeded, falcate-incurved, or coiled into a spiral.

6. **Melilotus.** Erect herbs with pinnately trifoliolate leaves and small fragrant flowers in slender axillary racemes: petals free from the stamens, deciduous: pods ovoid, small, scarcely dehiscent, 1–2 seeded.

7. **Trifolium.** Herbs with palmately or pinnately trifoliolate, rarely 5—7-foliolate leaves and mostly very many flowers on axillary or terminal peduncles: corolla persistent: the banner and wings commonly coherent with the staminal tube: pods concealed within or but little exserted from the calyx, 1—6-seeded.

TRIBE IV. LOTEÆ. Herbs or shrubs with pinnately 1–many-foliolate leaves and various colored flowers capitate or umbellate on axillary peduncles, rarely solitary.

8. **Lotus.** Herbaceous or suffrutescent plants with pinnate, usually 3—many-foliolate leaves and solitary or numerous flowers on axillary peduncles with or without a 1—3-foliolate bract at summit: corolla deciduous, the banner often remote from the other petals: pods oblong to linear, terete, turgid or plain, few or many-seeded.

TRIBE V. GALEGEÆ. Erect herbs, or shrubs with unequally pinnate, seldom stipellate leaves and axillary or terminal, racemose or spicate inflorescence. Corolla papilionaceous or otherwise irregular. Stamens diadelphous (9 and 1), or sometimes monadelphous. Pods continuous, 1-celled, several-seeded, dehiscent; or 1-2-seeded and indehiscent. Radicle incurved or inflexed.

9. **Psoralea.** Herbs with trifoliolate leaves and axillary spikes of rather small flowers; herbage glandular-dotted: stamens monadelphous or diadelphous: pods indehiscent, 1-seeded.

10. **Petalostemon.** Herbs with gland-dotted herbage unequally pinnate

leaves and small flowers in pedunculate dense terminal spikes or heads; petals 5, on filiform claws that are united to the stamen-tube the upper one free, all deciduous: stamens 5, monadelphous: ovary with two collateral ovules: pods 1-seeded.

TRIBE VI. ASTRAGALEÆ. Erect or decumbent herbaceous, rarely suffrutescent, plants with unequally pinnate leaves and axillary or radical, racemose or spicate inflorescence. Stamens diadelphous (9 and 1). Pods 1-celled or often spuriously 2-celled by the introflexion of one or both sutures, dehiscent, several-seeded or rarely 1–2-seeded. Radicle incurved.

11. **Astragalus.** Unarmed herbs with unequally pinnate leaves without tendrils and axillary spikes or racemes of comparatively small flowers: herbage neither glandular nor dotted: pods various, often coriaceous and turgid, or thin and bladderly-inflated, or thin and flat, more or less 2-celled by the intrusion of the dorsal suture: keel obtuse.

12. **Oxytropis.** Unarmed herbs or sometimes suffruticose plants, with unequally pinnate leaves: the flowers spicate on axillary or radical peduncles: pods partly 2-celled by the introflexion of the placental suture: keel with a subulate point.

13. **Glycyrrhiza.** Glandular-viscid perennials with unequally pinnate leaves and flowers in peduncled axillary spikes: pods short, compressed, prickly, indehiscent, few-seeded.

TRIBE VII. HEDYSAREÆ. Herbs or shrubs with pinnate or simple leaves, the flowers in axillary or terminal spikes, racemes or umbels. Stamens 10, monadelphous or diadelphous. Pods usually transversely divided into 1-seeded indehiscent joints.

14. **Hedysarum.** Herbs with unequally pinnate leaves, the flowers in axillary or terminal racemes: keel obliquely truncate, longer than the wings: stamens diadelphous: pods of several 1-seeded joints connected by their middle.

TRIBE VIII. VICIEÆ. Herbs with abruptly pinnate leaves, the common petiole not articulated with the stem, produced at the apex into a bristle or tendril, the flowers in axillary racemes. Stamens 10, diadelphous. Pods not jointed, dehiscent. Cotyledons remaining under ground and unchanged in germination. Radicle inflexed.

15. **Vicia.** Weak herbs with stems climbing by tendrils which terminate the pinnate leaves, and 1–several-flowered axillary peduncles. Style bent upward at the apex and villous under the stigma on the under or outer side.

16. **Lathyrus.** Herbs clinging by tendrils which terminate the pinnate leaves and few—several-flowered axillary peduncles: style bent at right angles to the ovary and villous in a line on the inside.

Tribe 1 Podalyricæ Benth. B. & H. Gen. i, 437. Mostly herbs with simple or digitately trifoliolate, rarely many-foliolate, leaves, and papilionaceous flowers. Stamens 10, free, or slightly united at base. Pod dehiscent. Radicle incurved or inflexed.

1 THERMOPSIS R. Br. in Ait. Hort. Kew. e. 2, iii, 3.

Stout perennial herbs with erect stems, digitately trifoliolate

leaves, foliaceous free stipules, petiolulate entire leaflets, and moderately large yellow flowers in terminal bracteate racemes. Bracts herbaceous, persistent. Calyx campanulate, 4-5-cleft to the middle, the lobes equal or the two upper ones united. Upper petal roundish, shorter than the oblong lateral ones, the sides reflexed, keel nearly sraight, obtuse, equalling the wings. Stamens 10, distinct. Style slightly curved; stigma minute. Pods narrow, compressed, few to many-seeded.

T. montana Nutt. T. & G. Fl. i, 388. Glabrous below, somewhat silky-villous above: stipules ovate to lanceolate, 1—2 inches long: leaflets oblong-ovate to oblong, 1—3 inches long, obtuse or acute, sparingly villous beneath, smooth above: bracts mostly lanceolate: lobes of the calyx triangular one and a half lines long: pods silky-villous, 2 inches long or more, nearly straight, erect, short stipitate, linear, 10—15-seeded. Along streams, Brit. Columbia to California and the Rocky Mountains.

T. gracilis Howell Eryth. i, 109. Sparingly strigose-pubescent throughout: stems slender, erect, 1—3 feet high, sparsely branched above the branches spreading: stipules broadly ovate to lanceolate, usually acute: leaflets oblanceolate, acute at base, petiolulate, 1—3 inches long by 8—12 lines broad: racemes short, loosely flowered: bracts ovate, acute, mostly shorter than the pedicels: lower teeth of the calyx triangular, acute, the upper truncate or barely 2-toothed: ovary about 12-ovuled: pods appressed-silky, 2 inches long or more by 2 lines broad, on a very short stipe, usually spreading and often falcate. In the mountains of southern Oregon from the sources of the Willamette river to northern California.

T. robusta Howell l. c. Densely tomentose throughout: stems stout, 4—6 feet high: stipules large, broadly ovate to orbicular-ovate, acute at both ends, 2—3 inches long: racemes long, densely many-flowered: bracts ovate-lanceolate, acuminate, longer than the pedicels: teeth of the calyx acuminate, the upper 2- toothed: fruit not seen. In open forests on top of the Coast Mountains on the old Crescent City Wagon road, collected in June, 1884, not since reported.

T. argentata Greene Eryth. iii, 18. Rather slender, a foot or two in height: all the growing parts, and when young the whole plant silvery-canescent throughout with a very dense and minute silky pubescence, the mature part also not indistinctly silky and pale: stipules 6—18 lines long, from broadly to narrowly lanceolate and often slightly falcate: leaflets of the lowest leaves obtusish and of narrowly cuneate-obovate outline, of the upper from oblanceolate to rhombic-obovate and very acute: raceme short and rather few-flowered: calyx-teeth triangular-subulate and about as long as the campanulate tube: petals of the wings and keel notably longer than the banner: pods long, spreading, silky-tomentulose. Modoc County, California, perhaps in southeastern Oregon.

Tribe 2. Genisteæ DC. Prodr. ii, 115. Herbs or shrubs with simple or compound estipellate leaves, and papilionaceous flowers. Stamens 10, monadelphous; anthers of two forms. Pod continuous, 1-celled, sometimes intercepted internally, but not jointed. Radicle incurved or inflexed.

2 LUPINUS Tourn. L. Gen. n. 865.

Herbaceous or rarely shrubby plants with palmately 5-15-folio-

late, rarely 1-foliolate, leaves, small stipules and mostly showy flowers in terminal racemes or spi Calyx deeply bilabiate, often 2-bracteolate; the upper lip cleft or -toothed, or rarely entire, the lower entire or 3-toothed. Upper petal with the sides reflexed, the lateral ones foveolate-plicate toward the base, united at the summit, keel falcate, acuminate. Stamens monadelphous, the sheath entire; alternate filaments longer; the 5 anthers opposite the sepals oblong, maturing early, those opposite the petals roundish or reniform, maturing later. Stigma bearded: Pod coriaceous, somewhat oblong, more or less compressed, often torulose or intercepted with cellular partitions. Cotyledons fleshy.

§ 1 LUPINUS PROPER. Flowers in terminal racemes. Sides of the upper petal strongly reflexed. Ovary 5–12-ovuled. Cotyledons petioled after germination.

* Perennial, shrubby, at least at base, tall, branched and leafy: pubescence silky, mostly appressed: leaflets 5–7: petioles rarely much exceeding the leaves; bracts deciduous; flowers large; lips of the calyx nearly equal: ovules 8–12.

L. holosericeus Nutt. T. & G. Fl. I, 380. Frutescent, silvery-canescent: stems 12—20 inches high, leafy, branching, ascending: leaflets 5—9, lanceolate, obtuse or acute, mucronulate, narrowed at base, often arcuate, densely silky-canescent and silvery on both sides, mostly shorter than the petiole or the upper ones as long or longer than the petiole: stipules subulate: flowers verticillate or somewhat scattered, approximate, on short pedicels: bracts lanceolate, shorter than the flowers: calyx bracteolate the upper lip slightly 2-cleft, the lower nearly as long and entire: petals bright blue, 6 lines long or more, the lateral ones broadly oblong. Islands and gravelly banks of the Willamette river, to California.

L. propinquus Greene Eryth. i. 126. Shrubby, much branched and bushy, usually 2—4 feet high, all the herbage except the glabrous upper surface of the leaves puberulent; racemes short and short-peduncled, the flowers indistinctly whorled: bracts squarrose spreading, very caducous: lobes of the calyx subequal, the upper notched, often deeply so: petals 5 lines long, subequal, violet, the upper one reddening in age; keel strongly ciliate. In damp woods along the coast from Santa Barbara to Crescent City, California; no doubt on the coast of southern Oregon.

* * Perennials: stems wholly herbaceous, more or less elongated.

+ Leaflets glabrous above or nearly so, oblong or oblanceolate an inch or more long; stems mostly succulent and fistulous: flowers subverticillate: bracts deciduous: lips of the calyx usually but slightly toothed: ovules 8 or more.

L. Nootkatensis Donn Cat. Cant. Sims Bot. Mag. t. 1311. Stems often stout, 1—2 feet long, more or less decumbent, leafy: pubescence densely villous, spreading or subappressed: stipules elongated, setaceous-acuminate: leaflets 6—8, cuneate-oblong, obtuse or acutish, mucronate, 1—2 inches long, about equalling the petiole: racemes elongated, nearly sessile: bracts linear-lanceolate, equalling the calyx: flowers blue or purplish, verticillate or scattered; pedicels 2—6 inches long; calyx large, with long setaceous bractlets, the upper lip rather deeply bifid and the lobes often erosely truncate, the lower one usually strongly 3-toothed: petals 8—9 lines long, the keel a little shorter and usually naked: ovules 9—12: pods 18 lines long. Near the sea,

northern Washington to the Aleutian Islands.

L. polyphyllus Lindl. Bot. Reg. xiii, t, 1096. Stems stout erect, 2—6 feet high, sparingly villous: the bracts calyx and youngest leaves silky-pubescent: stipules triangular to subulate: leaves distant, long-petioled; leaflets 10—16, in the upper leaves often but 8—10, glabrous above, 2—6 inches long by 6—12 lines broad: racemes often 1—2 feet long; bracts oblong-lanceolate, equalling or shorter than the calyx: flowers mostly scattered, blue, purple or white: pedicels 3—6 lines long: lips of the calyx subsequal, entire; bractlets very caducous; petals equal, 6—7 lines long, keel naked: ovules 8—10: pods an inch long or more. Common from Brit. Columbia to California, west of the the Cascade Mountains.

L. Wyethii Watson Proc. Am. Acad. 525. Stems ascending, stout, 6—.. inches high, sparingly leafy: pubescence villous, spreading: stipules setaceous: leaflets 8—12, oblong to oblanceolate, 1—3 inches long, acute, glabrous above; the lower petioles much elongated: racemes 4—10 inches long, often long-peduncled: bracts subulate-setaceous, exceeding the calyx: flowers blue or pink, scattered or subverticillate: pedicels slender, 3—4 lines long: calyx villous, with short setaceous bractlets, upper lip 2-toothed, the lower one longer, subentire: petals equal, 6—7 lines long, keel naked: ovules 7—8. Flathead river (Wye...) Clearwater, Idaho (Spalding).

L. longipes Greene Fl. Francis. 41. Stems more or less clustered, erect, stoutish, not at all succulent, sparingly branched above, 2—4 feet high, striate, glabrous or loosely hairy: leaves mostly basal, on petioles 12—18 inches long; stipules setaceous-subulate: leaflets 7—11, broadly lanceolate, acute, setaceously mucronulate, 2—4 inches long, glabrous, the margin often more or less ciliate: raceme peduncled, elongated, not dense: flowers subverticillate, long-pedicelled, blue to white, keel ciliate in the middle: pod an inch long or more, densely hirsute, about 7-seeded: seeds compressed, oval, brown with a dark diagonal line. Along streams and in wet meadows, from the Columbia river to California.

L. latifolius Agh. Syn. Lup. 18. Stems erect, 2—4 feet high, smooth, with numerous slender branches, flowering throughout the season: stipules small, linear-lanceolate: leaflets 7—9, light or yellowish green, oblanceolate or spatulate, narrowed below, mostly shorter than the petioles, 1—4 inches long by 3—12 lines broad, obtuse, with a slender mucro a line long at the apex, smooth above, rather sparsely pubescent with minute appressed hairs beneath: racemes 4—12 inches long, short peduncled; flowers subverticillate or scattered, pale blue or pinkish; bracts setaceous, about equalling the calyx, caducous; pedicels slender, 4—6 lines long; calyx appressed-pubescent, upper lip ovate-lanceolate, 2-toothed, shorter than the linear entire lower one: petals 6 lines long, light blue and white, the keel naked: ovary densely pubescent with brownish hairs, 7—8 ovuled: seeds light-colored, very smooth. In open places and among shrubs, Washington to California, west of the Cascade Mountains.

L. Burkei Watson Proc. Am. Acad. viii, 525. Stems 2—3 feet high, nearly glabrous: stipules lanceolate; lower leaves long-petioled; leaflets 7—10, 1—5 inches long, oblanceolate, acute or the lower ones obtuse, glabrous above: racemes short and dense, with the pedicels mostly but 1—2 lines long: flowers blue: bracts villous, somewhat persistent: pubescence of the calyx somewhat villous, spreading: pods 8-seeded. From Mount Adams, Washington, to the falls of the Yellowstone, Idaho and Nevada.

L. ligulatus Greene Pitt. i, 215. Stems clustered, simple, erect, stout and somewhat fistulous, 2—4 feet high, glabrous, a little glaucous; other parts of the plant except the upper surface of the leaves more or

+ + Leaflets pubescent both sides.

less hirsute: stipules an inch long, adnate for something less than half their length, the elongated-linear acuminate free part strongly villous-hirsute: petioles 3—5 inches long; leaflets about 9, oblanceolate, acute, 1—2 inches long: racemes short-peduncled, 6—10 inches long; bracts villous-ciliate: flowers rather distinctly verticillate, nearly 6 lines long; keel densely ciliate in the middle: ovary very villous. On Crooked Creek, southern Oregon.

L. littoralis Dougl. Bot. Reg. xiv, t. 1198. Stems slender, decumbent or ascending, 1—2 feet long often not succulent, leafy: pubescence silky, rather thin: stipules linear; leaflets 5—8, oblanceolate or cuneate-oblong, 6—12 lines long, the petioles sometimes twice longer: racemes short; bracts setaceous, exceeding the calyx: flowers blue or violet, verticillate or scattered on pedicels 2—3 lines long: calyx large with small bractlets, upper lip 2-toothed; petals equal, 6 lines long; keel ciliate: ovules and seeds 10—12: pods narrow, 15 lines long. On sand dunes along the coast, Washington to California.

+ + + Rather sparingly leafy, the lower petioles at least twice as long as the leaflets: racemes loose; bracts mostly deciduous; flowers large, not yellow: ovules 6—7, rarely fewer: leaflets glabrous above.

L. arcticus Watson l. c. 526. "Villous or subglabrous: stems rather stout, one foot high or less, erect or ascending, simple: stipules conspicuous, acuminate: leaflets 6—8, cuneate-oblong or oblanceolate, 1—2 inches long, acute or obtuse, the petioles much elongated: racemes 2—4 inches long; bracts linear about equalling the calyx, deciduous or subpersistent: flowers subverticillate or scattered, on slender pedicels 2—3 lines long: bractlets wanting or caducous: calyx-lips short, the upper entire or slightly toothed, the lower a little longer; petals 7—8 lines long, the upper one shorter: keel naked: ovary slightly hairy, 5—7-ovuled. Near the coast, Washington to the Polar Sea."

L. mucronulatus Howell Eryth. I, 109. Pubescence short and appressed: stems slender, decumbent, 2—6 inches long. 2—3 leaved: stipules subulate; leaflets 6—10, obovate to oblanceolate, obtuse or acutish, mucronulate, 1—2 inches long, sparingly pubescent on both sides or glabrous above: peduncles equalling the leaves: racemes 2—3 inches long, rather dense; bracts setaceous; flowers subverticillate, purple or ochroleucous; upper lip of the calyx acute, entire, the lower longer, narrow, subentire: petals 4—5 lines long, equal, keel ciliate above the middle. On dry hillsides, eastern base of the Coast Mountains in Josephine County, Oregon.

+ + + + Leafy and branching: the petioles not longer than the leaflets: flowers large: subverticillate: bracts deciduous: ovules 6-8.

L. Sabinii Dougl. Hook. Fl. I, 166. Stems erect, 2 feet high: pubescence short, appressed, silky: stipules long, setaceous; leaflets 8—11 oblanceolate, 12—18 lines long, acute, silky both sides, racemes 6—10 inches long, rather dense and long-peduncled: bracts linear-setaceous; pedicels 3—4 lines long; calyx minutely bracteolate, upper lip shortly toothed, the lower longer and entire; petals yellow, equal, 7—8 lines long, the upper one emarginate, naked, keel ciliate: ovules 7. In the Blue Mountains of Oregon.

L. albicaulis Dougl. l. c. 165. Pubescence short, more or less villous and spreading or appressed: cespitose; stems slender, erect, 1—3 feet high, branched, whitish: stipules linear-setaceous: racemes 4—12 inches long, short-peduncled; bracts subulate; pedicels 2—3 lines long; calyx large, the lips nearly equal, upper one narrow, shortly 2-toothed,

lower one subentire: petals equal, 5—7 lines long, blue, violet or whitish, the upper one acute, naked, keel strongly falcate, naked: ovules 5—7: pods 1—2 inches long, 4—5 lines wide, 3—6 seeded. From the Columbia to the Sacramento Valley.

L. ornatus Dougl. Bot. Reg. xiv, t, 1216. Stems decumbent or ascending: pubescence short, more or less silky, mostly appressed: stipules setaceous: leaflets 5—7, oblanceolate or cuneate-oblong, 8—24 lines long, acute or acutish: racemes 3—8 inches long, usually short-peduncled: bracts short, subulate or ovate; pedicles 2—3 lines long: calyx-lips nearly equal, the upper rather shortly toothed or bifid, the lower subentire; petals blue, equal, 5—7 lines long, the upper one acutish, subsilky on the back; keel ciliate: ovules 5—8. pods 15 lines long, 3—4 lines broad. From the Columbia river to California.

+ + + + + Leaves distant lower petioles elongated; leaflets not smooth above: racemes mostly dense.

L. sulphureus Dougl. Hook. Fl. i, 166. Stems erect slender, sulcate, silky: leaflets 13—15, narrowly lanceolate, densely sericeous on both sides, shorter than the petiole, whitish: stipules subulate, short: flowers somewhat verticillate, in a dense thick raceme: calyx ebracteolate, very silky: flowers small, pale sulphur-color, keel glabrous. On the Blue Mountains of Oregon.

L. sericeus Pursh Fl. 468. Rather stout, suberect, 1—2 feet high: pubescence more or less coarsely villous or subsilky, spreading: stipules usually long-setaceous: leaflets 5—8, rarely 10, narrowly oblanceolate, 1—3 inches long, acute; racemes short-peduncled; bracts deciduous, subulate-setaceous often much exceeding the calyx; flowers subverticillate or scattered, on short pedicels blue, pink or white; calyx strongly gibbous, minutely bracteolate, densely silky-villous, the lips nearly equal, 6 lines long, keel ciliate: ovules 4—6: pods densely hairy, an inch long. Common from Washington to northern California and Nevada.

L. saxosus Howell Eryth. i, 110. Stems simple, decumbent or ascending, 4—10 inches long, soft-pubescent with spreading hairs: stipules subulate: leaflets 8—12, densely appressed-silky beneath, sparsely so above, 6—12 lines long, acute or obtusish: racemes dense, 2—3 inches long, short-peduncled: bracts lanceolate, acuminate, caducous: flowers subverticillate, on short slender pedicels: upper lip of the calyx bifid, the lower a little longer, trifid: petals equal, 6 lines long, bright blue, the upper one obtuse, smooth, keel ciliate: ovules 4—5: pods villous. On high stony ridges in the John Day Valley, eastern Oregon, and the Klickitat hills, Washington.

L. leucophyllus Dougl. Bot. Reg. xiii, t, 1124. Stout, 2—3 feet high, branching, leafy, densely white-silky throughout: stipules long-setaceous or subulate: leaflets 7—10. oblanceolate or cuneate-oblong, 1—3 inches long, acute, the petioles about equalling the leaflets or the lower ones twice longer: racemes sessile or nearly so, very dense. 6—12 inches long: bracts subulate or linear, subpersistent or deciduous, longer than the buds: flowers scattered or subverticillate, nearly sessile: calyx minutely bracteolate, upper lip rather broad, more or less villous, keel ciliate. On dump hillsides, Brit. Columbia to California and New Mexico. Flowering from May until heavy frosts in autumn.

L. canescens Howell, l. c. Rather stout, strict, 2—3 feet high, at length branching, silky-canescent or the inflorescence hirsute: leaflets 8—12, lanceolate, acuminate, 1—3 inches long, densely appressed-villous on both sides: racemes short-peduncled, dense, 8—10 inches long:

bracts somewhat persistent, subulate, about equalling the calyx: flowers subverticillate, on stout pedicels a line long or more: upper lip of the calyx bifid, the lower subentire: petals 4 lines long, equal, the upper one rather broad, pubescent outside, keel ciliate. By small streams, western base of Buck Mountain, eastern Oregon.

L. lepidus Dougl. Bot. Reg. xiv, t, 1149. Stems slender, 6—24 inches high, leafy at base, densely appressed silky: stipules setaceous: leaflets 7—9, narrowly oblanceolate, 9—18 lines long, acute, petioles much elongated: racemes 2—8 inches long, many-flowered: bracts not exceeding the calyx, caducous: flowers in near verticils or scattered: pedicels 1—2 lines long: upper lip of the calyx 2-toothed or deeply cleft, the lower 3-toothed or subentire: petals violet, equal, 5 lines long, the keel ciliate: ovules 4—6: pods an inch long. In prairies and plains, Puget Sound to the Klamath Lakes.

+ + + + + + Stems leafy: petioles short: racemes short-peduncled: bracts deciduous, mostly short: flowers usually small, not yellow: ovules 3—5.

L. flexuosus Lind. in Agh. Syn. Lup. 34. Stems ascending or decumbent, 18 inches high, branching pubescence short, silky, appressed, or subvillous on the leaves: stipules linear-setaceous: leaflets 6—8, oblanceolate, 12—18 lines long, acute, silky on both sides: racemes 3—6 inches long or more; bracts lanceolate-setaceous, equalling or much exceeding the calyx; flowers subverticillate, on pedicels 2—3 lines long: lips of the calyx nearly equal, the upper slightly toothed, the lower subentire; bractlets short, setaceous; petals blue or flesh-color, equal, 5 lines long, the upper one very hairy, keel strongly ciliate: ovules 4—5; pods an inch long. Columbia valley to the Rocky Mountains.

L. parviflorus Nutt. H. & A. Bot. Beech. 338. Stems strict, usually solitary, slender, erect 2—3 feet high, at length branching: pubescence scanty, short, appressed, the calyx and pedicels silky: stipules setaceous: leaves rather distant; leaflets 5—11, oblanceolate to obovate, 1—2 inches long, acute or obtuse, mucronulate, glabrous above, the lower ones shorter than the petioles: racemes 6—12 inches long, slender; bracts linear-subulate, equalling the calyx; flowers subverticillate or scattered, the slender pedicels 1—2 lines long: lips of the calyx nearly equal, the upper bifid: petals light blue, equal, 3—4 lines long, keel ciliate or naked: pods 9—10 lines long, 2—4 seeded, pubescent. In the mountains, from the Columbia river to northern Utah and the Yosemite Valley, California.

L. laxiflorus Dougl. Bot. Reg. xiv, t. 1140. Stems cespitose, erect or ascending, 1—2 feet high, slender, at length much branched: pubescence minute, silky, appressed: stipules setaceous, mostly very small: leaflets 6—8, narrowly oblanceolate, canaliculate, arcuate, 1—2 inches long, acute, appressed-silky both sides or nearly smooth above, at least half as long as the petioles: racemes rather loose, 3—6 inches long: bracts subulate, deciduous: flowers subverticillate or scattered, on slender pedicels 2—4 lines long; calyx narrowed and more or less spurred at base, minutely bracteolate, the upper lip broad, shortly 2-toothed, lower one a little longer, almost oblong or broadly lanceolate, subentire; petals blue to white or yellowish, 3—5 lines long, equal, the upper one subpubescent, keel villous ciliate in the middle; ovules 4—5; pods silky-pubescent. Common from Vancouver Island to northern California, Utah and Montana.

Var. montanus Howell. Eryth. iii, 33. Leaflets silky both sides, rather shorter than the type: calyx dense-silky, prominently spurred, the upper lip more distinctly toothed. On Mount Hood, near the line of perpetual snow.

L. argenteus Pursh Fl. 468. Silvery canescent; stems erect or ascending, cespitose, 1—2 feet high, slender and branching: pubescence minute, silky, appressed: stipules small: leaflets 5—8, linear-lanceolate, 1—2 inches long, acute, smooth above or nearly so, about equalling the petioles: racemes 2—6 inches long, nearly sessile: flowers subverticillate or scattered; pedicels 1—2 lines long; calyx campanulate, gibbous but not spurred at base, upper lip broad, 2-toothed, the lower subentire, slightly longer; petals blue or cream-color, equal, 3—4 lines long, the upper one very broad, naked or subpubescent, keel naked or subciliate; ovules 3—5. Plains of the Columbia and Snake rivers.

* * * Dwarf, short stemmed, mostly cespitose: racemes mostly short and dense: bracts subpersistent; flowers subverticillate, short-peduncled: calyx with the upper lip deeply cleft, the lower 3- toothed, keel ciliate: ovules 3—6: pods hairy, 1—4-seeded.

L. cespitosus Nutt. T. & G. Fl. i, 376. Stems very short and cespitose: pubescence dense, villous, appressed: leaflets 5—7, oblanceolate, 6—12 lines long, acute, the petioles thrice longer: racemes sessile, shorter than the leaves: bracts setaceous, exceeding the calyx; petals pale blue, equal, 3—4 lines long, the upper one narrow, 2 lines broad: pods 6 lines long. Eastern Oregon to Colorado.

L. aridus Dougl. Bot. Reg. xv, t. 124. Stems cespitose, 2—3 inches long, with rather long internodes: pubescence silky-hirsute, fulvous, appressed: leaflets 5—7, oblanceolate, acute, 9—12 lines long, the petioles 3—4 times longer: racemes dense, 2—3 inches long, the peduncles shorter than the leaves: bracts nearly equalling the calyx: upper lip of the calyx shortly toothed, the lower subentire petals purple, 5 lines long, nearly twice longer than the calyx, the elliptical upper one usually shorter: pods 5 lines long, very hairy. In sandy or gravelly places, Washington to California.

L. Lobbii Gray in Herb. Watson l. c. 533. *L. aridus var. Lobbii Watson.* Stems cespitose, 1—3 inches long, leafy: pubescence silky, appressed: leaflets 5—7, oblanceolate to obovate, 6—8 lines long, the petioles 2—3 times longer: racemes dense, 1—2 inches long, peduncles shorter than the leaves: bracts nearly equalling the calyx: upper lip of the calyx deeply bifid, the lower slightly trifid; petals purple, the upper one orbicular. In alluvial prairies and hillsides, Washington to California.

L. minimus Dougl. Hook. Fl. i, 163. Appressed silky-villous, 3—6 inches high: leaflets 5—9, obovate or lanceolate, 3—8 lines long, mostly acutish, the petioles 3—4 times longer: pedicels equalling or exceeding the leaves: bracts short, deciduous: calyx half the length of the petals, upper lip deeply bifid; petals purple, 4—5 lines long, equal, the upper one orbicular. Eastern Oregon and Washington.

L. Cusickii Watson Proc. Am. Acad. xxii, 469. Canescent throughout with soft appressed hairs: stems 2—4 inches high, much branched from the biennial or perennial root: leaflets 5—8 oblanceolate, slightly less villous above, 3—9 lines long, the petioles usually elongated: peduncles mostly very short, the loosely few-flowered racemes shorter than the leaves: flowers purple, 3—4 lines long: calyx narrowly lobed, 1—3 lines long: upper petal glabrous, keel ciliate: pods villous with short appressed hairs, 2—3 seeded, 4—5 lines long. On sterile hillsides, Union County, Oregon.

L. Breweri Gray Proc. Am. Acad. vi, 334. Stems 2—6 inches long, from a spreading branched woody caudex, very leafy: pubescence dense, villous, appressed: leaflets 7—10 obovate, obtuse, 4—6 lines long, the petioles 1—2 times longer: racemes very short; peduncles equalling the leaves: bracts short; lips of the calyx nearly equal, the upper

one deeply bifid, the lower one shortly and equally toothed; petals blue, equal, 3—4 lines long, the upper one orbicular. Alpine, on the Siskiyou and Sierra Nevada Mountains.

L. Lyallii Gray l. c. Canescent with dense appressed villous pubescence: stems leafy, 2—6 inches long, from a spreading woody caudex: leaflets 5—7, obovate, 3—4 lines long, acutish, the slender petioles 3—4 times longer: racemes very short, the pedicels exceeding the leaves: bracts short: lips of the calyx nearly equal: petals purple or blue, 5 lines long, nearly equal, the upper one elliptical: pods silky, 4—6 lines long. Common on the highest points of the Cascade and Sierra Nevada Mountains from Washington to California.

* * * * Erect annuals: leaflets mostly 5—7: upper lip of the calyx 2-parted or bifid: keel mostly ciliate.

L. carnosulus Greene Bull. Cal. Acad. ii, 144. Erect annual, 1—2 feet high, simple or branched, stout and succulent: pubescence appressed, minute: leaflets pubescent both sides, oblanceolate, 6—12 lines long, obtuse but with a small recurved mucronation: the petioles 1—3 times longer: racemes loose, distinctly verticillate: bracts mostly exceeding the calyx: upper lip of the calyx deeply cleft, the lower entire: petals barely exceeding the calyx, 2 lines long, the upper one entire: petals 3—6 lines long, deep blue, keel villous in the middle: pods fleshy, an inch long. In open places, Willamette Valley to Marin County, California.

L. micranthus Dougl. Bot. Reg. xv, t. 1251. Stems slender, branching from the base, 6—8 inches long, pilose-pubescent, not at all succulent: leaflets 5—7, narrowly linear to linear-spatulate, 6—18 lines long, on petioles twice longer: racemes pedunculed; flowers more or less distinctly verticillate: bracts shorter than the calyx: pedicles 1—3 lines long: upper lip of the calyx with divergent lobes, lower lip longer, entire: petals barely exceeding the calyx, 2 lines long, the upper one short, orbicular, mucronulate, blue with white dots in the centre, lateral ones narrow, appressed, dark blue, keel wooly-ciliate toward the apex: pods an inch long, 3—4 lines broad, appressed-pubescent, 5—7-seeded: seeds grayish with a dark diagonal line near the hilum. In open places along streams, Washington to California.

L. bicolor Lindl. Bot. Reg. xiii, t. 1109. Stems stoutish, 6—10 inches high, erect, diffusely branched, sometimes simple, silky-pilose: stipules linear-lanceolate: leaflets 5—8, unequal, narrowly oblanceolate, obtuse or acutish, 6—10 lines long, appressed-silky both sides, the petioles 3—4 times longer: racemes long-pedunculed; bracts setaceous, shorter than the calyx, deciduous; flowers in 2—4 verticils, on stout pedicels a line or more long; upper lip of the calyx deeply cleft, the lower a little longer and slightly 3-cleft; petals 3—4 lines long, the upper one orbicular, blue with a white dotted with blue stripe down the center, lateral ones broadly obovate, dark blue, keel ciliate: pods an inch long by 3 lines broad, densely appressed-silky, 4—6 seeded; seeds light brown. In open places, Washington to California.

L. trifidus Torr. in Watson Proc. Am. Acad. viii, 535. Stems slender, 6—10 inches high, branched from the base, pubescent throughout with rather coarse more or less spreading whitish hairs: stipules linear-lanceolate, adnate for half their length: leaflets 5—8, unequal, linear-oblanceolate, obtuse, not half as long as the petioles: bracts deciduous, linear-lanceolate, 2—3 lines long: upper lip of the calyx deeply cleft, the segments divergent, lower lip a little longer, trifid: flowers verticillate, on pedicels a line long: petals nearly 3 lines long, the upper one orbicular, blue and white, the lateral ones dark blue, keel ciliate above the middle. On dry hillsides, southern Oregon to California.

§ 2 PLATYCARPOS Watson Proc. Am. Acad. viii, 588. Flowers in terminal racemes. Sides of the upper petal strongly reflexed. Ovary 2-ovuled. Cotyledons broad and clasping after germination, usually long-persistent. Annuals with cuneate-oblong or obovate leaflets and persistent bracts; pods ovate.

L. luteolus Kell. Proc. Cal. Acad. v, 38. Stout, 1—2 feet high, usually much branched: pubescence short, appressed, rather silky: stipules setaceous, villous: leaflets usually 7, cuneate-oblong, an inch long or more, the petioles but little longer: racemes short, dense; peduncles exceeding the leaves; bracts linear-setaceous, villous; flowers yellow, 6 lines long; upper lip of the calyx narrow, about a line long, lower lip 4 lines long, upper petal oblong, shorter than the others: pods villous; seeds 2 lines long, black, rough. Southern Oregon to California.

L. microcarpus Sims Bot. Mag. t, 2413. Erect and branching, 3—18 inches high, villous with long spreading hairs: stipules long-setaceous; leaves mostly approximate upon the stem, on elongated petioles; leaflets 7—11, usually 9, cuneate-oblong, 1—2 inches long, obtuse and mucronulate or emarginate, smooth above: flowers in close verticils, on pedicels 1—2 lines long; bracts subulate-setaceous, equalling the calyx or shorter; calyx dense villous, lower lip large 3-toothed, the middle tooth small; upper lip very short, sub-scarious, 2-toothed; petals purple to white or cream-color, 6—7 lines long, the keel slightly ciliate; pods villous, 8 lines long. On moist slopes, from the Columbia river to southern California.

L. pusillus Pursh Fl. 468. Rather stout, 3—10 inches high, diffusely branched from the base, hirsute with long spreading hairs; leaflets usually 5, cuneate-oblong or oblanceolate, 9—15 lines long, acute or obtuse, nearly glabrous above, about half as long as the petioles; racemes short-peduncled or sessile, not exceeding the leaves, 2—3 inches long: pedicels 2—3 lines long; upper lip of the calyx 2-cleft, the lower subentire; petals purple or rose-color, 4 lines long, equal: seeds nearly 2 lines broad. On sandy plains, eastern Washington to the Missouri river and New Mexico.

L. brevicaulis Watson Bot. King 53, t. 7. Stems short or nearly wanting: leaves 1—4 inches high, pubescent with spreading hairs; leaflets mostly 7, cuneate-obovate, 5—7 lines long, rounded at the apex; racemes dense, 1—2 inches long, the peduncles nearly equalling the leaves: upper lip of the calyx very short or truncate, scarious, the lower one subentire: petals blue, 3—5 lines long, equal. Southeastern Oregon to Nevada, Arizona and New Mexico.

3 ULEX L. Gen. n. 881. (FURZE.)

Compact thorny shrubs with simple prickle-pointed leaf-like organs without stipules, and scattered yellow flowers. Calyx of two nearly or quite distinct yellowish sepals. Petals short, unguiculate, subequal the upper one not reflexed. Stamens 10, monadelphous; anthers in two sets, the outer ones short and versatile, the inner long and basifixed. Ovary sessile, many-ovuled; style smooth, incurved; stigma capitate.

U. Europæus L. Sp. 741. A dense shrub 3—6 feet high, the numerous short branches villous, ending in a short spine: lower leaves sometimes lanceolate, more commonly reduced to spines, 6 lines long: flowers 6 lines long, yellow, solitary in the axil of a spinescent leaf, often crowded on the short branchlets: calyx villous; upper petal ovate, obtuse, hardly erect: pods few-seeded, but little longer than the calyx.

On sandy plains about the mouth of the Columbia river. Introduced from Europe.

4 CYTISUS L. Gen. n. 877.

Shrubs with green, more or less leafy angular branches, palmately or pinnately trifoliolate leaves, minute or inconspicuous stipules and solitary or racemous, yellow or white flowers. Calyx with campanulate tube and bilabiate limb. Petals broad, unguiculate, free, the keel obtuse. Stamens 10, monadelphous; anthers in two sets, the outer ones short and versatile, the alternate ones long and basifixed. Ovary mostly sessile, many-ovuled; style glabrous, incurved; stigma terminal, capitate or oblique. Pod compressed, several-seeded.

C. SCOPARIUS Link. Enum. ii, 241. (SCOTCH BROOM). A much branched shrub 3–8 feet high with prominently angular green branches; sparingly leafy, leaflets glabrous, often 1 only: flowers large, bright yellow, solitary or in pairs along the branchlets, in the leaf-axils and apparently racemose: pods pilose along the margins. Becoming common in many places. Introduced from Europe.

Tribe 3.. Trifoliæ Bronn. DC. Prodr. ii, 171. Erect or procumbent, mostly low herbs, rarely a little shrubby, with palmately or pinnately trifoliolate, rarely 5–7-foliolate leaves, the leaflets often toothed or serrulate, and axillary or terminal, racemose, spicate, capitate or umbellate inflorescence. Corolla papilionaceous. Stamens diadelphous. Pod continuous, 1-celled, several-seeded and dehiscent, or one to few-seeded and nearly indehiscent. Radicle inflexed.

5 MEDICAGO Tourn. L. Gen. n. 899.

Herbaceous, or rarely shrubby, plants with palmately trifoliolate leaves, often incised stipules, and axillary, 1–2- or many-flowered peduncles. Calyx somewhat cylindrical, 5-cleft. Keel of the corolla remote from the upper petal. Pod usually many-seeded, of various forms, falcate or spirally coiled.

M. SATIVA Moris. Hist. ii, 150. (ALFALFA). Perennial; glabrous: stems erect, 2–4 feet high: leaflets cuneate-oblong or oblanceolate, toothed above, mucronate; stipules lanceolate, somewhat toothed: flowers numerous, racemose, violet: pods spirally coiled, unarmed. Fields and roadsides, sparingly introduced.

M. LUPULINA L. Sp. 779. Annual, slender, procumbent, 1–2 feet long, soft-hairy: leaflets obovate, small: flowers minute, in small, oblong heads; yellow: pod small, reniform or curved almost into a ring, black when ripe, 1-seeded. Klickitat Co., Washington. Introduced from Asia.

M. DENTICULATA Willd. Sp. iii, 1414. (BUR-CLOVER). Annual, much branched, decumbent, glabrous: leaflets obovate or obcordate, denticulate: flowers 2–3, yellow: pods coiled into 2 circles, their margins armed with hooked prickles. Introduced from Asia.

6 MELILOTUS Tourn. Inst. t. 226 L. Gen. n. 899 (SWEET CLOVER).

Erect herbs with pinnately trifoliolate leaves and small fra-

grant flowers in slender axillary racemes. Calyx tubular or campanulate, 5-toothed, persistent. Corolla deciduous, the upper petal free, longer than the lateral ones, keel petals completely united cohering with the lateral ones, all free from the stamens. Stamens diadelphous. Style filiform. Pods coriaceous, globose or ovoid, longer than the calyx, scarcely dehiscent, one to few-seeded.

M. INDICA All. Fl. Ped. i, 303. *M. parviflora Desr.* Stems erect or ascending, with spreading branches, 1–3 feet high, from an annual root; leaflets of the lower leaves obovate and often nearly entire, of the upper ones cuneate-oblong or linear, truncate or emarginate, serrate; stipules linear-setaceous; racemes at first dense, at length rather loose; flowers yellow, small; teeth of the calyx broad, nearly equal, half the length of the corolla; petals nearly equal: pods globose-ovate, wrinkled, 2-seeded. In low grounds and along rivers. Introduced.

M. ALBA. Lam. Encycl. iv, 63. Stems erect, branching, 3–6 feet high, from a biennial root: leaflets ovate-oblong, truncate at the apex, mucronate, remotely serrate; stipules setaceous: racemes elongated, paniculed, loose; teeth of the calyx unequal, as long as the tube; corolla white, 2–3 lines long, more than twice the length of the calyx, the upper petal longer than the others: pods ovate, wrinkled, two-seeded. Along streams and river bottoms. Introduced.

7 TRIFOLIUM Tourn. Inst. t. 228. L. Gen. n. 896. (CLOVER).

Herbs with palmately or pinnately trifoliolate, rarely 5–7-foliolate, leaves with adnate stipules, and usually numerous flowers in capitate racemes, spikes or umbels, on axillary or apparently terminal peduncles. Calyx 5-cleft or -parted, with nearly equal teeth, persistent. Petals persistent, unguiculate, the claws all more or less adnate to the staminal tube, or the upper one free: keel short, obtuse. Stamens diadelphous. Pods concealed within or little exserted from the calyx, 1–6-seeded, dehiscent or indehiscent.

§ 1. LUPINASTER Moench. DC. Prodr. ii, 203. Heads not involucrate, dense: leaflets 5–7, rarely only 3; flowers sessile: teeth of the calyx nearly equal, filiform, plumose: perennials.

T. megacephalum Nutt. Gen. ii, 105 (?). Stems stout, 4–8 inches long, from a stout perennial root, decumbent or ascending, villous, 1–2-leaved below, and a pair of opposite ones at the summit; stipules foliaceous, the lower ones lanceolate to oblong, irregularly incised with acuminate lobes, to almost entire, the pair subtending the peduncle obliquely ovate, 6–8 lines long by 4–6 lines broad, laciniately lobed and toothed; leaflets 5–7, obovate to oblanceolate, 4–10 lines long, spinulose-dentate, apiculate, obtuse or emarginate, strongly veined: peduncle stout, apparently terminal, longer than the leaves: flowers many, in dense capitate spikes, very shortly pediceled, an inch or more long, ochroleucous and purple: tube of the calyx 1–2 lines long, the setaceous plumose teeth 5–6 times longer; upper petal broad, free, longer than, and enfolding the others, wings and keel unguiculate, the claws adnate to the staminal tube: pods sessile, ciliate near the apex, otherwise smooth, 4–6-ovuled, usually 2-seeded. In wet gravelly places, Eastern Oregon and Washington.

T. Plummeræ Watson Bot. Cal. ii, 440 (?). Stems cespitose, 1–3 inches high, clustered at the crown of a thick perpendicular root, canescent with

appressed hoary pubescence throughout: leaflets 3–5, obovate to oblanceolate, coarsely serrate, 3–6 lines long: stipules mostly scarious and inflated: peduncles shorter than the leaves; flowers few, 3–4 lines long, on short pedicels: teeth of the calyx linear, but little longer than the tube, a third shorter than the petals: ovary densely villous, 2-ovuled. In open forests, Blue Mountains of Oregon.

§ 2. EUTRIFOLIUM. Heads not involucrate: peduncles terminal or apparently so: flowers sessile or nearly so.

* More or less pubescent: teeth of the calyx longer than the tube, very narrow: stipules linear or lanceolate, acuminate.

+ Teeth of the calyx plumose or hairy.

++ Flowers never reflexed.

T. albopurpureum T. & G. Fl. i, 313. *T. Macræi* of authors not H. & A. Somewhat villous, with appressed or spreading hairs: stems slender, branching, 6–12 inches high: from an annual root: stipules ovate to lanceolate, long-acuminate: leaflets obovate to narrowly oblong, obtuse or retuse, serrulate above the middle, 2–6 lines long: flowers in dense, ovate slender-peduncled heads, sessile, dark purple; calyx very villous, the straight filiform plumose teeth as long as the petals, somewhat spreading: petals scarcely connected: ovary pubescent: pods 1-seeded. On dry hillsides, western Washington to California.

T. PRATENSE L. Sp. 1082. (RED CLOVER). Perennial: stems ascending, somewhat hairy, 1–3 feet long: stipules broadly lanceolate, membranaceous, nerved, setaceously acuminate: leaflets obcordate or oblong-ovate, often emarginate, nearly entire, glabrous above, 1–2 inches long: heads of flowers ovate, dense, nearly sessile, bracteate; teeth of the calyx setaceous, hairy, the lower one much longer than the other four, which are equal and about half as long as the corolla; petals purplish-red, all united into a tube at the base. Roadsides and cultivated fields, common.

T. longipes Nutt. T. & G. Fl. i, 314. Glabrous or nearly so: stems erect or ascending from spreading perennial roots, 6–20 inches high, stout: stipules mostly narrow, entire or sparsely toothed, apiculate: leaves long-petioled; leaflets lanceolate to ovate, entire or minutely denticulate, 1–2 inches long, acute or obtuse, apiculate, strongly veined: flowers white, in dense ovate long-peduncled heads, sessile or nearly so; tube of the calyx sparingly villous, a line long, the setaceous teeth minutely plumose; 5–7 lines long, nearly equalling the corolla; upper petal free, the others united with the staminal tube: ovary pubescent at the apex, shortly stipitate, 2–4-ovuled. In wet places and about springs, Brit. Columbia to California and the Rocky Mountains.

Var. latifolium Hook. Lond. Journ. Bot. vi, 209. Often low: leaflets broad: flowers pedicillate, in loose heads. From the Rocky Mountains to the Pacific.

++ ++ Flowers at length reflexed.

T. eriocephalum Nutt. l. c. 313. Villous with spreading hairs, stems erect, 6–10 inches high or more, from a stout perennial root: stipules linear to lanceolate, entire or repand; 12–18 lines long: leaflets oblong to lanceolate; 1–2 inches long, acutely and minutely serrulate: flowers in dense ovate spikes, yellowish or white, 4–8 lines long; tube of the calyx very short, its filiform plumose teeth abruptly narrowed from a broad base, nearly equalling the petals; claws of the petals united to the staminal tube; ovary hairy, 2–4-ovuled. Common in open places, western Washington and Oregon to northern California.

T. plumosum Dougl. Hook. Fl. i, 130, t. 49. Silky-pubescent: stems

slender, 8–16 inches high, from a stout perennial root, erect or ascending: stipules linear-lanceolate, acuminate, adnate to above the middle: leaflets narrowly oblong to linear, 1–2 inches long, acuminate, denticulate: flowers white, in dense oblong or ovate spikes, 6 lines long, reflexed; tube of the calyx very villous, a line or less long, the subulate-setaceous teeth about half as long as the petals, silky-plumose: ovary 4-ovuled. In open places that are wet in spring, Oregon to California.

T. Harneyensis Howell P. C. Pl. Coll. of 1887. Glabrous or nearly so; stems erect; 6–18 inches high, from a creeping perennial root: stipules linear to lanceolate, entire or dentate, an inch or more long; leaflets linear to oblanceolate, irregularly dentate, 1–3 inches long, appressed pubescent beneath; flowers in dense oblong heads, on rather long pedicels, at length reflexed: tube of the calyx appressed-pubescent, less than a line long, the subulate teeth 2–3 lines long, less than half as long as the petals: ovary densely tomentose. In alluvial prairies, Harney valley southeastern Oregon.

T. Oreganum Howell Eryth. i, 110. Perennial; stems decumbent or ascending, 6–8 inches long; herbage glabrous or the petioles and peduncles appressed-silky; stipules linear or the upper ones lanceolate, acute, entire or serrate above the middle; leaflets linear-oblong to lanceolate, entire or denticulate, 6–12 lines long; flowers pinkish or light red in loose subumbellate heads; the short pedicels reflexed in age; tube of the calyx minutely villous, a line long, the subulate-setaceous teeth twice longer: ovary smooth, stipitate, 3–4-ovuled. In moist places, eastern base of the Coast Mountains, near Waldo, Josephine Co., Oregon.

* * Glabrous perennials: teeth of the calyx subulate, rigid, contorted, twice longer than the tube: flowers sessile, not reflexed: stipules lanceolate, acuminate.

T. altissimum Dougl. Hook. Fl. i, 130, t, 48. Erect, stout, a foot or more high: stipules very long, toothed; leaflets narrowly oblanceolate, very acute, 2 inches long, strongly veined, the veins excurrent: flowers in dense oblong or ovate spikes, 6–8 lines long; lower tooth of the calyx straight, the others curved or twisted: petals red: ovary smooth, 2-ovuled. Eastern Oregon and Washington to Idaho.

* * * Glabrous throughout: teeth of the calyx straight, scarcely longer than the tube: stipules lanceolate to ovate: flowers on very short pedicels, at length reflexed: perennials.

T. Beckwithii Brewer Watson Proc. Am. Acad. xi, 128. Stout: leaflets oblong to oblanceolate, obtuse or acute, 1–2 inches long, coarsely veined and toothed: flowers 7–9 lines long, in dense globose heads; teeth of the calyx linear-subulate: ovary 2–6-ovuled. Southern Idaho to northern California.

T. Kingii Watson Bot. King, 59. Slender, 6–8 inches high: stipules lanceolate to ovate, entire or the upper ones dentate; lower leaflets round-ovate to oblong, obtuse, upper ones linear-oblong to lanceolate, acute, all serrate: flowers in oblong spikes, the rachis often produced above the head with a few spinescent bracts; teeth of the calyx thin, subulate, a line long, but little if any longer than the tube, about one-third the length of the purplish corolla. In moist places, eastern base of the Cascade Mountains at Camp Polk, Oregon, to California, Utah and Montana.

T. Howellii Watson Proc. Am. Acad. xxiii, 262. Stems stout, erect, 1–3 feet high: stipules of the lower leaves narrowly lanceolate, of the upper ones ovate, all entire: petioles short; leaflets mostly cuneate-oblanceolate, 1–3 inches long irregularly-toothed peduncles axillary, longer than the leaves; flowers white, in rather dense ovate or oblong heads, 4–6 lines long; teeth of the calyx subulate, about as long as the tube; upper petal oblong, 6–7 lines long, much longer than the others, free; ovary 2-ovuled;

pods 1-2-seeded, a little longer than the calyx, dehiscent. Along streams and ditches, Siskiyou Mountains, Oregon and northern California.

* * * * Peduncles axillary: flowers on slender pedicels, soon reflexed: ovules 2–4: spreading perennials.

T. Breweri Watson l. c. xi, 131. Somewhat pubescent throughout, stems procumbent, very slender, 4–12 inches long, from a rather thick perennial root: stipules lanceolate, short; leaflets obovate to oblong, mostly retuse, toothed or serrulate, 3–9 lines long: flowers white or pinkish, on slender pedicels, in loose globose heads: calyx very narrow, the slender teeth much shorter than the corolla. In moist places, southwestern Oregon and northern California.

T. REPENS L. Sp. 1080. (WHITE CLOVER). Glabrous perennial; stems slender, creeping, rooting at all the nodes, 4–20 inches long: leaves long-petioled; stipules narrowly lanceolate, scarious; leaflets obcordate, denticulate, 4–10 lines long: flowers white or pinkish, in loose depressed-globose long-peduncled heads, soon reflexed; teeth of the calyx unequal, lanceolate-subulate, shorter than the tube: pods 4-seeded. Common in cultivated fields and roadsides. Introduced from Europe.

* * * * * Peduncles axillary: flowers on short pedicels, in small heads, at length reflexed: teeth of the calyx subulate, mostly glabrous: slender annuals.

T. ciliolatum Benth. Pl. Hartw. 304. *T. ciliatum* Nutt. not Clark. Glabrous; stems erect, often 1–2 feet high, simple or branched: stipules usually narrow, acuminate; leaflets cuneate-oblong to obovate, 6–12 lines long, obtuse or retuse, serrulate: flowers in small dense ovate heads, the rachis prolonged above as a stout bristle: calyx campanulate, the teeth very unequal, the two upper ones lanceolate, spinulose-acuminate, longer than the corolla, the others similar but smaller, about two-thirds as long, all with scarious and rigidly ciliolate margins; petals purple and white, 3–4 lines long, the upper one free and folded around the others: pods shorter than the calyx, 1-seeded; seeds oblong, turgid, light brown. In moist meadows of the Willamette Valley to California.

T. Hallii. *T. gracilentum* and *bifidum* of authors as to the Oregon plant not T. & G. Subvillous to glabrous, pale green and somewhat glaucous: stems slender, diffusely branched to simple, 6–18 inches high from a slender annual root: stipules ovate-lanceolate, setaceous-acuminate, entire: leaflets linear-cuneate to obcordate, sparsely dentate, more or less deeply notched at the apex, the midnerve excurrent in the centre, 4–8 lines long: peduncles exceeding the leaves, pilose near the summit; flowers pink or rose-color, in small depressed-globose 10–30-flowered heads, on short pedicels, soon reflexed; calyx 5-parted, the teeth subulate-setaceous, sparsely hirsute, somewhat unequal, but little shorter than the corolla; petals rose-color, 3–4 lines long, the upper one free and folded over the others: pods included, 1-seeded. Open places and prairies, western Washington to California.

T. PROCUMBENS L. Sp. 772. Pubescent; stems procumbent to sub-erect, slender, 4–12 inches long: leaves short-petioled, pinnately-trifoliolate; stipules rather foliaceous, ovate, ciliate, mostly shorter than the petiole; leaflets cuneate-obcordate or cuneate-oblong and emarginate, denticulate, the lower pair distant from the terminal one: flowers on slender axillary peduncles, in small ovate heads, soon reflexed; teeth of the calyx unequal, the two upper ones very short; petals yellow, the upper one striate when old: pods 1-seeded. Common in fields and roadsides. Introduced from Europe.

§ 3. INVOLUCRARIUM T. & G. Fl. i, 317. **Heads of flowers subtended by a monophyllous, usually many-cleft involucre: pedun-**

cles axillary: flowers sessile or nearly so, never reflexed: pods often dehiscent at the ventral suture: veins of the leaves often reticulate.

* Involucre not membranaceous, deeply lobed, the lobes laciniately and sharply toothed: corolla not becoming inflated.

T. fimbriatum Lindl. Bot. Reg. t. 1070. Glabrous: stems long and thick, prostrate: stipules ovate, acuminate, laciniate-spinulose: leaflets oblong or slightly cuneate, spinulose-denticulate, an inch or more long: involucre laciniately many-cleft, shorter than the large subglobose heads of purple or reddish flowers: teeth of the calyx broadly subulate, straight, half the length of the corolla, shorter than the tube, unequal, spiny: corolla slender: pod 2-seeded. In salt marshes along the coast, Oregon to California.

T. spinulosum Dougl. Hook. Fl. i, 133. Glabrous: stems prostrate or ascending, slender, 1–2 feet long: stipules ovate, acuminate, spinulose-serrate; leaflets oblong, acute at each end, spinulose-denticulate, terminated by a rigid spiny point; involucre often small, laciniately many-cleft, shorter than the subglobose heads; teeth of the calyx narrowly subulate, pungent, shorter than the corolla, 3–4 times as long as the tube; corolla white, or the keel and wings tipped with fine purple: pods 2-seeded. In mountain valleys near springs, Oregon.

T. heterodon T. & G. Fl. i, 133. Glabrous: stems several from a branching perennial root, decumbent, 10–18 inches long, simple or a little branched, usually producing only terminal heads: stipules membranaceous, ovate, acuminate, laciniately serrate with subulate teeth, the lower ones lanceolate and nearly or quite entire; leaflets oblong or oval, somewhat cuneiform at base, mucronately ciliate-serrulate, obtuse, the lowermost mostly emarginate, 6–18 lines long: heads an inch or more in diameter depressed-globose, long-peduncled; involucre large, foliaceous, laciniately many-cleft with spinulose lobes, little shorter than the heads; teeth of the calyx narrowly subulate, nearly equal, 2–3 times longer than the tube, shorter than the corolla; petals an inch long, purple, the upper one pale at the tip: pods somewhat stipitate, 3–6-seeded. In salt meadows along the coast, near the mouth of the Columbia river.

T. obtusiflorum Hook. Ic. Pl. t. 218. Sparsely short-hairy or glabrous, often more or less resinous-glandular: stems stout, a few inches to 3 feet long, from an annual root, erect or decumbent, diffusely branched: lower stipules scarious, prominently nerved, lanceolate, setaceously acuminate, an inch long, entire or toothed, upper ones more herbaceous, setaceously pectinate: leaflets elliptic-lanceolate 12–18 lines long, spinulose-serrate, acute at each end, terminated by a rigid spiny point: heads an inch or more broad on long stoutish peduncles: involucre setaceously many-cleft: tube of the calyx oblong-campanulate, 3 lines long, with 10 prominent and as many lesser nerves, these branching and forming reticulations above, teeth subulate-spinose, entire, shorter than the tube; petals 8–10 lines long, lilac-purple with dark centre: pods elliptical, 2-seeded, dehiscent. On clayey hillsides, southwestern Oregon to middle California.

T. tridentata Lindl. Bot. Reg. under t. 1070. Glabrous annual: stems slender, erect, simple or branched, 3–20 inches high: stipules scarious, narrowly lanceolate, spinulose acuminate, the lower entire, the upper setaceously laciniate: leaflets linear-lanceolate, 1–2 inches long, spinulose serrate; heads nearly an inch broad: involucre orbicular, setaceously many-lobed and toothed, shorter than the flowers: tube of the calyx campanulate, prominently 10-nerved, reticulated, the short oblong lobes abruptly contracted above to a slender spine, often subtended by a pair of short spines or teeth; flowers purple and white: mature pods fully as broad as

long, 2-seeded, dehiscent. Common on rocky hillsides and river banks, Brit. Columbia to California.

T. oliganthum Steud. Nom. i, 707. *T. pauciflorum* Nutt. not d'Urville. Glabrous annual: stems slender, erect, much branched from the base and sometimes sparingly so above, about a foot high: stipules laciniate, acuminate: lower leaflets on long petioles, cuneate-oblong, obtuse or emarginate, upper ones on short petioles, lanceolate-linear, acuminate, 8–10 lines long by 1–2 lines broad, distinctly and minutely spinulose-serrulate; involucre 12–16-parted, about one-third the length of the flowers: heads 5–7-flowered, on long filiform peduncles; teeth of the calyx simple, broadly subulate, pungent, scarcely longer than the tube, shorter than the petals; lower part of the corolla dull purple, upper part whitish: pods 2-seeded. Wet places on the higher plains of the Columbia and Willamette valleys.

T. variegatum Nutt. T. & G. Fl. i, 317. Glabrous winter annual; stems weak and decumbent, 8–12 inches long, branching from the base and sparingly above: upper stipules roundish, laciniately dentate with subulate-setaceous teeth: leaflets obovate to oblong or somewhat obcordate, minutely spinulose-serrate, 3–6 lines long, peduncles filiform, longer than the leaves; involucre open-campanulate or at length spreading, lacinately many-cleft, shorter than the flowers; heads about 6 lines in diameter; teeth of the glabrous calyx equal, lanceolate-subulate with setaceous points, longer than the tube, shorter than the corolla: petals purple with white tips: pods small, 2-seeded. Common in wet places throughout the Willamette valley.

* * Involucre membranaceous, at least at base, less deeply lobed, the lobes entire or toothed: corolla not becoming inflated: annuals.

T. microcephalum Pursh Fl. 478. Villous with soft hairs: stems slender, erect or decumbent, 6–20 inches long, diffusely branched from the base: stipules lanceolate to ovate, acuminate, mostly entire: leaflets oblanceolate to obcordate or obovate, denticulate: 4–6 lines long: heads small, densely many-flowered; involucre about 9-lobed, the lobes acuminate, 3-nerved, entire; calyx hairy, its subulate teeth scariously margined, sometimes toothed at base, attenuate to a long spinulose point, equalling the corolla: ovules 2; pods glabrous, 1-seeded. Common in open places, Brit. Columbia to California.

T. microdon H. & A. Bot. Beech, 330, t. 79. Somewhat villous: stems slender, erect or ascending, diffusely branched below, 6–12 inches high: stipules lanceolate to ovate, spinulose-acuminate, entire; leaflets obcordate, serrate, 4–8 lines long, nearly as broad: heads small, long-peduncled; involucre conspicuously cup-shaped, as long as the flowers, 9-12-lobed, the oblong lobes laciniately toothed: calyx glabrous, campanulate, 10-nerved, the short teeth triangular-subulate, spinose; petals rose-color: pods small, 1-seeded. On dry hillsides, Brit. Columbia to California.

T. cyathiferum Lindl, Bot. Reg. under t. 1070. Glabrous: stems erect or ascending, 4–12 inches high, diffusely branched: stipules ovate to lanceolate, laciniately toothed or entire; leaflets obovate to oblanceolate, obtuse or acute, 6–12 lines long by half as broad; heads 6–10 lines in diameter, long-peduncled; involucre broad and membranaceous, conspicuously nerved and reticulated, 7–10-lobed, the shallow acute lobes spinulose-dentate, nearly as long as the flowers: calyx smooth, the tube somewhat inflated, prominently 5-nerved, the nerves excurrent into branching setaceous tips which equal the small white corolla: pods oblong, 2-seeded. About springs and on wet rocks, Brit. Columbia to California and the Rocky Mountains.

* * * Involucre membranaceous: the upper petal becoming conspicuously inflated and enclosing the lower ones.

T. fucatum Lindl. l. c. t. 1883. Usually stout and fistulous, the decumbent branches 1–2 feet long: herbage light green, glabrous and somewhat succulent: stipules large, membranaceous nearly or quite entire: leaflets 6–18 lines long, broadly obovate, obtuse or retuse, dentate or spinulose-denticulate; peduncles stout, far exceeding the leaves; bracts of the involucre ovate-lanceolate, acuminate, scarious-margined, connate at base; heads hemispherical, 1–2 inches broad: calyx thin, campanulate, the short teeth entire, unequal: corolla 6–12 lines long, ochroleucous, fading with a red tinge: pods stipitate, 3–8-seeded: seeds roundish, nearly a line broad, minutely granulate. Along the coast, Oregon and California.

T. depauperatum Desv. Journ. Bot. iv. 69, t. 32. Smooth, low and slender, decumbent or ascending: stipules small, lanceolate, acuminate, entire; leaflets obcordate to linear, obtuse, 6 lines long or less: heads 3–10-flowered; involucre reduced to a very small toothed or truncate, often minute and scarious rim: calyx short, the narrowly subulate teeth but little longer than the tube; upper petal much inflated and enclosing the others; pods 1–2-seeded, seeds little broader than long, rather angular, tuberculate-rugose. In wet places top of Table Rock, Southern Oregon to California and South America.

Tribe 4. Loteæ B. & H. Gen. 442 Herbs rarely shrubby, with one to many-foliolate leaves, entire leaflets, foliaceous, scarious or gland-like stipules, and capitate, umbellate or solitary inflorescence. Petals free from the stamens. Stamens 10, diadelphous. Pod continuous, one-celled but often with spongy partitions between the seeds.

8 LOTUS Tourn.

HOSACKIA Benth. and American authors.

Herbaceous or suffrutescent plants with pinnately one to several-foliolate leaves with gland-like, rarely scarious or foliaceous, stipules and one to several-flowered axillary peduncles, the flower often subtended by a 1–5-foliolate bract. Calyx 5-toothed or -cleft, the teeth nearly equal, usually longer than the tube. Petals free from the stamens, nearly equal, the upper one ovate or roundish, lateral ones obovate or oblong, keel somewhat incurved, obtuse or acutely beaked. Stamens diadelphous; the alternate filaments dilated or thickened under the anthers. Pods linear, compressed or terete, straight or arcuate, sessile, dehiscent or indehiscent, 1–several-seeded, with spongy partitions between the seeds. Seeds variously rounded or elongated, sometimes quadrate, smooth, tuberculate or rugose.

§ 1 ACMISPON Raf. New Fl. 53, as genus. Annuals with 1–5-foliolate nearly sessile leaves with small gland-like stipules and small flowers on axillary peduncles. Petals but little exceeding the calyx the claws equally approximate to each other, keel narrowed above into a rather short, acute, incurved beak, equalling or exceeding the wings: pods linear, straight or nearly so, somewhat compressed, readily dehiscent, several-seeded.

L. Americanus Bisch. Hort. Heidelb. *Hosackia Purshiana Benth.* More or less villous or glabrous: stems erect or assurgent, 6–18 inches high, simple to diffusely branched: leaves nearly sessile or short-petioled: leaflets ovate to lanceolate or oblong, 3–9 lines long often only the terminal one present, the others when present scattered on a short slightly dilated

rachis: peduncles usually exceeding the leaves, with a single unifoliolate bract at the summit; flowers solitary, 2–3 lines long; teeth of the calyx linear, much longer than the tube, almost equalling the corolla; petals salmon-color, the upper one orbicular: pods narrow, somewhat compressed, about an inch long, 5–7-seeded, with very spongy partitions between the oblong black or mottled seeds. Common on bars and gravelly banks of streams. Brit. Columbia to California, Missouri and Arkansas.

§ 2. ANISOLOTUS Bernh. as genus. Leaves pinnately 2–10-foliolate, the leaflets scattered on a more or less dilated rachis, with gland-like stipules and small flowers on axillary peduncles. Pods promptly deciduous.

* Annuals: flowers solitary, on very short pedicels, not bracted: claws of the petals equally approximate to each other; the keel narrowed above into a somewhat incurved beak: pods short, not attenuate at base, few-seeded, promptly deciduous.

L. Wrangelianus F. & M. Ind. Sem. Hort. Petrop. 16. *Hosackia subpinnata T. & G.* Pilose or subglabrous: stems diffusely branched from the base, 4–6 inches high: leaflets 2–4, all but one on the outside of the rachis, oblong, subglabrous, 4–6 lines long, more or less pilose: flowers sessile or nearly so, about 2 lines long; teeth of the calyx subulate, several times longer than the tube, ciliate with long spreading hairs, not as long as the yellow corolla: pods pubescent, 6 lines long, nearly obtuse, 5–7-seeded. Southern Oregon to California.

L. humistratus Greene Pitt. ii, 139. *Hosackia brachycarpa Benth.* Softly villous: stems 4–6 inches high, diffusely branched from the base: leaflets usually 4, all but one on the outside of the rachis 3–6 lines long, obovate to oblong, acute, flowers sessile, 3–4 lines long, bright yellow; calyx-tube very short, its subulate teeth much longer, nearly equalling the corolla: pods 3–4 lines long, oblong, obtusish, very pubescent, nearly terete, 2–4-seeded. On gravelly bars and banks along streams, Southern Oregon to California.

L. denticulatus Greene l. c. *Hosackia denticulata Drew.* Pale green and glaucous, glabrous or the inflorescence villous: stems erect, sparingly branched, 1–2 feet high: leaflets 2–6, all but one on the outside of the rachis, obovate to oblanceolate, 4–8 lines long, sparingly hairy beneath: flowers 2–3 lines long, solitary, on short axillary pedicels or nearly sessile: calyx deeply 5-cleft, its subulate teeth longer than the tube, denticulate, about equalling the corolla; petals about 2 lines long, pale yellow or salmon-color, changing to rich dark red: pods pubescent, very short, 3-seeded. In wet places, Vancouver Island to California.

* * Peduncles elongated, one to several-flowered, mostly bracted: claw of the upper petal commonly remote from the others: keel mostly obtuse.

L. micranthus Benth. Trans. Linn. Soc. xvii, 367. *Hosackia parviflora Benth.* Annual: glabrous or nearly so: stems slender, ascending, 4–12 inches long, usually branching from the base: leaflets 3–5, obovate to narrowly oblong, 2–8 lines long: peduncles longer than the leaves, 1–2-flowered, with a 1–3-foliolate bract at the summit: petals yellow, about 2 lines long, keel with a short incurved apex, nearly equalling the wings; banner obcordate: pods 6–12 lines long, 5–7-seeded, often contracted between the seeds. Common on dry or gravelly plains and hillsides, Vancouver Island to California.

§ 3. SYRMATIUM Vogel as Genus. Mostly perennials with pinnately 3–7-foliolate leaves, and gland-like stipules. Peduncles umbellately one to several-flowered; claw of the upper petal

remote from the others; keel broad and obtuse above. The mature calyx deciduous with the indehiscent, usually small, arcuate, slender-pointed, few-seeded pod.

L. Douglasii Greene l. c. 149. *Hosackia decumbens Benth.* Villous-pubescent and somewhat tomentose: stems slender, ascending or diffusely procumbent, 6–18 inches long, from a thick very tough perennial root: leaflets 5–7, cuneate-obovate to oblong, mostly acute, 3–6 lines long: umbels of yellow flowers on short peduncles, subtended by a 1–3-foliolate bract: calyx silky, its slender teeth often as long as the campanulate tube: pods pubescent, falcate, the beak longer than the seed-bearing portion, about 2-seeded. Open plains and hillsides, Brit. Columbia to California.

§ 4. HOSACKIA Benth. Bot. Reg. xv, under t. 1257, as Genus. Perennial herbs with pinnate leaves, true stipules, the leaflets evenly distributed upon a linear rachis. Peduncles umbellately many-flowered, the flowers usually subtended by a bract. Claw of the upper petal remote from the others, the lateral ones partially cohering with the broad and mostly very obtuse keel and spreading away from the claw of the upper one. Pods acute above, linear, straight or nearly so, 5–20 seeded, glabrous, terete or somewhat compressed, tardily dehiscent.

* Glabrous throughout or becoming so: bracts petioled or wanting: stipules scarious: leaflets 5–15: flowers rather large.

L. crassifolius Greene l. c. 147. *Hosackia crassifolia Benth.* Stout, erect, often 2–4 feet high, widely branching: leaflets 9–15, minutely pubescent or somewhat villous but soon glabrate, thickish obovate or oblong, usually obtuse and mucronulate, 6–12 lines long. peduncles nearly equalling the leaves, usually many-flowered: bract usually some distance below the umbel, 1–3-foliolate: flowers on slender pedicels, 2–4 lines long: tube of the calyx campanulate, 3 lines long, truncate, the very short triangular teeth distant from each other; petals much longer than the calyx, dull dark purple: pods thick, about 2 inches long by 5 lines in diameter: seeds nearly orbicular. In rich alluvial soil, foothills of the Cascade Mountains, Washington to California.

L. pinnatus Hook. Bot. Mag. t. 2913. *Hosackia bicolor Dougl.* Glabrous throughout: stems numerous, from a thick perennial root, erect, branched above, 1–2 feet high: leaflets 5–9 obovate or oblong, obtuse or acutish, 6–12 lines long; stipules rather large, triangular, acuminate: peduncles mostly longer than the leaves, 3–10-flowered, naked, or sometimes with a small scarious or 1–3-foliolate bract at the summit: flowers nearly sessile, 8–10 lines long; calyx campanulate, oblique, its triangular teeth but half as long as the tube; upper petal bright yellow, the lateral ones usually white: pods nearly terete, 2 inches long, but little more than a line in diameter: seeds numerous, oblong. In springs and ditches, Brit. Columbia to California.

L. formosissimus Greene l. c. *Hosackia gracilis Benth.* Low and slender, the weak stems 6–12 inches long: leaflets 5–7, broadly obovate to obovate-oblong, obtuse, the lowest truncate or retuse; stipules thin, ovate: pedicels equalling or shorter than the leaves; bract petioled, 1–3-foliolate: teeth of the calyx unequal, triangular, acute or acuminate, shorter than the campanulate tube; petals 7 lines long, the upper one yellow, the wide spreading lateral ones and much shorter keel rose-color: pods short. In moist ground along the seaboard, Oregon to California.

* * Pubescent or puberulent; bracts nearly sessile, at the top of the peduncles.

L. Torreyi Greene l. c. 146. *Hosackia Torreyi Gray.* Minutely pubescent: stems rather slender, numerous, from a stout perennial root, 1–2 feet high, mostly simple: stipules triangular, a line or more long; leaflets 5–9, obovate to narrowly oblanceolate or linear, densely pubescent beneath, mostly obtuse, 6–12 lines long: peduncles exceeding the leaves; bracts usually trifoliolate: umbels 5–7-flowered: teeth of the pubescent calyx subulate, about as long as the short campanulate tube; petals 6 lines long, the upper one bright yellow, the lateral ones and very obtuse keel white or reddish: pods linear, 1–2 inches long, with an acuminate hooked beak. In springs and ditches, southwestern Oregon to California.

Tribe 5. Galegeæ. Brann. (partly) T. & G. Fl. i. 292. Erect herbs, shrubs, or trees with usually unequally pinnate, seldom stipellate leaves and axillary or terminal, racemose or spicate inflorescence. Corolla papilionaceous, or otherwise irregular. Stamens diadelphous or sometimes monadelphous. Pods continuous, rarely with transverse cellular partitions between the seeds, but never separating into joints, 1-celled, several-seeded, dehiscent, or 1–2-seeded and indehiscent. Radicle incurved or inflexed.

9 PSORALEA Royen L. Gen. ed. 2, 358.

Our species perennial herbs, the herbage punctate with dark glandular dots with digitately or pinnately 3–5-foliolate leaves with entire leaflets and free stipules, and white or purple flowers in axillary pedunculate spikes or racemes, mostly with membranaceous deciduous bracts. Calyx campanulate, persistent, 5-cleft, its teeth nearly equal, or the lower one longest, the two upper ones often connate. Petals free from the stamens; keel broad and obtuse above, united with the wings. Stamens usually diadelphous, the upper one sometimes united with the others at the base; anthers uniform, often only 5 perfect. Pods ovate, about as long as the calyx, 1-seeded, indehiscent, thick, often wrinkled.

* Leaves digitately 3–5-foliolate, rarely 7-foliolate.

P. lanceolata Pursh. Fl. 475. Aromatic-glandular throughout: stems slender, 12–30 inches high, erect or assurgent, branched, glabrous or with a few scattered hairs: stipules linear-lanceolate to setaceous, 3–6 lines long: petioles 1–2 inches long; leaves trifoliolate; leaflets 1–2 inches long, linear-lanceolate to obovate, acute or obtuse, mucronate, glabrous or with a few hairs: peduncles longer than the leaves; inflorescence capitate, small; bracts minute; flowers nearly white; calyx minutely hairy, the lobes nearly equal, obtuse: pods globose, 3 lines long, light with conspicuous large raised brown glands, nearly glabrous, beak small and erect: seeds globose, brown. On sandy plains, Oregon and Washington to Iowa and Arizona.

P. Purshii Vail Bull. Torr. Club, xxi, 94. Glandular throughout; stems assurgent 6–20 inches high or more, from a long slender rootstock, glabrous or somewhat hirsute at base; scales ovate, scarious: leaves 3-foliolate; stipules lanceolate, 3–4 lines long; leaflets 1–2 inches long, obovate cuneate or elliptical, or the uppermost nearly lanceolate and often much narrower, varying greatly in size and shape, retuse or mucronulate, glandular, glabrous or with a few scattered white hairs: peduncles varying in length, rarely longer than the leaves: flowers scattered in slender spikes or crowded in nearly capitate heads; bracts minute; lobes of the

calyx about equal, sparingly hirsute: pods glabrous, 4 lines long, with a short erect beak, light with scattered brown glands and more or less densely villous with white hairs: seeds globose, 3 lines long, light brown. On sand banks along the Columbia river, to Idaho and Nevada.

* * Leaves pinnately 3-foliolate.

P. physodes Dougl. Hook. Fl. i, 136. Glabrous or with a few weak, mostly black hairs: stems slender, assurgent, 1–2 feet high, simple: leaves 3-foliolate; stipules lanceolate, acuminate, reflexed; leaflets broadly rhomboid-ovate, mostly acute, mucronate an inch long, glandular; peduncles equalling or exceeding the leaves; flowers in capitate racemes; bracts small, elliptical; calyx more or less villous with usually dark-colored hairs, 4–5 lines long, becoming much inflated, lobes nearly equal, triangular, the margins ciliate with dark hairs: petals 5–6 lines long, white or purplish, pods membranaceous, rounded, somewhat compressed, 3 lines long; seeds grayish. In open woods and rocky hillsides, Vancouver Island to California.

P. melilotoides Michx. Fl. ii, 58. *Hedysarum pedunculatum* Mill. Gardn. Dict, No. 17. Stems erect, 1–2 feet high, from a long rootstock, simple or branching from the base: stipules 2–3 lines long, setaceous: petioles shorter than the leaflets; leaves remote, 3-foliolate, rarely 4–5-foliolate; leaflets 2 inches long, lanceolate, acute, rarely ovate and obtuse, glabrous except the veins and margins which are very sparingly hirsute; peduncles much exceeding the leaves; flowers in loose spikes: bracts glandular, broadly ovate, much imbricated, the cuspidate apex longer than the flowers; lobes of the calyx acute, glandular, the lower one the longest: pods orbicular, compressed, transversely wrinkled, beak minute, recurved: seed orbicular, flat, brown. Seattle, Washington (Piper) and the Atlantic States.

10 PETALOSTEMON Michx. Fl. ii, 48, t. 37.

Herbaceous, mostly perennial glandular dotted plants with unequally pinnate leaves with minute setaceous stipules, and small flowers in dense terminal spikes or heads. Calyx often glandular, 5-toothed, the teeth connivent, nearly equal. Petals 5, on filiform claws; 4 of them nearly similar, their claws united to the stamen-tube quite to the summit, alternate with the stamens, deciduous by an articulation, the upper one free, inserted at the bottom of the calyx, the limb cordate or oblong, conduplicate. Stamens 5, monadelphous, the tube cleft. Ovary with 2 collateral ovules. Pod membranaceous, enclosed in the calyx, indehiscent, 1-seeded.

P. ornatus Dougl. Hook. Fl. i, 138. Perennial; stems simple, 1-2 feet high, glandular-dotted: leaflets 5–9, obovate to narrowly oblong, 5–6 lines long, flowers in dense, long-peduncled terminal spikes, sessile, bright purple; bracts lanceolate, acuminate, about equalling the flowers: calyx densely silky-villous; upper tooth as long as the tube, the others shorter: ovary pubescent. Hillsides and old river banks, Eastern Oregon.

Tribe 5. Astragaleæ. Adans. Erect or decumbent, herbaceous, rarely suffrutescent, plants with unequally pinnate leaves and axillary or radical, racemose or spicate inflorescence. Corolla papilionaceous. Stamens monadelphous. Pod continuous, turgid or inflated, rarely flattened, often spuriously 2-celled or partly 2-celled by the introflexion of one or both of the sutures, dehiscent, several-seeded, rarely 1–2-seeded. Radical incurved.

11 ASTRAGALUS Tourn. (RATTLE WEED, LOCO-WEED).

Erect or decumbent herbs with unequally pinnate leaves without tendrils, persistent stipules and axillary spikes or racemes of rather small, narrow flowers. Calyx 5-toothed. Petals with slender claws, the keel obtuse. Stamens diadelphous. Stigma terminal, minute. Pod very various, commonly turgid or inflated, one or both sutures often projecting inward more or less, the dorsal one frequently so much as to divide the cell into two, rarely flat. Seeds few or many, on slender stalks, generally small for the size of the pod.

SERIES 1. ASTRAGALUS L. gen. n. 892 as genus. Pod completely or imperfectly 2-celled by the intrusion of the dorsal suture, the ventral suture being not at all or less deeply intruded.

§ 1 DIPHYSI Gray Proc. Am. Acad. vi, 193. Pods ovate or globose, membranaceous or coriaceous, inflated, glabrous or nearly so, sessile, completely 2-celled and more or less didymous by the intrusion of both sutures, several-seeded: pubescence short or wanting; flowers rather small, white to purple or yellowish, spicate or subspicate.

A. araneosus Sheld. Bull. Minn. Nat. Hist. Surv. No. 9, 170. Glabrous throughout or slightly pubescent when young: stems decumbent or assurgent, 6–18 inches long, very finely striate, simple, few to many from a thick perennial root: leaves 4–6 inches long, the rachis slightly winged, not channeled or but slightly so: stipules deltoid-acuminate, semi-sheathing below, reflexed; leaflets 6–8 pairs, 5–6 lines long, somewhat fleshy, orbicular or obcordate, obtuse, retuse or emarginate; peduncles equalling the leaves, striate, capitately or subspicately 10–12 flowered; calyx short-cylindrical, with a few scattered, blackish hairs, the linear spreading teeth ⅓–½ the length of the tube; petals whitish tipped with purple: pods ovate-lanceolate, arcuate-incurved, with a long acuminate incurved beak, 6–10 lines long, coriaceous, glabrous, minutely reticulated, sessile, both sutures intruded so as to form a nearly 2 celled cavity which is lined throughout with fine cobwebby hairs, 8–10-seeded. On dry plains and hillsides, Eastern Oregon and Washington to Utah.

A. lentiginosus Dougl. Don Syst. Gard. and Bot. ii, 257. Slightly pubescent: stems tufted, 6–12 inches long, soon diffusely spreading: stipules small, ovate, acute; leaflets 11–19, from obovate or oblanceolate to oblong, 3–5 lines long: pods turgid, ovate, acuminate, more or less incurved, 4–6 lines long, puberulent, often mottled, thick-membranaceous, sessile, 2-celled by the intrusion of both sutures, 6–8-seeded. Dry plains, Brit. Columbia to California and Nevada.

A. salinus Howell Eryth. i, 111. Minutely hirsute: stems numerous from a thick perennial root, decumbent or ascending, rather slender 4–8 inches long, much branched: leaflets 9–17, obovate to oblong, obtuse or retuse, 4–6 lines long: peduncles shorter than the leaves: calyx narrow, its short subulate teeth half as long as the tube: flowers yellowish, 6–8 lines long: pods inflated, ovoid, short-beaked, chartaceous, 6–8 lines long, very glabrous, nearly 2-celled by the intrusion of the dorsal suture, several-seeded. In saline soil, Harney valley, southeastern Oregon.

A. diaphanus Dougl. Hook. Fl. i, 151. Prostrate and diffuse, pilose-scabrous; stipules small, ovate, acuminate; leaflets 11–19, obovate: peduncles shorter than the leaves; flowers about 6 lines long, purple, in loose heads; bracts minute, ovate, acuminate rather shorter than the pedicels:

pods falcate, somewhat reflexed, linear, compressed, somewhat diaphanous; nearly glabrous, 2-celled, many-seeded. Sandy soil, near the Great Falls of the Oregon (Douglas).

A. accidens Watson l. c. Sparingly pubescent; the numerous stems 6–18 inches long, from a thick perennial root: leaflets 10–15 pairs, oblong, retuse, cuneate at base, glabrous above, appressed pubescent beneath, 6–8 lines long: peduncles about equalling the leaves: flowers reflexed, in a short raceme; calyx campanulate, dark-pubescent, 3 lines long, the teeth nearly equalling the tube: corolla yellowish, the narrow erect banner 6–7 lines long. Pod white-pubescent, on a stipe as long as the calyx, oblong-ovate, subsulcate on the back, the ventral suture somewhat prominent, straight, reflexed, 4–5 lines long. On open hillsides, southwestern Oregon.

A. Pacificus Sheld. Bull. Minn. Nat. Hist. Surv. 9, 174. *A. Hendersoni Watson, not Baker.* Thinly pubescent throughout with soft woolly hairs, the numerous stems erect or ascending from a stout perennial rootstock, 1–2 feet high: leaflets 6–10 pairs, narrowly oblong, obtuse or retuse, 6–9 lines long; stipules lanceolate: pedunculate racemes exceeding the leaves, few-flowered: calyx tubular-campanulate, dark-villous, 3–4 lines long, the narrow teeth nearly equalling the tube: pods reflexed, 2-celled, very fleshy-coriaceous, upon a stipe twice longer than the calyx, turgid, oblong to oblong-obovate, with a stout prominent ventral suture, the dorsal less prominent, very abruptly mucronate, glabrous, rugose, 8–11 lines long by 4 thick. Open hillsides, Jackson Co., Oregon and adjacent California.

§ 2 CHÆTODONTES Gray l. c. 194. Pods ovate, small, sessile, coriaceous, turgid or at times subcompressed, more or less sulcate on the back, 2-celled by the intrusion of the dorsal suture, cells 3–4-ovuled. Many-stemmed perennials.

A. Spaldingii Gray l. c. 524. Villous-pubescent: stems a foot in height: leaflets 21–25, lanceolate to oblong-linear, 3–6 lines long: peduncles exceeding the leaves: spikes oblong, dense, or rather loose at base; flowers nearly 5 lines long: bracts setaceous: calyx very villous; pods 2–3 lines long, villous scarcely sulcate, 2–4-seeded. Plains of eastern Washington and Idaho.

A. Lyallii Gray l. c. 195. White-silky: stems a foot high, leaflets 19–25, 3–6 lines long, lanceolate to oblong-linear: peduncles not exceeding the leaves; spikes long and loose; calyx villous, the tube equalling the teeth: pods hoary, sulcate. Valley of the Yakima, Wash., near the Brit. Columbia boundary.

§ 3. ULIGINOSI Gray l. c. 196. Pod coriaceous, turgid, oblong, terete, scarcely sulcate and only on the back, nearly straight, sessile, septum perfect. Tall perennials with appressed gray-pubescence or glabrate.

A. Mortoni Nutt. Journ. Acad. Philad. vii, 19. Minutely appressed-pubescent, greenish: stems erect 18–24 inches high: stipules broad and membranaceous; leaflets 11–17, oblong, obtuse, 6–12 lines long: peduncles as long as the leaves; flowers sessile or nearly so, in dense racemose spikes, reflexed as they open, the fruit erect; calyx villous, its teeth triangular-lanceolate, shorter than the tube: pods 6 lines long, minutely pubescent, elongated-oblong, grooved at the dorsal suture, the ventral suture externally prominent: seeds numerous. Dry plains, eastern Oregon and Washington to Montana, Utah and Nevada.

§ 4. OXOBRYCHIDES Gray l. c. 196. Pods coriaceous, oblong

or ovate, straight, usually more or less compressed or obcompressed-triangular, dorsally sulcate 2-celled, pubescent, many-ovuled, erect: stipules more or less sheathing: flowers in dense spikes or small heads: perennials.

A. adsurgens Pall. Astrag. 40. Cinereous with minute appressed pubescence or glabrate: stems rather stout, 4–18 inches high, ascending or decumbent: leaflets 13-19, narrowly to linear-oblong, 10–12 lines long, obtuse, pale green: peduncles longer than the leaves; flowers erect, in oblong to subglobose spikes; tube of the calyx long-campanulate, twice as long as the setaceous teeth, subvillous with partly black hairs; petals bright purple, the upper one about one-third longer than the others: pods coriaceous, erect, sessile, ovate-oblong, 4–5 lines long, straight, usually triangular compressed, dorsally sulcate, pubescent with appressed hairs, many-ovuled. Plains of eastern Oregon to Brit. Columbia and western Kansas.

A. hypoglottis L. Mant. ii, 274. Somewhat hirsute: stems 6–24 inches long, slender, diffusely procumbent or ascending: leaflets 15–21, oblong or obovate to elliptical, obtuse or retuse; stipules lanceolate, more or less cohering: peduncles longer than the leaves; bracts longer than the calyx, lanceolate: calyx blackish-pilose, its subulate teeth as long as the tube petals bright purple: pods ovate, triangular, compressed, silky-villous, very shortly stipitate, 6–8-seeded. Alluvial plains, southeastern Oregon and Washington to Colorado and Hudson Bay.

§ 5. DIDYMOCARPI Gray l. c. 188. Pods thin-coriaceous, obcompressed-didymous with a narrow perfect septum, transversely ridged or reticulated, at length separating into two 1–2-seeded divisions, mostly deflexed; ovary short-stipitate: caulescent annuals.

A. Catalinensis Nutt. Pl. Gamb. 152. *A. nigrescens* Nutt. not Pall. Cinereous with a short appressed pubescence: stem annual, 2–6 inches high, branching from the base: stipules scarious, triangular-ovate, acuminate, distinct, nearly free; leaflets 7–11, cuneate-oblong, obtuse or retuse, a line long, pubescent beneath, sometimes smooth above; peduncles longer than the leaves; flowers 4–8, in a subcapitate raceme, on very short spreading pedicels, soon deflexed, a line long; calyx campanulate, pubescent with dark colored hairs, the broadly subulate teeth twice longer than the tube: pods broadly ovate, obcompressed, pubescent, 2-celled by the intrusion of the dorsal suture, the ventral suture obtuse, several-ovuled. On dry hillsides and banks, both sides of the Siskiyou Mountains near Ashland, Oregon.

§ 6. MICRANTHI Gray l. c. Pod coriaceous, oblong, lanceolate, or linear, straight or curved, sessile, dorsally sulcate, the ventral suture rather prominent, 2-celled, many-ovuled.

A. drepanolobus Gray l. c. xix, 75. Perennial: strigose-pubescent throughout; the numerous stems ascending or decumbent, diffusely branched, 6–12 inches long: leaflets 9–11, obovate, usually emarginate, 4–6 lines long: peduncles exceeding the leaves, rather loosely-flowered; calyx short-campanulate, its subulate teeth shorter than the tube: pod linear-oblong, compressed, very falcate, 2-celled by the intrusion of the dorsal suture, many-ovuled. On gravelly bars of the John Day river near its junction with the Columbia.

A. umbraticus Sheld. l. c. *A. sylvaticus Watson*, not Willd. Glabrous: stems numerous from a stout perennial root, ascending or erect, 12-18 inches high, branching: leaflets 17–21, oblong, retuse, 4–9 lines long: peduncles equalling or exceeding the leaves; racemes close, rather few-

flowered; calyx slightly pubescent, campanulate, its acuminate teeth about equalling the tube; petals 8–10 lines long, yellowish or whitish; pod deflexed, chartaceous, linear, more or less curved, compressed, 2-celled by the intrusion of the dorsal suture, the ventral suture acute, 6–10 lines long by ⅛ line broad, black when mature. In forests at Glendale, southwestern Oregon.

A. malacus Gray Proc. Am. Acad. vii, 336. Villous-hirsute with long spreading hairs: stems rather stout, from a perennial root: leaflets 11–17, obovate, retuse, 4–8 lines long: peduncles exceeding the leaves, bearing a rather loose spike of several to many flowers; calyx cylindrical, pubescent, with dark-colored hairs, the slender teeth much shorter than the tube, but little shorter than the corolla: pods pendulous or spreading, lunate-lanceolate, an inch long, 3–4 lines broad, densely long-hairy, turgid and sulcate on the back, sharp-edged ventrally, many-seeded. On alkaline plains, southeastern Oregon to Nevada and Colorado.

A. arrectus Gray l. c. viii, 280. Somewhat cinereous-pubescent or nearly glabrous: stems 1–2 feet high from a perennial root, erect, sulcate, simple or branched: stipules distinct, scarious; leaflets 19–25, ovate or narrowly oblong, obtuse or retuse, 6–8 lines long: racemes on long peduncles, loosely rather few-flowered; flowers ochroleucous, 7 lines long; calyx tubular-campanulate, pubescent with black hairs, its teeth short and slender: pods erect upon spreading or somewhat deflexed pedicels, coriaceous, subglabrous, oblong, 8–12 lines long, nearly straight, cuspidate, abruptly narrowed at base into a stipe as long as the calyx, with a deep dorsal sulcus and somewhat carinate ventral edge, 2-celled, many-seeded. Eastern Washington to Idaho and Nevada.

A. obscurus Watson Bot. King. 69. Somewhat canescent, with a minute appressed pubescence: stems 6–12 inches high, numerous, slender, ascending; from a perennial root: stipules small, triangular, somewhat adnate to the petiole; leaflets 5–15, linear to oblong, 2–5 lines long, obtuse or acute: peduncles exceeding the leaves: racemes 5–15-flowered, loose or capitate, calyx pubescent with black hairs, the campanulate tube twice longer than the acute teeth, petals 6 lines long, ochroleucous or tinged with violet, the upper one orbicular, longer than the entire lateral ones and arched keel; pods terete, with a narrow dorsal sulcus, sessile, chartaceous, erect, 10–15-ovuled. Eastern Oregon to Nevada.

§ 7. SUCCUMBENTES Gray l. c. vi, 200. Pod chartaceous-coriaceous, sessile, strongly compressed, falcate upward, bicarinate and deeply sulcate on the back, the ventral suture prominent and acute.

A. succumbens Dougl. Hook. Fl. i, 151. Hirsute throughout: stems numerous, from the crown of a perennial root, decumbent, branching, 8–15 inches long: stipules small, oblong, acuminate, free and distinct; leaflets 11–15, obovate to oblong, 6 lines long or less; peduncles stout, shorter than the leaves; racemes short, dense, many-flowered; calyx cylindrical, loosely hirsute, its triangular acuminate teeth shorter than the tube: petals 8–10 lines long, nearly equal: pods glabrous, linear-lanceolate, falcate, 2 inches long, erect on spreading pedicels, bicarinate and deeply sulcate on the back, the ventral suture prominent, acute, strongly compressed, many-ovuled. On rocky or sandy hillsides along the Columbia river above The Dalles.

§ 8. GALEGIFORMES Gray l. c. Pod exsert-stipitate, pendent coriaceous or cartilaginous-chartaceous, straight, narrow, more or less triangular, very deeply sulcate dorsally, the suture intruded to the middle or beyond.

A. **Howellii** Gray Proc. Am. Acad. xv, 46. Cinereous-pubescent throughout: stems erect, slender, 1–2 feet high, sparsely leafy; stipules linear-lanceolate, partly adnate, 2 lines long; leaflets 11–31, oblong to linear, obtuse to retuse, 4–8 lines long; peduncles exceeding the leaves; flowers white, on short spreading pedicels, soon deflexed, in a loose raceme; calyx campanulate, subgibbous at base, its subulate-setaceous teeth about equalling the tube: pods straight, oblong-lanceolate, acuminate, attenuate at base to a stipe, twice longer than the calyx, 2-celled by the intrusion of the dorsal suture, the ventral suture prominently keeled, canescent, several-ovuled. Dry hillsides and plains, Eastern Oregon near The Dalles.

A. **misellus** Watson Proc. Am. Acad. xxi, 449. Canescent with a short appressed pubescence: stems numerous from a thick perennial root, decumbent or ascending, 4–6 inches long: stipules triangular to broad-subulate, slightly connate; leaflets 17–21, oblong to linear, 2–3 lines long, pubescent beneath, soon glabrate above: peduncles about equalling or much exceeding the leaves, few-flowered; flowers spreading or reflexed, on very short pedicels: calyx campanulate, its teeth nearly equalling the tube: pod linear, somewhat curved; attenuate below to a stipe a little longer than the calyx, compressed, 2-celled by the intrusion of the dorsal suture, the ventral suture rounded or acute, reflexed, finely pubescent, 8–10 lines long. On sterile hillsides in the John Day valley at Mitchell, Oregon.

A. **racemosus** Pursh Fl. 740. Appressed pubescent or glabrate: stems 1-2 feet high, rather stout, somewhat sulcate, very leafy: leaflets about 21, elliptical, oblong or oval, obtuse, mucronate, smooth above, 6–8 lines long: peduncles about the length of the leaves, loosely many-flowered; flowers nodding and somewhat secund, calyx whitish-pubescent, strongly gibbous at base, the setaceous teeth slightly shorter than the tube, equalling the stipe: pods lance-oblong, an inch long, triangular, not 2-celled, very smooth. Plains of Idaho to Kansas and the Northwest Territory.

§ 9. ARGOPHYLLI Gray Proc. Am. Acad. vi, 209. Pods mostly thick-coriaceous and obcompressed, the intruded dorsal suture more or less approaching the ventral, not 2-celled, pubescent.

A. **iodanthus** Watson Bot. King 70. Canescent with an appressed hairy pubescence, or nearly glabrous with scattered hairs upon the petioles and margins of the leaves; stems decumbent, 6–10 inches long, from a perennial root: stipules ovate-lanceolate, free or somewhat adnate to the petiole; leaflets 13–21, 2–5 lines long, obovate or orbicular, obtuse: peduncles equalling the leaves: spikes short, dense: flowers on short pedicels, deep violet-purple or ochroleucous tinged with purple, the lateral and upper petals 6–8 lines long, exceeding the obtuse keel, the somewhat nigrescent campanulate calyx-tube twice longer than the subulate teeth: pods 18 lines long, 3 lines broad, linear-oblong, acuminate, strongly arcuate or hamate, sessile, nearly glabrous with a very sparse pubescence, mottled, chartaceous, irregularly folded but usually with a deep dorsal sulcus approximating the suture to the prominent ventral one, many-seeded. Eastern Oregon to California, Nevada, Colorado and Montana.

A. **Beckwithii** T. & G. Pac. R. Rep. ii, 120. Glabrous or nearly so: stems 1–2 feet long, from perennial roots, diffusely spreading: stipules ovate-lanceolate, adnate to the petiole: leaflets 13–25, 6 lines long, broadly oval: flowers 5–8, in a short loose raceme, orchroleucous, 9 lines long; calyx nearly glabrous, its subulate teeth scarcely shorter than or exceeding the campanulate tube: pods 1 inch long, glabrous, transversely rugulose, coriaceous, short stipitate, somewhat obcompressed, flattened dorsally with the sutures slightly intruded, bisulcate ventrally with the prominent suture acutely margined, many-seeded. Brit. Columbia to Southern Idaho, Utah Nevada and California.

A. **glareosus** Dougl. Hook. Fl. i, 152. Silky-villous with incumbent

hairs: stems short, depressed: stipules oblong, acuminate, appressed, membranaceous: leaflets 13–15, linear-oblong: peduncles as long as the leaves or shorter, 3–4-flowered; bracts linear, as long as the cylindrical elongated blackish-hairy calyx; teeth of the calyx one-third as long as the tube: pods oblong-ovate, attenuate above, incurved, silky-pubescent. Southern Idaho and Wyoming.

SERIES II. PHACA L. Gen. n. 891, as genus. Pod 1-celled, neither suture being inflexed, nor the ventral more intruded than the dorsal.

§ 9. ERIOCARPI Gray Proc. Am. Acad. vi, 212. Pod very woolly, short turgid, coriaceous, more or less incurved, acuminate or pointed, sessile. Stems prostrate, from a stout perennial root.

A. inflexus Dougl. in G. Don. Gen. Syst. ii, 256. Soft-woolly throughout: stems 1–2 feet long, prostrate, branching: stipules subulate or acuminate from a rather broad base, 6–8 lines long: leaflets 21–25, oblong or oblanceolate, about 6 lines long, densely silky peduncles not exceeding the leaves; flowers purple, rather numerous, in short capitate spikes: bracts setaceous, 6–8 lines long; calyx about equalling the lateral petals, its subulate teeth about as long as the tube; upper petal longer than the lateral ones, pubescent on the back: pods ovate, acuminate, densely silky-villous, at length strongly incurved, 1-celled but at maturity the dorsal suture becomes inflexed so as to nearly meet the ventral, but not forming a partition. On sandy banks and plains, along the Columbia river above The Dalles.

A. dorycnioides Dougl. in G. Don Gen. Syst. ii, 258 (?). Appressed-silky with white hairs, stems short, depressed, several from the crown of a stout perennial root 1–3 inches long: stipules subulate, setaceous-acuminate, 6–9 lines long: leaves numerous; leaflets usually 13, 6–10 lines long by 2 lines broad, oblong to oblanceolate, acute or acuminate, densely silky both sides; peduncles shorter than the leaves; capitately few-flowered; calyx tubular, 4–5 lines long, its subulate teeth about half as long as the tube; corolla 8–10 lines long, persistent, bright purple: pods ovate, acuminate, at length strongly incurved, densely villous, 10–12 lines long, 1-celled, the dorsal suture at maturity strongly intruded, the ventral rounded. On rocky hillsides, eastern Oregon and Washington.

A. leucocystis Greene Eryth. iii, 76. (*A. lanocarpus* Sheld. l. c. 144). Woolly-pubescent with long white hairs: stems cespitose, very short, from a thick perennial root, branching and forming a close mat 4–8 inches in diameter: leaves numerous, 3–6 inches long, the rachis channelled; leaflets 7–11, usually absent from the lower half of the rachis, narrowly obovate to oblong, acute or obtuse, 3–6 lines long, stipules triangular-ovate, acuminate, sheathing peduncles equalling the leaves, 3–5-flowered; calyx narrowly cylindrical, with unequal teeth, one-fifth as long as the tube; corolla ochroleucous tipped with purple, 10–12 lines long: pods 8–10 lines long, coriaceous, white-pubescent with long stiff hairs, sessile, oblong, slightly arcuate, 1-celled, but with the ventral suture somewhat intruded, lined within with cobwebby hairs which traverse the cavity, few to many-seeded. On dry hillsides and plains, eastern Oregon and Washington.

A. Purshii Dougl. Hook. Fl. i, 152. Very hirsute, stems short, diffuse: leaflets 13–17, oblong; stipules lanceolate, acuminate: peduncles half as long as the leaves; flowers in loose heads, spreading; bracts linear-lanceolate, twice as long as the pedicels; calyx elongated, membranaceous, its subulate teeth half as long as the tube, equal; corolla yellow, 18 lines long, upper petal obovate, equalling the narrow lateral ones, keel purple-tipped; ovary subsessile, linear, very hirsute. Brit. Columbia to California and Utah.

A. **Utahensis** T. & G. Pac. R. Rep. ii, 120. Canescent with a long and dense soft-woolly appressed pubescence: subcaulescent, the short stems 2–6 inches long, prostrate: leaflets 11–17, suborbicular, 2–4 lines in diameter: flowers violet; pods oblong, obcompressed, densely woolly, moderately incurved, slightly sulcate. Union Co. Oregon to Salt Lake Utah.

A. **allanaris** Sheld. l. c. 141. Pubescent throughout with white loose hairs: cespitose, nearly acaulescent or with very short erect, simple hidden stems, from the crown of a stout perennial root: leaves 2–5 inches long, erect, pubescent with sparse spreading hairs, the rachis slightly channelled, but nearly terete; stipules ovate-lanceolate, long-acuminate, usually closely imbricated; leaflets 7–11, 4–6 lines long, elliptical to lanceolate, acute, pubescent both sides; peduncles 1–2 inches long, 2-flowered; flowers narrow, each subtended by a black-bordered bract; calyx tubular-cylindrical, oblique at base, spreading-pubescent, striate, the lanceolate teeth nigrescent-margined, much shorter than the tube: corolla purplish, tinged with green: pods 6–7 lines long, ovate-arcuate, acute or shortly acuminate pointed, incurved, coriaceous, sessile, white-pubescent, 1-celled the dorsal suture slightly impressed, few-seeded, Eastern Washington.

§ 10. INFLATI Gray l. c. 213. Pod membranaceous, inflated, globose, egg-shaped or semi-ovate, usually large, finely reticulated, glabrous or glabrate, neither suture inflexed or rarely the ventral only and slightly.

* Perennial; pod not mottled. Caulescent, rather tall, leafy: racemes or spikes usually many-flowered.

A. **Suksdorfii** Howell Eryth. i, 111. Cinereously pubescent throughout: stems many from a stout perennial root, slender, ascending, 8–12 inches long: stipules foliaceous, ovate-lanceolate, acute, about a line long: leaflets 9–11 cuneate-oblong, obtuse or retuse, 3–4 lines long: peduncles very slender, shorter than the leaves; flowers in compact clusters white or yellowish, on slender pedicels; bracts lanceolate, about half as long as the pedicels; calyx campanulate, its subulate teeth about equalling the tube; upper petal far exceeding the lateral ones and twice the length of the keel, entire: pods of firm texture, sessile, obliquely ovate, acuminate, 6 lines long or less, finely appressed-pubescent. In loose volcanic soil near the base of Mount Adams, Washington. (Suksdorf).

A. **diurnus** Watson Proc. Am. Acad. xxi, 450. Minutely appressed-pubescent throughout: stems numerous from a thick perennial root sparingly branched below or simple, 4–10 inches high, slender, ascending or erect: leaves about 2 inches long; leaflets 7–11, obovate, obtuse or retuse, glabrous above, pubescent beneath, 1–3 lines long: peduncles shorter than the leaves, slender, few-flowered; bracts about equalling the pedicels, subulate: flowers spreading or reflexed, pale yellow or lined with purple, 3 lines long; calyx turbinate-campanulate, the slender teeth as long as the tube: pods inflated, membranaceous, sessile, obliquely oblong-ovate to oblong, the ventral edge nearly straight, or somewhat incurved, somewhat compressed, finely-pubescent, 6–10 lines long. On gravelly bars of the John Day river at Dayville, eastern Oregon.

* * Root perennial; pod mottled, short-stipitate, the stipe equalling the calyx: flowers few, rather small, light-colored, keel with the inflexed apex somewhat produced.

A. **Hookerianus** Gray l. c. 215. Canescently pubescent: stems much branched from the base, ascending, 5–6 inches high, from a perennial root: stipules lanceolate, membranaceous; leaflets 15–19, oblong or linear-oblong, slightly petiolulate, rather rigid: peduncles scarcely as long as the leaves; bracts setaceous, about as long as the very short pedicels; calyx pubescent with whitish and black hairs intermixed, its subulate

teeth shorter than the tube: ovary canescent; pods very large, inflated, obovoid, obtuse, tapering into a very short stipe, glabrous, thin and membranaceous, whitish and beautifully mottled with purple, nearly 2 inches long. Oregon to California and Nevada.

A. ceramicus Sheld. l. c. 19. *A. pictus Gray*, not Steud. Hoary with a loose silky pubescence: stems erect, slender, branching, from filiform roots, ascending, 10–12 inches high: lower petioles short, pinnately 3–5-foliolate, with narrowly linear leaflets, the upper ones elongated and filiform, mostly leafless; stipules lanceolate-subulate, the lowermost united, the upper ones distinct: racemes on filiform peduncles shorter than the leaves, 7–10-flowered: pods 6–18 lines long, ovoid, scarcely pointed, membranaceous and much inflated, stipitate, pendent. Idaho to Nebraska and New Mexico.

A. Cusickii Gray Proc. Am. Acad. iii, 370. Many-stemmed from a thick perennial root, strict, smooth or nearly so: stipules scarious, triangular, acuminate, slightly connate; leaflets 13–17, remote, linear, 5–7 lines long: peduncles exceeding the leaves, bearing few to several white or yellowish flowers in a loose raceme; calyx cylindrical, more or less dark-pubescent, the short triangular teeth not ¼ as long as the tube: pods oblong, with a short incurved acute beak, an inch long or less, contracted at base to a short stipe about equalling the calyx, glabrous. Powder river valley eastern Oregon.

* * * Annual: pod sessile, not mottled; flowers small, ochroleucous or purplish. Low; leaflets linear or linear-oblong, grey with strigulose hairs.

A. Geyeri Gray l. c. 214. Subcanescent with an appressed hairy pubescence: stem somewhat simple, 3–6 inches high, annual: leaflets linear or oblong, obtuse, glabrous above: peduncles shorter than the leaves, 3–5-flowered; calyx campanulate, its subulate teeth about equalling the tube; corolla 3 lines long, ochroleucous; pods 8–9 lines long, membranaceous, inflated, ovate-lunate with an incurved acumination, sessile, not mottled, finely reticulated, glabrous, 1-celled. Montana and southern Idaho to Nevada and California.

§ 11. MICROCYSTEI Gray l. c. 219. Pod membranaceous or chartaceous, small, globose or ovate, inflated, sessile, neither suture intruded. Diffuse or procumbent perennials, mostly small and slender; flowers small and usually few.

A. microcystis Gray l. c. 220. Cinereous-pubescent: stems slender, procumbent, from a woody root, much branched: stipules scarious, connate or the uppermost nearly distinct; leaflets 9–13, oblong or oblong-lanceolate, obtuse: racemes slender, 5–12-flowered; calyx hairy, the setaceous-subulate teeth about as long as the short-campanulate tube; corolla violet or whitish, the deeply emarginate upper petal slightly exceeding the lateral ones, twice as long as the incurved keel: pods globose-ovate, 3 lines long, thin-membranaceous, gray-pubescent. Brit. Columbia to Washington, Idaho, Wyoming and Montana.

§ 12. SCYTOCARPI Gray l. c. 222. Pod coriaceous, ovate or oblong, rarely cylindrical, turgid, not sulcate and neither suture intruded.

A. Chamæleuce Gray Ives Rep. 10. Perennial; silvery-canescent with a dense silky pubescence: stems numerous, 1–6 inches long, prostrate, or nearly acaulescent: stipules ovate, membranaceous, free; leaflets 3–7, 2–4 lines long, oblong, obovate or oval: peduncles shorter than the leaves, slender, 3–8-flowered; calyx cylindrical, its subulate teeth much shorter than the tube: corolla light violet, 9 lines long: pods 6–12 lines long

thick-coriaceous, sessile, ovate-oblong, acuminate, somewhat arcuate, terete or somewhat obcompressed and frequently sulcate ventrally, rugosely reticulated and subpubescent, 1-celled, many-seeded. Idaho to New Mexico and Arizona.

A. reventus Gray l. c. xv, 46. Stems short, numerous, from a thick perennial root, much branched from the base, glabrate: stipules scarious, connate lanceolate, 2–3 lines long; leaves numerous, 4–6 inches long or more, leaflets 21–23, linear-oblong to oblong, emarginate, pubescent beneath, smooth above, 5–6 lines long: peduncles at length exceeding the leaves; flowers whitish, in a dense short-oblong raceme, erect in bud but soon reflexed; bracts scarious, triangular, a line long or more, a little longer than the pedicels; calyx campanulate, pubescent with blackish hairs, its subulate teeth not more than half as long as the tube: pods sessile or nearly so, erect on stout pedicels, cartilaginous, reticulated, 8–10 lines long, glabrous, ovate-oblong, turgid, acuminate, obcompressed but the sutures prominent, several-seeded. Open plains and hillsides, eastern Oregon and Washington.

A. conjunctus Watson Proc. Am. Acad. xvii, 371. Stems short, numerous, from a stout perennial root, erect or assurgent, sparingly appressed-pubescent: leaves 6–12 inches long; leaflets 11–21, on an elongated rachis, linear, 4–6 lines long: peduncles elongated, 6–12 inches long, but little or not at all surpassing the leaves, bearing an open few-flowered raceme; bracts subulate, about equalling the very short pedicels; calyx narrowly tubular, 3–4 lines long, pubescent with dark-colored hairs, the narrow teeth not half as long as the tube; petals purple, 6–8 lines long: pods erect, sessile, coriaceous, rugose narrowly oblong, nearly straight, acuminate, 1-celled, the dorsal suture impressed, 9–12 lines long. On dry rocky ridges, John Day valley, Eastern Oregon.

A. Hoodianus Howell Eryth. i, 111. Canescent with a short appressed pubescence: stems strictly erect, 4–6 inches high, from a stout perennial root; leaves 6–8 inches long; leaflets 21–29, linear to narrowly lanceolate, very shortly petiolulate, 6–8 lines long; stipules subulate, 3–4 lines long; peduncles very stout, 10–16 inches long; flowers whitish, in a rather short raceme, 8–10 lines long; bracts setaceous, twice as long as the stout pedicels; calyx cylindrical, 4–5 lines long, pubescent with white appressed hairs, its setaceous teeth nearly as long as the tube: mature pods pubescent, oblong, shortly acuminate, sessile, 8–10 lines long, erect. Open woods and plains, Oregon and Washington, near The Dalles.

A. Palousensis Piper Bot. Gaz. xxi, 489. Perennial, from a stout woody caudex: 16–24 inches high, simple, or branched above, striate, sparingly pubescent with short appressed hairs, these white below and blackish above: leaves 4–8 inches long; stipules deltoid-acuminate; leaflets 25–31, elliptical or lanceolate, obtuse or truncate, appressed-pubescent beneath, glabrous above, 6–10 lines long, nearly sessile: petioles sparsely hirsute; racemes elongated, 3–7 inches long, flowers 20–25, erect on short pedicels, 8 lines long; bracts lanceolate, shorter than the calyx: calyx obliquely campanulate, the slender teeth nearly as long as the tube, pubescent with short appressed black hairs: corolla pale yellowish, with or without a black spot on the lateral petals: pods 10 lines long, crustaceous, narrowly oblong, tipped with a slender short beak, its surface transversely reticulated and sparsely pubescent with short white hairs, on a stipe as long as the calyx tube or shorter. Common on rich loess hillsides about Pullman, Washington.

§ 13. PODO-SCLEROCARPI Gray l. c. 225. Pod thick-cartilaginous or coriaceous, exsertly stipitate, compressed or turgid, incurved; sutures not intruded, sometimes thickened and separating from the valves. Perennial, branched, ashy-puberulent; stipules small, distinct.

A. sclerocarpus Gray l. c. Cinereous with a very short appressed pubescence, much branched: leaflets 13–19, linear, 4–6 lines long: peduncles exceeding the leaves, loosely rather few-flowered; calyx cylindrical, pubescent with black hairs, 3 lines long, its short triangular teeth not half as long as the tube: pods canescent-puberulent, lanceolate, acuminate, falcate or nearly hamate, an inch or more long, attenuate at base to a stipe an inch or more long. On sandy banks and plains, along the Columbia river above The Dalles.

A. speirocarpus Gray l. c. Stems slender, decumbent or ascending, 10–12 inches long, cinereous: stipules very small, triangular, obtuse; leaflets 9–13, oblong or cuneate, obtuse or retuse, 1–4 lines long, pubescent both sides: peduncles about equalling the leaves, loosely rather many-flowered; flowers yellowish-white, on very short pedicels, soon deflexed; calyx cylindrical, 3–4 lines long, pubescent with black hairs, its short triangular teeth not half as long as the tube: pods linear, acuminate, pubescent, coiled into a short spiral, attenuate at base to a stipe a little longer than the calyx. Along the Columbia river above The Dalles.

Var. falciformis Gray Bot. Cal. i, 152. Stipe filiform, 6–9 lines long, nearly the length of the thinner-walled and less turgid falcate or merely hooked pod. Brit. Columbia to Washington, Nevada and California.

A. Gibbsii Kell. Proc. Cal. Acad. ii, 161. Cinereous-pubescent: stems many from a thick perennial root, rather stout, 10–12 inches high: leaflets 11–15, oblong with a cuneate base, truncate or retuse, 6–8 lines long: peduncles exceeding the leaves; flowers numerous, in a rather dense raceme, reflexed on short spreading pedicels; calyx cylindrical, gibbous at base, 5–6 lines long, the triangular teeth not more than ⅓ as long as the tube: pods linear, about an inch long, curved or annular, very acute, finely pubescent, attenuate at base into a stipe twice as long as the calyx. Plains and hillsides, eastern Oregon and Idaho to Nevada.

§ 14. HOMALOBI Gray l. c. Pod flattened or compressed, straight, margined by the nerve-like sutures, coriaceous or chartaceous, sometimes stipitate.

A. collinus Dougl. in G. Don. Gen. Syst. ii, 256. Stems erect or diffuse, 6–12 inches long, numerous, from a stout perennial root, grayish-pubescent: leaflets 19–23, linear or oblong-linear, obtuse, attenuate at base, 6–12 lines long; stipules very small, oblong, acuminate; peduncles twice the length of the leaves; flowers whitish, in dense oblong racemes refracted on suberect pedicels; calyx tubular, densely hirsute; 4–6 lines long, its triangular teeth about half as long as the tube: pods pubescent, linear-oblong, attenuate at base to a stipe, somewhat turgid, an inch long with the stipe reflexed. In rocky gulches and hillsides of the Blue Mountains of Oregon.

A. Californicus Greene Bull. Cal. Acad. i, n. 3, 157. Stems numerous, from a stout perennial root, rather slender, 8–12 inches high, usually simple, minutely pubescent: leaves 2–4 inches long: stipules triangular, 2 lines long, nearly as broad; leaflets 11–19, cuneate-oblong to linear, obtuse, pubescent both sides with white hairs, 4–6 lines long by 1–3 broad, petiolulate: peduncles longer than the leaves; flowers ochroleucous, 6–8 lines long, pendent, on erect pedicels in dense oblong racemes: bracts lanceolate longer than the pedicels; calyx tubular, 3–5 lines long, pubescent with minute brownish hairs, its short triangular teeth about a line long: pods 1–2 inches long by 2 lines broad, acute, attenuate below to a slender stipe as long as the calyx, strongly reticulated and very minutely pubescent, compressed or somewhat turgid. In rich alluvial soil, valley of the Klamath river near Yreka, California, no doubt in adjacent Oregon.

A. Tweedyi Canby Bot. Gaz. xi, 150. Stems erect, 12–18 inches high,

from a perennial root, branching, sparsely cinereous-pubescent: stipules subulate, acuminate, 2–3 lines long; leaflets 13–17, linear to linear-spatulate, 6–8 lines long: peduncles much exceeding the leaves; racemes many-flowered, dense; flowers yellowish-white, spreading, on very short erect pedicels: calyx cylindrical, subgibbous at base, 3–4 lines long, white-pubescent, the short teeth triangular: pods oblong, turgid, acute at both ends, slightly curved, 6–8 lines long, erect on a long slender stipe. On alluvial hillsides along the Columbia river and its tributaries above The Dalles.

A. **filipes** Torr. Bot. Wilkes 278. Stems slender, erect, 1–2 feet high: stipules triangular, a line long, acute: leaves 3–6 inches long, the slender rachis channelled; leaflets 7–15, remote, linear, 4–8 lines long, less than a line broad, finely pubescent: peduncles much longer than the leaves; flowers numerous, in an elongated narrow raceme, yellowish to nearly white, erect or spreading on slender pedicels; bracts subulate, not as long as the pedicels; calyx cylindrical, 2 lines long, pubescent with minute black hairs, the narrow teeth about ¼ as long as the tube: pods elongated-oblong, 9–15 lines long by 2 lines or more broad, abruptly acute at both ends, straight, on a slender stipe 6–8 lines long, glabrous and shining, finely reticulated, flat, spreading or pendent. Plains and hillsides, eastern Oregon and Washington to Nevada.

A. **Bourgovii** Gray l. c. 227. Stems short, numerous, from a thick perennial root, thinly strigose-pubescent: leaflets 11–13, lanceolate, pubescent beneath, smooth above, 1–2 lines long: peduncles much longer than the leaves, loosely 3–7-flowered; calyx cylindrical, 2–3 lines long, pubescent, the subulate teeth half as long as the tube: pods oblong, somewhat obcompressed, curved downward, mottled, pubescent, obliquely rounded at summit, 6–8 lines long, on a stipe shorter than the calyx. On rocky hillsides, eastern Oregon to Brit. Columbia.

A. **multiflorus** Gray l. c. 226. Perennial, somewhat glabrous: stems a foot high, numerous, ascending, slender, branched: stipules dark-colored, the lower ones sheathing; leaflets 13–21, 3–6 lines long, linear or narrowly oblong, acute or obtuse: peduncles not exceeding the leaves, loosely few-flowered; flowers ochroleucous, small, 2–3 lines long; calyx campanulate, the teeth shorter than the tube: pods 4–6 lines long, chartaceous, flat, glabrous, oblong on a stipe about as long as the calyx-tube, reflexed, 6-ovuled, 2–4-seeded. Eastern Oregon, to Brit. Columbia, Minnesota, Colorado and California.

A. **tegetarius** Watson Bot. King 76. Canescent with a silky pubescence: stems cespitose, 2–6 inches long, numerous, branched, from a much branched perennial caudex, procumbent: stipules membranaceous, mostly acuminate, sheathing; leaflets 7–9, 2–3 lines long, linear, acute: peduncles slender, about equalling the leaves, 1–3-flowered: flowers small, 2–3 lines long, ochroleucous, the keel purplish; calyx-teeth as long as the campanulate tube: pods 2–3 lines long, chartaceous, sessile, compressed, pubescent, ovate-oblong, straight, erect, 1-celled, 6-ovuled, 1–2-seeded. On high mountains, Montana, Wyoming, Idaho and Nevada.

A. **miser** Dougl. Hook Fl. i, 153. Cinereous-pubescent: stems diffuse, 8–10 inches long, slender, loosely leaved: stipules rather large, the upper ones connate to the middle; leaflets broadly-linear to oblong, mostly obtuse: peduncles much exceeding the leaves, loosely 5–7-flowered: young pods ovate-oblong, canescent. In the Spokane country, Washington.

A. **serotinus** Gray Pac. R. Rep. xii, 51. Cinereous with a minute strigulose pubescence: stems branching from the perennial root, ascending, slender, often flexuous, 8–15 inches high: stipules triangular, acuminate; leaflets 9–21, linear to oblanceolate, mucronate, not rigid, glabrous or nearly so above: peduncles exceeding the leaves; racemes virgate; calyx campanulate, minutely pubescent, its teeth very short: pods sessile, linear, acute, glabrous or minutely pubescent, 8–10-seeded. Northeastern Washington.

12 OXYTROPIS DC. Astragal. 24 t, 2–6.

Perennial, very rarely annual, herbaceous, or sometimes suffrutescent, often acaulescent plants with unequally pinnate leaves and axillary or radical pedunculate spikes of various colored flowers. Calyy 5–toothed. Keel with a subulate point. Pods partly 2–celled by the introflexion of the upper or placental suture.

O. viscida Nutt, T. & G. Fl. i, 341. "Stemless, cespitose, hairy and viscid; leaflets numerous (16–29 pairs),oblong-lanceolate, somewhat acute; peduncles longer than the leaves, about 14 inches high; stipules pilose, membranaceous, with a long acumination: spikes subcylindrical; bracts as long as the calyx; teeth of the calyx subulate, about the length of the tube; legumes short, terete, pubescent, acuminate." Eastern Oregon to the Rocky Mountains.

13 GLYCYRRHIZA Tourn. L. Gen. n. 882. (LIQUORICE).

Erect perennial herbs with unequally pinnate leaves deciduous stipules, the flowers in dense axillary pedunculate spikes with caducous bracts. Calyx tubular, gibbous at base, 5-cleft, the two upper segments partly united. Upper petal ovate-lanceolate, straight, the lateral ones acute, united at the tip, keel not pointed. Stamens diadelphous. Pod ovate or oblong, compressed, often echinate, 1-celled, few-seeded, scarcely dehiscent, sessile. Rootstock rather large, sweet.

G. lepidota Nutt. Gen. ii, 106. Tall and stout, 2–5 feet high, somewhat glandular-puberulent or the younger leaves slightly silky: leaflets punctate, 6–8 pairs, oblong-lanceolate, mucronate, often acuminate, usually 1–2 inches long; stipules linear-subulate: peduncles about equalling the leaves; spikes short; bracts lanceolate, acuminate; flowers ochroleucous, nearly 6 lines long; calyx half as long, the slender teeth much longer than the tube: pod thickly beset with hooked prickles, oblong, 6 lines long, 2–6-seeded. On sandy plains and river banks, Brit. Columbia to California, Missouri and Arkansas.

G. glutinosa Nutt. T. & G. Fl. i, 298. Stems rather stout, from long running rootstocks, 2–4 feet high; glandular-pubescent leaflets oblong to oblong-lanceolate, strigose with scaly glands: peduncles much shorter than the leaves, very glandular: spikes short; bracts lanceolate with a long acuminate point; calyx very glandular, the teeth nearly equal: pods densely beset with hooked bristles, 2–6-seeded. On sandy river banks, Brit. Columbia to California.

Tribe 7. Hedysareæ, DC. Prodr. ii, 307. Herbs or shrubs with 1–many-foliolate or simple usually stipellate leaves and racemose, spicate or umbellate axillary or terminal inflorescence. Corolla papilionaceous. Stamens 10, monadelphous or diadelphous. Pods usually transversely divided into 1-seeded indehiscent joints. Cotyledons plain, foliaceous after germination. Radicle incurved.

14 HEDYSARUM Jeaum in Desv. Journ. Bot. iii, 61, L. gen. n. 887.

Herbs with unequally pinnate leaves, scarious stipules, entire usually pellucid-punctate exstipellate leaflets and purple, white or yellow flowers in axillary pedunculate racemes with scarious or setaceous bracts. Calyx 5-toothed or -parted, the linear-sub-

ulate lobes subequal. Corolla with the upper petal ample, free from the stamens, keel oblique, truncate, longer than the wings. Stamens diadelphous. Pod flattened, tranversely articulated into several equal-sided roundish 1-seeded indehiscent joints that are connected in the middle.

H. Mackenzii Richard Frankl. Journ. 17. Stems suberect, simple or branched, 1–2 feet high, minutely pubescent: stipules broadly subulate, the lower ones connate: leaflets 5–8 pairs, canescently pubescent, oblong or lanceolate, nearly glabrous above, 3–12 lines long: peduncles longer than the leaves; loosely 7–30-flowered; bracts subulate, longer than the pedicels; flowers 6–9 lines long, light purple; teeth of the calyx subulate, about as long as the tube; pods 3–4-jointed, minutely pubescent. Washington to the Rocky Mountains and far northward.

H. flavescens Coult. & Fish. Bot. Gaz. xviii, 300. Stems slender, a foot or more high, puberulent: stipules lanceolate, acuminate, the lower ones connate; leaflets 9–15, oblong to lanceolate, 8–12 lines long: peduncles longer than the leaves, loosely many-flowered; calyx campanulate, 2 lines long, the somewhat unequal teeth about as long as the tube; flowers cream-color, 8 lines long, the broad keel conspicuously longer than the wings and banner, on slender pedicels: joints of the pods 2–3 lines broad, usually only 2 maturing, the lowest one aborting and serving as a stipe. Idaho to Montana and Wyoming.

Tribe 8. Vicieæ, Bronn. Diss. 133. Herbs with abruptly pinnate leaves, the common petiole not articulated with the stem, produced at the apex into a tendril or bristle. Corolla papilionaceous. Stamens diadelphous. Pod continuous, not articulated, dehiscent, Radicle inflexed. Cotyledons thick, farinaceous, remaining underground and unchanged in germination.

15 VICIA Tourn. Inst. t. 221. L. Gen. n. 873. (VETCH, TARES.)

Weak herbs with angled stems, more or less climbing by branched tendrils that terminate the leaves, pinnate leaves, semisagitate usually foliaceous stipules, and numerous, rarely few or solitary, flowers in loose peduncled axillary racemes. Calyx 5-cleft or toothed, usually unequal. Wings of the corolla adherent to the middle of the short keel, the banner obovate or oblong, free. Stamens diadelphous or nearly so, the mouth of the sheath oblique; anthers uniform. Ovary two to many-ovuled; style filiform, bent at right angles to the ovary, the apex surrounded by hairs or hairy on the outside. Pod flat, two-valved, short-stipitate or sessile, not jointed. Seeds globular, the stalk expanded above to cover the linear hilum.

* Perennials: flowers in pedunculate secund racemes.

V. gigantea Hook. Fl. i, 157. Stout and tall, climbing several feet high, somewhat pubescent or puberulent: leaves 6 inches long or more; stipules narrow, deeply and sharply toothed in the middle: leaflets 10–15 pairs, oblong-lanceolate, obtuse, mucronate, 1–2 inches long, entire: peduncles shorter than the leaves, 5–18-flowered; flowers ochroleucous, reflexed on short pedicels, 6 lines long; upper calyx-teeth very short, triangular, the lower longer, subulate: pods broadly oblong, 16–18 lines long, glabrous, 3–4-seeded, black when mature. Common in woods and moist places, California to Alaska, near the coast.

V. semicincta Greene Eryth. iii, 17. Stoutish, very leafy, probably several feet high, the stem very prominently striate-angled and puberulent: leaflets 20–24, approximate, about 1 inch long, oblong-linear, mucronate, glabrous above, beneath silky-puberulent: peduncles far surpassing the leaves, the flowers probably in a short and dense raceme: pods obliquely oblong-linear, less than . . ies long, glaucescent, not blackening in maturity, few-seeded: seeds globose, 1½ lines thick, dull black, nearly half encircled by the hilum. On Crane Creek, southeastern Oregon. (Mrs. R. M. Austin, 1893.)

V. Americana Muhl. Willd. Sp. iii, 1096. Glabrous throughout: stems 1–4 feet high, from creeping jointed rootstocks: leaflets 4–8 pairs, variable, usually oblong to oblong-lanceolate, obtuse or truncate, mucronate, entire, somewhat coriaceous, prominently veined and reticulated, 6–12 lines long: peduncles shorter than the leaves, 4–8-flowered; flowers purple, 6–9 lines long; calyx tubular, the 2 upper teeth very short or obsolete, the lateral ones broadly subulate, the lower one narrow, not half as long as the corolla; style very villous at the top: pods oblong, glabrous, an inch or more long, 3–6-seeded: seeds dark purple, 1½ lines in diameter. Common in copses, Oregon and Washington to the Atlantic States and Canada.

V. truncata Nutt. T. & G. Fl. i, 270. Somewhat pubescent: stems 1–2 feet high, weak: leaflets 5–6 pairs, oblong-linear, usually truncate, serrate or tridentate at the apex, 10–12 lines long by 1–4 lines broad, the lowest ones often simply acute and apiculate; stipules lunate, incisely serrate: peduncles 4–7-flowered, rather shorter than the leaves; lower teeth of the calyx lanceolate, acuminate, the upper ones very short, triangular; style very villous at the apex: pods oblong, an inch long, 1–8-seeded: seeds globular, 1½ lines in diameter. Common in copses, Brit. Columbia to California.

V. Californica Greene Fl. Fr. 3. Villous-pubescent: stems erect or decumbent, 6–12 inches high, scarcely climbing, the tendrils usually short and stiffish, not branching: leaflets 8–14, delicately feather-veined, cuneate oblong to oblong or orbicular, truncate, or retuse, mucronate, 2–7 lines long, more or less dentate toward the apex: peduncles 3–5-flowered; upper teeth of the calyx triangular, the lower ones subulate; corolla 6–9 lines long, deep purple: pods oblong, pubescent, 2–10-seeded. In copses, southern Oregon to California.

* * Few-flowered annuals.

V. exigua Nutt. T. & G. Fl. i, 272. More or less pubescent: stems slender, 4–18 inches high, branching: leaflets 6–8, oblong to linear, obtuse, often tridentate at the apex, 2–12 lines long: peduncles filiform, 1–2-flowered, shorter than the leaves; teeth of the calyx lanceolate, broad at the base, shorter than the tube; corolla white or purple, 3 lines long: pods oblong, nearly sessile, 8–12 lines long, glabrous, 2–8-seeded. Southern Oregon to California.

* * * Annuals: flowers 3–6, on elongated peduncles.

V. HIRSUTA Koch Syn. 191. Stems weak and slender, branching: leaflets 4–10 pairs, linear, truncate or retuse at the apex, mucronulate: peduncles 3–6-flowered, about the length of the leaves; flowers white, 2 lines long; calyx hairy, the subulate teeth nearly equalling the petals, all nearly alike: pods oblong, 4–6 lines long, torulose, hirsute, 2-seeded; seeds subglobose, somewhat compressed. In fields and roadsides, western Oregon and Washington. Introduced from Europe.

* * * * Annuals; flowers 1–2, sessile in the axils of the upper leaves.

V. SATIVA L. Sp. 736. (TARES). Rather stout, somewhat pubescent:

leaflets 5–6 pairs, obovate-oblong to linear, retuse, long-mucronate; flowers 1 or 2, 10–12 lines long, red purple: pods linear, several-seeded, black when mature; seeds black, globose, 1–2 lines in diameter. Common in fields and waste places. Introduced from Europe.

16 LATHYRUS L. Sp. 872. (PEA).

Herbs with angled stems, more or less climbing by tendrils that terminate the pinnate leaves, usually foliaceous stipules and flowers in loose axillary racemes. Calyx campanulate, 5-toothed, the two upper ones more or less shorter than the others. Corolla with the lateral petals but slightly if at all coherent to the keel, the upper one free. Stamens diadelphous or nearly so, sheath of the filaments scarcely oblique. Style usually somewhat flattened and dilated above, bent nearly at a right angle with the ovary, pubescent or villous in a line along the inside, next the free stamen. Pods oblong, compressed, two-valved, one-celled, not jointed, many ovuled. Seeds globular or angular.

* Rachis of the leaves tendril-bearing: peduncles mostly equalling or exceeding the leaves: pods sessile: perennials: racemes several-flowered.

+ Stipules large, ovate or somewhat semihastate with broad lobes: calyx-teeth ciliate. Stems not winged.

L. maritimus Bigel. Fl. Bost. ed. 2, 268. Glabrous throughout: stems stout, 1–2 feet high, from long slender rootstocks: stipules broadly ovate, hastate, acute, 12–18 lines long; leaflets 3–5 pairs, ovate-oblong, 1–2 inches long, obtuse or acutish, nearly sessile: peduncles a little shorter than the leaves, 6–10-flowered; flowers purple and white, 9 lines long; calyx-teeth sparingly ciliate, the upper ones triangular, half as long as the narrowly subulate lower one: pods linear-oblong, 2 inches long, about 10-ovuled, glabrous or pubescent, straight. On sandy banks near the sea, northern California to Alaska and the Atlantic coast: and Europe.

L. polyphyllus Nutt. T. & G. Fl. i, 274. Glabrous throughout: stems stout, 2–4 feet high, branching: stipules triangular, as broad or broader than long, acuminate, often more or less dentate; leaflets 6–10 pairs, thin, oblong, obtuse or acutish, distinctly petiolulate, 1–2 inches long: peduncles slender, shorter than the leaves, 6–10-flowered; flowers purple, 6–8 lines long; calyx teeth ciliate, the upper pair short, triangular, the other three nearly equal, subulate, 3–4 lines longer: pods linear-oblong, 2 inches long, 2–10-seeded. In forests, Puget Sound to California, near the coast.

L. ochroleucus Hook. Fl. i, 159. Glabrous and a little glaucous: stems slender 1–3 feet high: leaflets 3–4 pairs, ovate or ovate-lanceolate, distinctly petiolulate; stipules semicordate, entire or obtusely toothed below: peduncles 7–10-flowered; flowers ochroleucous, 5–6 lines long; calyx somewhat truncate above, the upper teeth broadly triangular, scarcely half the length of the oblong or lanceolate lateral ones, the lower one lanceolate and a little the longest: pods glabrous, linear-oblong. In forests, Puget Sound to the Arctic Circle and across the continent.

L. sulphureus Brewer in Gray Proc. Am. Acad. vii, 399. Rather stout, 1–4 feet high, glabrous: stipules semisagittate, acuminate, 6–10 lines long, the lower half sometimes toothed; leaflets 3–5 pairs, oblong to elliptical, obtuse to acute, 9–18 lines long, very shortly petiolulate: peduncles longer than the leaves, few–many-flowered; flowers sulphur-yellow, 6 lines long; calyx teeth ciliate or glabrous, the upper pair very short, triangular, the other three subulate, nearly as long as the corolla: pods

linear-oblong, 1–2 inches long. Edges of copses, Western Washington to California.

L. pauciflorus Fernald Bot. Gaz. xix, 335. Glabrous throughout: stems rather slender, 2–3 feet high: stipules semisagittate, acuminate, 8–12 lines long, coarsely toothed below; leaflets 4–5 pairs, oblong, 6–18 lines long, 4–6 lines broad, acutish, spinulose apiculate, nearly sessile: peduncles about equalling the leaves, 2–5 flowered; corolla 6–8 lines long; upper teeth of the calyx triangular, acuminate, nearly as long as the subulate lateral ones, the lower one setaceous and nearly as long as the keel of the corolla: fruit not seen. In copses, southern Oregon to Utah and Idaho.

+ + Stipules narrow, semisagittate, the lobes usually lanceolate, acuminate: flowers purple or purplish.

++ Leaflets 4–6 pairs: peduncles rather many-flowered.

L. Bolanderi Watson Proc. Am. Acad. xx, 363. Stems usually stout and tall, wingless: glabrous throughout or the calyx only ciliate; stipules semisagittate, often toothed: leaflets 3–5 pairs, oblong-lanceolate to broadly ovate, obtuse or retuse to acute, 6–18 lines long or more: racemes about equalling the leaves, 8–10 flowered; calyx-teeth broad, the lowest elongated; petals purple, 6–9 lines long: pods linear, attenuate to the base, 2–2½ inches long, 3–4 lines broad. Oregon and California.

L. lanceolatus. Stems rather slender, 1–2 feet high, not winged, pubescent with small soft hairs intermixed with minute dark-colored glands; leaflets 4–5 pairs, lanceolate, acute, 6–12 lines long, pubescent beneath, smooth above; stipules small, semisagittate, acuminate, 6–8 lines long, 2–3 lines broad: peduncles about equalling the leaves, 3–6 flowered; flowers blue or violet, 8–10 lines long; calyx dark purple, pubescent, the tube 3–4 lines long, the lateral teeth triangular, 2 lines long, the lower one setaceous, but little longer; ovary glabrous, 10–16 ovuled: fruit not seen. In forests at Glendale, southern Oregon.

L. Nuttallii Watson l. c. xxi. 450. More or less pubescent throughout with loose wooly hairs; stems rather stout, 1–2 feet high: stipules narrow, semisagittate: leaflets 3–6 pairs, variable, narrowly to broadly elliptical, usually acute or acutish at both ends, apiculate, 1–2 inches long: peduncles shorter than or equalling the leaves, calyx light purple, 3–4 lines long, the 4 upper teeth triangular, acuminate, the lower one subulate, but little longer than the lateral ones; petals reddish purple, 6–8 lines long: pods glabrous, oblong, attenuate to a very short thick stipe, 1–1½ inches long by 4 lines broad; seeds globose, brown. In copses, Brit. Columbia to California.

L. vestitus Nutt. T. & G. Fl. i, 276. Stems erect and rigid or a little climbing, silky-canescent, 1 foot or more high: leaflets 5–7 pairs, small, elliptical or oval, cuspidate, 6–7 lines long by 2–3 broad, silky pubescent beneath, smooth above; stipules broadly semisagittate, acuminate, slightly toothed below, about the size of the leaflets: peduncles about the length of the leaves, 4–6-flowered; flowers large, purple: calyx attenuate at base, the lower segment narrowly lanceolate, acuminate, rather longer than the tube: pods flat, pubescent, attenuate at each end. Plains of the Oregon toward the sea. Nuttall. not since reported.

++ ++ Leaflets 4–8; peduncles 2–6-flowered.

L. coriaceus White Bull. Torr. Club, xxi. 452. Glabrous or minutely papillose throughout: stems erect, 6–18 inches high, rather stout, flexuous, quadrangular or terete, wingless, scarcely striate: stipules semisagittate, lanceolate, acuminate, 4–12 lines long; leaflets 3–6 pairs, sub-opposite, thick and coriaceous, strongly venulose on both sides, elliptical to linear-lanceolate, obtuse or acute, 1½–3 inches long by 2–8 lines broad: pedun-

cles much shorter than the leaves, 3–10-flowered; upper teeth of the calyx short, triangular, about half as long as the subulate lateral ones, petals 5–7 lines long, dark purple; ovary glabrous, 6–8-ovuled: pods not seen. Base of Stein's Mountain, southeastern Oregon to the Wahsatch Mountains in Utah.

L. parvifolius Watson l. c. xvii, 345. Glabrous throughout: stems rather stout, not winged: stipules more or less broadly semisagittate; leaflets 4–6 pairs, rhombic-oblong to ovate, acute, 6–12 lines long: peduncles exceeding the leaves, loosely 6–12-flowered, calyx-teeth triangular, much shorter than the tube; corolla purple, 6–8 lines long: pod sessile, linear, 2 inches long by about 3 lines broad. Eastern Washington to Mexico and the Rocky Mountains.

L. Cusickii Watson l. c. 371. Glabrous or sparingly pubescent, slender, from a slender perennial rootstock, 6–24 inches high; stipules narrowly semisagittate, subulate, 4-6 lines long: leaflets 2 or 3 pairs, linear-lanceolate to narrowly linear, acute or acutish and mucronate, 2–3 inches long: peduncles equalling or exceeding the leaves, 2–4-flowered: corolla white, 10–12 lines long: calyx 3–4 lines long, with nearly equal teeth: pods attenuate to a narrow base, 1½–2 inches long by 3 lines broad: hilum short. On dry mountain slopes, eastern Oregon and Washington.

L. Nevadensis Watson l. c. xi, 133. Slender, usually 8–10 inches high, finely pubescent or nearly glabrous: stipules semisagittate, the lobes narrowly acuminate; leaflets thin, 2–4 pairs, ovate to ovate-oblong, 1–2 inches long, obtuse or acute; flowers large, 7–12 lines long, purple; calyx-teeth shorter than the tube, pods linear, 1½–2 inches long by 2–3 lines broad, obliquely acute, attenuate at base to a short stipe. On dry wooded hillsides, Washington to California and Nevada.

L. rigidus White l. c. 455. *L. albus Watson* not Kittle. Glabrous and somewhat glaucous: stems numerous, from a thick perennial rootstock, erect, a foot or less high: stipules semisagittate, lanceolate, 6–8 lines long by 2–3 broad, the lower lobe small and subulate: leaflets 3–5 pairs, linear to oblong, acute at each end, cuspidate, 7–10 lines long: peduncles about equalling the leaves, 2–3-flowered; flowers white, 8–9 lines long: upper teeth of the calyx deltoid, the lower one setaceous, all nearly equal and shorter than the tube: pods 18–20 lines long by 4 lines broad, attenuate below to a short stipe; seeds olive-yellow, 2 lines in diameter or more, with very small somewhat sunken hilum. On open hillsides of the Blue Mountains of Oregon.

L. decaphyllus Pursh Fl. 471. *L. polymorphus Nutt.* Mostly glabrous: stems erect, a little woody at the base, much branched, short; branches quadrangular: leaflets 2–5 pairs, elliptical-lanceolate or linear-oblong, somewhat glaucous, rigid and very strongly veined, 1–2½ inches long, mostly obtuse at each end; stipules lanceolate, subfalcate, minutely semisagittate at base, very variable in size, acute, sometimes almost subulate: peduncles a little longer than the leaves, 3–5-flowered; flowers an inch long or more, very showy, purple; teeth of the calyx lanceolate-subulate, somewhat unequal, nearly as long as the tube: pods large, glabrous. Grassy alluvial plains, Idaho to the Missouri river, Colorado, Arizona and New Mexico.

L. Oregonensis White l. c. 456. Sparingly pubescent throughout: stems erect, 8–16 inches high, flexuous, terete or quadrangular, wingless, rigid; stipules narrowly semisagittate or semihastate, acuminate at each end, entire, the lower lobe often quite short, ⅓–¼ the length of the adjacent leaf; leaflets mostly 4–7 pairs, opposite, lanceolate, obtuse, 8–20 lines long, by 2–4 broad, coriaceous, sparingly pubescent on both sides: peduncles shorter than the leaves, 3–8-flowered; flowers purple, veined, 6–8 lines long; calyx-teeth subequal, the upper slightly shorter, all shorter than the dilated pubescent tube: pods compressed, abruptly terminated at the

apex, short-stipitate, brown, 1½–2 inches long, ¼ as broad, 4–6-seeded; seeds brown, orbicular. In the mountains of eastern Washington and Oregon.

L. bijugatus White l. c. 457. Stems slender, wingless, round or quadrangular, slightly flexuous, erect or slightly decumbent, 1–2 inches high, glabrous throughout: stipules minute, linear-subulate, semisagittate; leaflets 2 pairs, sometimes only 1 pair, elliptical to obovate, obtuse, thin, paler green beneath, 1–2 inches long, 1-5—1-3 as broad: peduncles about as long as the rachis of the leaves, 2-flowered; flowers purplish, about 2 lines long, calyx-teeth very short, triangular, subequal, much shorter than the tube: pods brown, compressed, about 6-seeded. Northern Idaho and adjacent Washington.

L. Sandbergi, *L. bijugatus Sandbergi White* l. c. Glabrous throughout: stems very slender, flexuous, 2–3 inches high, wingless: stipules setaceous, 2–4 lines long, semisagittate, the lower lobe minute; leaflets 1 or 2 pairs, linear to linear-lanceolate or -spatulate, 2–3½ inches long by ½–1 line broad: peduncles filiform, an inch long, 2–3 times longer than the rachis of the subtending leaf, 2-flowered; calyx attenuate at base, the triangular teeth much shorter than the tube: fruit not seen. Northern Idaho.

L. Torreyi Gray Proc. Am. Acad. vii. 337. Minutely villous throughout: stems very slender, 6–18 inches high, from slender creeping rootstocks, branching: stipules lanceolate, acuminate, 4–6 lines long by 1-2 broad, semisagittate, the lower lobe small; leaflets thin, 4–6 pairs, ovate to oblong or lanceolate; 3–6 lines long by 2–6 broad: peduncles filiform, 6–12 lines long, much shorter than the leaves, 1-flowered, rarely 2-flowered; calyx campanulate, the two upper teeth triangular, acuminate, about as long as the tube, about half as long as the subulate lower ones; upper petal purple, the others yellowish-white; pods linear-oblong, pubescent, 3–5-seeded. In open forests, Washington to California west of the Cascade Mountains.

* * Rachis of the leaves not tendril-bearing: pod broad, shortly stipitate.

L. littoralis Endl. in Walp. Rep. i, 722. Densely silky-villous throughout: stems numerous, from creeping perennial rootstocks, stout ½–2 feet high, decumbent to assurgent, diffusely branched: stipules ovate to oblong or lanceolate, 6–12 lines long; leaflets 1–5 pairs with a small linear terminal one, cuneate-oblong, 4–12 lines long: peduncles stout, much longer than the leaves, 4–10-flowered; calyx truncate at base, the triangular-subulate teeth nearly equal, longer than the tube; upper petal bright purple, 6–8 lines long, exceeding the paler wings and keel; style flattened for most of its length: pods 10–18 lines long by 6–8 broad, nearly semicircular in outline, villous, 3–5-seeded; seeds nearly 3 lines broad. On sand-hills and -banks along the coast. Washington to California.

Order XXVII. AMYGDALACEÆ Reichb. Consp. 177.

Shrubs or trees with alternate simple leaves, small caducous stipules and usually perfect, regular flowers. Calyx tubular or campanulate, free from the ovary, the tube lined with a disk, deciduous, the limb 5-lobed, imbricate in the bud. Petals 5, perigynous. Stamens about 20, inserted into the disk of the calyx-tube. Pistil 1, rarely 5; style simple. Ovary 1-celled, usually with two collateral ovules, becoming a mostly 1-seeded drupe. Seed pendulous, without albumen. Cotyledons large, thick, fleshy, containing hydrocyanic acid.

Calyx campanulate, the limb 5-parted, persistent. Petals 5. Stamens 20, much shorter than the petals. Styles 3–5, coalescent at base or distinct Carpels 3–5, becoming membranaceous, incompletely 2-celled by a partition from the back, 1-seeded. Wholly covered by the adnate calyx-tube. Fruit small, berry-like, crowned with the persistent calyx-lobes, the pulp sweet. Seeds small, with a thin black testa.

A. **alnifolia** Nutt. Journ. Philad. Acad. vii, 22. Stem slender, 3–30 feet high, with slender erect flexuous branches: leaves thin, elliptical to obovate, obtuse at each end or often cordate, serrate toward the apex, entire below, 1–2 inches long, more or less densely tomentose beneath, smooth, or nearly so above: racemes many-flowered; bracts setaceous, long-woolly, longer than the pedicels, caducous: calyx densely tomentose, the triangular-lanceolate lobes closely reflexed, about as long as the broadly turbinate tube; petals spatulate, 6 12 lines long by 2 lines broad, obtuse; stamens very short: fruit globose, 3–4 lines in diameter. Common along streams and swales, Brit. Columbia to California and the Rocky Mountains.

A. **florida** Lindl. Bot. Reg. xix, t. 1589. Stems stoutish, erect cespitose, 2–10 feet high with erect somewhat cinereous branchlets: leaves thickish, orbicular to elliptical or ovate, 12–14 lines long, rounded to acute at the apex, coarsely serrate above the middle, entire and rounded or cordate at base, glabrous, or sparingly tomentose on the midrib and veins beneath: stipules subulate, setaceously acuminate: racemes rather loosely several-flowered; bracts setaceous, ciliate with long straight hairs; calyx somewhat tomentose, the subulate lobes longer than the tube, reflexed, densely tomentose inside; petals oblong, 6–7 lines long by 2–4 lines broad, rounded at the summit; stamens shorter than the lobes of the calyx: fruit globose, 3–4 lines in diameter. In wooded districts, Washington and Oregon east of the Cascade Mountains.

A. **pallida** Greene Fl. Fr. 53. Stems clustered and bushy, 3–6 feet high, with an ashy bark, rigid and somewhat intricately branched: leaves rather thick, oblong-lanceolate to oblong or elliptical obtuse or retuse, sparingly dentate towards the apex, entire and usually rounded below, often entire and cuspidate, 6–10 lines long, somewhat tomentose: racemes short and somewhat corymbose, the lower pedicels elongated; calyx more or less tomentose, the lobes triangular, acute, erect; petals obovate or obovate-oblong, slightly concave, 3–6 lines long: stamens shorter than the calyx. Common on dry hillsides, southern Oregon and northern California.

5 PERAPHYLLUM Nutt. T. & G. Fl. i, 474.

Low much branched shrubs with deciduous leaves crowded at the ends of the branchlets, and 2–4-flowered corymbs of white flowers. Calyx-tube urceolate, the limb 5-lobed. Petals 5, obovate, unguiculate. Stamens about 20, exserted. Styles 2, rarely 3, coherent below. Fruit a small pome containing 2, rarely 3 almost distinct carpels, each 2-celled by a spurious partition, the cells 1-seeded. Seeds angular, compressed, with a cartilaginous testa, erect, with the radicle at the base.

P. **ramosissimum** Nutt. l. c. A shrub 4–6 feet high with hard white wood and grayish bark: branches slender, recurved and more or less tortuous, spreading widely: leaves linear-lanceolate, acute, 1–2 inches long, entire or obsoletely serrulate, smooth and shining above, very minutely pubescent beneath: calyx urceolate, the tube wholly adnate to the ovary,

the triangular lobes shorter than the tube, reflexed, pubescent within; petals broadly obovate, rounded at the apex, 4–6 lines long, white; stamens about equalling the calyx-lobes, persistent; styles filiform, thickened toward the summit, longer than the stamens, united and pubescent below; fruit globose, 4–5 lines in diameter, crowned with the persistent calyx-lobes. On dry hillsides, eastern Oregon to California.

ORDER XXIX. ROSACEÆ Juss. Hort. Trian., Endl. Gen. 1240.

Herbs or shrubs with alternate simple or compound leaves, mostly foliaceous commonly adnate stipules and perfect or unisexual flowers in cymes, corymbs, panicles or solitary. Calyx free from the ovary, 4–5-cleft, the segments mostly valvate in the bud, commonly persistent. Petals perigynous, as many as the lobes of the calyx and alternate with them, or none. Stamens five to many, perigynous, rarely hypogynous. Pistils one to many; ovary usually one-celled and one-valved, sometimes many-ovuled; ovules pendulous or ascending. Styles as many as the ovaries, inserted terminally or laterally, persistent or deciduous. Fruit achenes drupelets or follicular. Seeds mostly anatropous, with little or no albumen.

TRIBE I. ROSEÆ. Carpels many, becoming bony achenes, enclosed and concealed in the globose or urn-shaped fleshy calyx-tube which resembles a pome.

1. **Rosa.** Erect, usually prickly shrubs with pinnate leaves and large flowers.

TRIBE II. SANGUISORBEÆ. Carpels 1–3, becoming achenes, completely enclosed in the dry and firm calyx-tube, the throat of which is constricted or sometimes nearly closed: ovule suspended, solitary. Ours are herbs with compound or lobed leaves.

2. **Sanguisorba.** Calyx-lobes petaloid, deciduous; the tube 4-angled, naked; petals wanting: carpels 1-2: herbs with compound leaves and red or white flowers in dense spikes.

3. **Agrimonia.** Calyx turbinate, surrounded by a margin of hooked prickles: stamens 5–15: carpels 2: perennial herbs with pinnate leaves and yellow flowers in spicate racemes.

4. **Alchemilla.** Calyx urceolate, naked, minutely bracteolate: petals wanting: stamens 1–4: small annuals with minute flowers in axillary clusters.

TRIBE III. DRYADEÆ. Carpels numerous, several or solitary, 1-ovuled, becoming dry achenes: calyx not enclosing or at least not constricted over the fruit: seeds erect or ascending.

* Shrubs: carpel solitary: style not elongated in fruit; stigma decurrent: calyx imbricated, without bractlets: radicle inferior.

5. **Kunzia.** Diffusely branched shrubs with mostly fascicled leaves and solitary yellow flowers, terminal on the short branchlets.

* * Trees or shrubs: carpels solitary: style elongated and plumose in fruit: calyx imbricated, without bractlets: seeds erect.

6. **Cercocarpus.** Small trees or shrubs with simple leaves and axillary

solitary or somewhat fascicled flowers: calyx-tube long-cylindrical, the limb deciduous; petals wanting: carpel usually solitary.

* * * Herbs: carpels few–many: calyx valvate in the bud, with a set of bractlets alternating with the lobes.

+ Seeds erect from the base of the cell: style terminal, often geniculate in the middle.

7. **Geum.** Carpels numerous, on a dry receptacle: the elongated style in fruit mostly geniculate and articulated near the middle or plumose.

+ + Seed suspended or ascending: radicle superior: style small, naked, not geniculate.

8. **Fragaria.** Petals broad and conspicuous, sessile: carpels numerous, scattered on a large fleshy, becoming pulpy, receptacle; style lateral: leaves trifoliolate.

9. **Comarum.** Carpels very numerous, on a large fleshy or spongy convex receptacle: style inserted below the apex of the ovary: leaves pinnate: coarse marsh perennials.

10. **Sibbaldia.** Petals narrow and minute, sessile: stamens 5; filaments very short, filiform: carpels 5–10, on a dry receptacle: leaves trifoliolate.

11. **Potentilla.** Petals usually conspicuous, sessile: stamens usually 20 or more; filaments narrow or filiform: carpels mostly numerous, on a dry receptacle: leaves pinnate or digitate; leaflets not confluent.

12. **Horkelia.** Petals conspicuous, with claws: stamens 10 or more; filaments more or less dilated or subulate: carpels usually many, on a dry nearly naked receptacle: leaves pinnate; leaflets many, the upper ones often confluent.

13. **Ivesia.** Petals with claws: stamens 5–20; filaments filiform: carpels 1–15, on a dry villous receptacle: leaves pinnate; leaflets cleft or parted, often small and very numerous, closely imbricated.

TRIBE IV. RUBEÆ. Calyx open, without bractlets: stamens numerous: carpels several or numerous, on a spongy receptacle, becoming pulpy-coated achenes in fruit: ovules 2, pendulous, but one maturing.

14. **Rubus.** Carpels 2-many, crowded on an elevated receptacle, ripening into a coherent body of small drupes.

TRIBE V. SPIRÆÆ. Calyx campanulate, imbricate or sometimes valvate in the bud: carpels few, mostly 5, rarely solitary, becoming follicles or dehiscent 2-valved pods: styles terminal: seeds 1–10 in each carpel, pendulous or ascending.

§ 1 Carpels becoming 1-seeded achenes.

15. **Holodiscus.** Carpels membranaceous, woolly, 1-seeded: shrubs with simple lobed leaves without stipules.

§ 2 Carpels becoming follicles or 2-valved capsules, usually several-seeded.

* Seeds in ours not known: carpels distinct: ovules 2, one above the other, pendulous: herbs with pinnately divided stipulate leaves.

16. **Filipendula.** Carpels membranaceous, 1-celled, distinct: leaves pinnate, the terminal leaflet large and lobed.

* * Seeds with shining stony testa: albumen very distinct: stipules membranaceous, caducous.

17. Opuiaster. Carpels membranaceous, inflated, 2-valved, distinct, often stipitate: flowers perfect, corymbose: leaves lobed.

* * * Seeds with membranous testa and no albumen: stipules none.

+- Calyx persistent: stamens perigynous: carpels several-seeded.

18. Spiræa. Carpels cartilaginous, follicular, distinct: flowers perfect, rarely polygamous: shrubs with simple serrate or incised leaves.

19. Luetkea. Carpels membranaceous, 2-valved, distinct: low herbs with biternately parted leaves and perfect flowers.

+- +- Calyx marcescent: stamens hypogynous: carpels few-seeded.

20. Aruncus. Carpels cartilaginous, 1-valved, distinct: tall herbs with ternately compound leaves and dicœcious flowers.

Tribe 1. Roseæ Juss. Carpels many, with two suspended ovules, one above the other, becoming crustaceous, indehiscent, one-seeded achenes, inserted on the whole inner surface of the thickened torus or disk which lines the tube of the calyx.

1 ROSA Tourn. L. Gen. n. 631. (Rose).

Prickly shrubs with unequally pinnate leaves, adnate stipules and large flowers in corymbs or solitary. Calyx urceolate, the tube contracted at the mouth, at length fleshy or baccate, enclosing the numerous distinct ovaries. Ovaries one-celled, with two suspended ovules, one above the other, becoming one-seeded indehiscent crustaceous or bony achenes, inserted on the whole inner surface of the thickened disk that lines the tube of the calyx, style terminal or nearly so, somewhat exserted, distinct or connate above.

* Sepals connivent after flowering and persistent.

R. Nutkana Presl. Epimel. Bot. 203. Stems stout, 1–10 feet high, armed with stout straight or recurved spines, the branches sometimes unarmed and the young shoots usually prickly: stipules rather broad, glandular-ciliate; leaflets 5–9, broadly elliptical to ovate or oblong or lanceolate, usually rounded at base, serrate above the middle, ½–2 inches long, finely pubescent and more or less resinous beneath: flowers solitary or 2–3 together; calyx-lobes lanceolate, acuminate and tipped with a lanceolate entire foliaceous appendage, the whole 12–18 lines long, densely tomentose inside, smooth or more or less glandular outside: petals broadly obovate or obcordate, 12–16 lines long, nearly as broad: fruit globose, 6 lines long or more, not contracted above into a neck. Common from Brit. Columbia to California, Montana and Utah.

R. blanda Ait. Hort. Kew. ii, 202. Stems 1–2 feet high, wholly unarmed, or usually with a few slender straight scattered prickles, sometimes more densely prickly: stipules dilated, naked and entire, or slightly glandular toothed above; leaflets 5–7, usually oblong-oblanceolate, mostly cuneate at base and shortly petiolulate, coarsely and simply toothed, glabrous above, paler and glabrous or more or less pubescent beneath, not resinous or very rarely slightly so, usually large, the terminal one ¾–2½ inches long; rachis pubescent, sometimes sparingly prickly: flowers large, corymbose or often solitary: sepals entire, shortly hispid or sometimes naked: fruit globose or with more or less of a neck below the calyx, sometimes

1. **Prunus.** Flowers perfect: carpel solitary: leaves convolute in the bud.

2. **Cerasus.** Flowers perfect: carpel solitary: leaves conduplicate in the bud.

3. **Osmaronia.** Flowers polygamo-dicecious: carpels 5, becoming 5 drupes, or by abortion fewer or none.

1 PRUNUS Juss. Gen. 341. (PLUM. PRUNE).

Leaves convolute in the bud. Flowers in umbellate clusters from lateral buds, appearing before or with the leaves. Drupe ovoid, glabrous and glaucous; the thick sarcocarp pulpy. Putamen (stone) bony, smooth, compressed, acutely edged on one margin, grooved on the other.

P. subcordata Benth. Pl. Hartw. 308 (?). A much branched shrub, 3–12 feet high, with ashy-gray bark: young branches and leaves finely pubescent, becoming glabrous: stipules narrowly-lanceolate, laciniate-dentate, 1–2 lines long; leaves elliptical to ovate, cordate to cuneate at base, obtuse or acute, sharply and finely serrulate, about an inch long, short-petioled: umbel 2–4-flowered; pedicels 3–6 lines long; calyx campanulate, the oblong obtuse minutely dentate lobes about as long as the tube; petals white, obovate, rounded at the apex, 4–5 lines long by 2–3 lines broad: fruit 8–10 lines long, oblong, subacid. On dry rocky hills and open woods, Umpqua valley, Oregon, to California.

P. Oregana Greene Pitt. iii, 21. "Evidently allied to *P. subcordata*, but leaves little more than an inch long, subcoriaceous, pubescent on both faces, in outline oval or broadly elliptic, never subcordate, commonly acutish at both ends, serrulate: flowers unknown: fruits in pairs or threes, on pedicels 6 lines long or more, densely tomentose when very young, more thinly so, yet distinctly tomentulose when half-grown. Known only from specimens collected on the Yainax Indian reservation in southeastern Oregon, by Mrs. Austin, in 1893. * * * "

2 CERASUS Juss. gen. 340. (CHERRY.)

Trees or shrubs with alternate simple leaves that are conduplicate in the bud and corymbose or racemose flowers from lateral buds, appearing before or with the leaves. Calyx campanulate, deciduous, the limb 5-parted, regular. Petals 5, spreading. Stamens 15–30. Ovary solitary, 1-celled, with two collateral pendulous ovules. Drupe globose, fleshy, destitute of bloom; stone mostly globose, smooth, not prominently margined.

§ 1. EUCERASUS T. & G. Fl. i, 409. Flowers from lateral leafless buds, appearing before or with the leaves; pedicels umbellate-fascicled, corymbose, or racemose.

C. emarginata Dougl. Hook. Fl. i, 169. *Prunus emarginata Walp.* Shrub 3–12 feet high, diffusely branched from the base and clothed throughout with a smooth shining bark: leaves oblong-obovate to oblanceolate, mostly obtuse, rarely emarginate, crenately serrulate, 1–3 inches long, with a single or a pair of glands at or above the junction of the petiole and blade, pubescent beneath, nearly smooth or puberulent above: inflorescence pubescent; racemes few-flowered: calyx campanulate, the oblong obtuse lobes soon reflexed, scarcely equalling the tube, about a line long; petals orbicular-ovate, 2 lines long, minutely pubescent outside: drupe 3–4 lines in diameter, dark-red, intensely bitter and astringent. Common in mountainous districts, Brit. Columbia to California, east of the Cascade Mountains.

C. mollis Dougl. l. c. *Prunus emarginata var. mollis* Brew. A small straight graceful tree 20–50 feet high by 2–20 inches in diameter, with reddish, characteristic cherry bark and slender ashy-gray or reddish branchlets: young branches and inflorescence soft-pubescent: stipules lanceolate, pectinate, 1–2 lines long; leaves obovate to oblong or oblanceolate, mostly acutish, crenately serrulate, 1–3 inches long, narrowed below to a short petiole, pubescent beneath, nearly smooth above: corymbs 5–10-flowered; calyx turbinate, the oblong, obtuse, entire lobes soon reflexed, not more than half as long as the tube; petals obovate, on short claws, 2 lines long: fruit bright red, about 3–4 lines long, intensely bitter: stone wrinkled, carinate on one edge, rounded or barely acute on the other. Common in forests, Brit. Columbia to California.

§ 2. PADUS T. & G. l. c. 410. Flowers in racemes terminating leafy branches, appearing after the evolution of the leaves: leaves deciduous.

C. demissa Nutt. T. & G. Fl. i, 411. *Prunus demissa Walp.* An erect slender shrub 2–20 feet high: leaves obovate or oblong-ovate, usually broadest above the middle, abruptly acuminate, mostly rounded or somewhat cordate at base, sharply serrate with straight slender teeth, more or less pubescent beneath, 2–4 inches long, the petiole usually biglandular just below its summit: racemes 3–4 inches long, many-flowered, longer than the leaves, usually nodding; calyx hemispherical, the lobes short and obtuse, glandularly ciliate, much shorter than the tube; petals white, orbicular to elliptical, 2–3 lines long: fruit globose, purplish-black or red, sweet and edible but astringent: stone globose. On rocky hills and river banks, Brit. Columbia to California and the Rocky Mountains.

3 OSMARONIA Greene Pitt. ii, 189.

NUTTALLIA T. & G. II. & A. Bot. Beech. Supp. 336 t. 82.

Shrubs with simple alternate deciduous leaves without stipules and polygamo-dioecious white flowers in loose nodding bracted racemes which appear with the branchlets from the same buds. Calyx 5-lobed, deciduous. Petals 5, alternate with the lobes of the calyx. Stamens 15, in two rows, 10 inserted with the petals and 5 lower down upon the disk that lines the calyx-tube, those of the fertile flowers all with abortive anthers. Carpels 5, inserted upon the persistent base of the calyx, free; styles lateral, jointed at base; ovules two in each carpel, pendulous. Fruit 1–5, 1-seeded drupes with thin pulp and smooth bony stone. Cotyledons convolute in the bud.

O. cerasiformis Greene l. c. 191. *Nuttallia cerasiformis T. & G.* Shrubs with clustered stems 2–15 feet high, dark brown bark and rather slender glabrous branches: leaves broadly oblanceolate, acute or acutish, attenuate to a short slender petiole, entire, smooth above, soft-pubescent beneath, 2–4 inches long: racemes short-peduncled, shorter than the leaves; bracts spatulate, equalling the calyx-tube; deciduous; pedicels 6–7 lines long, with a pair of linear, acuminate bractlets near the base of the calyx; calyx campanulate, the short triangular lobes about half as long as the tube: petals spatulate, twice as long as the calyx-lobes, those of the fertile flowers smaller: drupes blue-black with a bloom when fully mature, 5–8 lines long, oblong, with a slight furrow on the inner side; stone smooth, somewhat compressed. Common in wooded districts, Brit. Columbia to California. Flowering in very early spring.

ORDER XXVIII. POMACEÆ Loiseleur-Deslongchamps Man. Pl. Us. i, 211.

Trees or shrubs with alternate, simple or unequally pinnate leaves, caducous free or nearly free stipules and perfect, regular white or reddish flowers in racemes or corymbosely clustered. Calyx-tube urceolate or campanulate, more or less coherent with the ovary, the usually short, free portion lined with an annular or laminar disk, the limb 5-lobed, imbricate in the bud. Petals 5, perigynous. Stamens mostly 20, inserted on the disk of the calyx. Ovary compound, composed of 2–5 carpels with two collateral ascending ovules in each, becoming a pome; styles as many as the carpels. Seeds usually two in each cell, without albumen.

* Carpels 1-celled, not divided by a partition from the back.

1. **Cratægus.** Fruit drupaceous: ovary 2–5-celled, becoming 2–5 1-seeded nutlets, either separable or united into one.

2. **Sorbus.** Shrubs or small trees with unequally pinnate leaves: fruit a proper pome, with coriaceous undivided 1–seeded cells.

3. **Malus.** Trees or shrubs with simple leaves: fruit a proper pome with chartaceous 2-seeded undivided cells.

* * Carpels more or less spuriously 2–celled by a partition from the back of each carpel.

4. **Amelanchier.** Shrubs or small trees with simple leaves: fruit a proper pome, 5-carpeled or by abortion 3 or 4-carpeled: carpels coherent, incompletely 2–celled by a partition from the back.

5. **Peræphyllum.** Small shrubs with simple leaves: fruit a proper pome; 2- rarely 3-carpeled; carpels nearly distinct, 2-celled by a partition from the back.

1 CRATÆGUS Tourn. L. Gen. n. 622.

Thorny shrubs or small trees with simple toothed or lobed leaves, and mostly white, heavy-scented flowers in terminal corymbs. Calyx-tube urceolate, the limb 5-parted. Petals 5, spreading. Stamens 5–20. Carpels 2–5, becoming bony 1–seeded nutlets, contiguous or united: styles distinct. Fruit drupe-like, globose or ovoid, crowned with the calyx-teeth.

C. Douglasii Lindl. Bot. Reg. t. 1810. *C. rivularis Nutt.* (?). A stout shrub or small tree, 20–40 feet high: spines stout, 6–12 lines long: leaves elliptical to obovate, usually cuneate at base, irregularly serrate, those of the young shoots often incisely lobed, 1–3 inches long, somewhat pubescent on both sides: inflorescence tomentose; lobes of the calyx entire, a line long, about half as long as the tube, pubescent inside; petals orbicular, 3–4 lines long: fruit black, 4–5 lines in diameter, often only 3-carpeled; carpels distinct. Along water courses, Brit. Columbia to California, west of the Cascade Mountains.

C. Columbiana. A much branched shrub or small tree, 6–15 feet high: spines stout, 1–2 inches long: leaves cuneate-obovate, 1–2 inches long, incisely 5–9-lobed above the middle, acute, serrate, the teeth often gland-tipped, especially below, sparingly pubescent or glabrate, attenuate below to a short petiole: corymbs rather many-flowered, sparingly pubescent or

glabrate; lobes of the calyx triangular, acute, often serrate, about as long as the tube, dark red, petals orbicular, 3–4 lines long: fruit scarlet, obovoid, 4–6 lines long; carpels distinct. Common along the Columbia river and its tributaries east of the Cascade Mountains.

2 SORBUS Tourn. L. Gen. n. 623.

Shrubs or small trees with unequally pinnate deciduous leaves and small flowers in terminal compound cymes. Calyx urceolate, 5–lobed. Petals 5, alternate with the lobes of the calyx. Stamens 20. Styles 3–5, distinct. Carpels 3–5, coriaceous, 1-celled, 2-ovuled, 1-seeded. Fruit small, globose or pyriform.

S. sambucifolia Roem. Syn. Monogr. iii, 39. *Pyrus sambucifolia Cham. & Schlecht.* A shrub, 4–12 feet high with coarse ascending branches: nearly glabrous, the leaf-buds and inflorescence usually sparingly villous: leaflets 4–8 pairs, oblong to lanceolate, acute; sharply serrate from near the base, 1–2 inches long: cymes flattish, often 4 to 6 inches in diameter and many-flowered; lobes of the calyx broadly subulate, 1–2 lines long; petals white, orbicular, attenuate below to a short claw, 2–3 lines long, fruit globose, about three lines in diameter, coral-red, bitter. On high mountains, Oregon to Alaska.

S. occidentalis Greene Fl. Fr. 54. *Pyrus occidentalis Watson Proc. Am. Acad. xviii, 263.* A shrub 2–6 feet high with rather coarse erect branches; glabrous throughout or the inflorescence partly hairy: leaflets 3–5 pairs, oblong-elliptical, obtuse, sometimes mucronate, dentate usually only toward the apex, rarely below the middle, sometimes entire, 6–20 lines long: cymes small, usually rather few-flowered; calyx glabrous, with short triangular lobes: petals white, 1–2 lines long, orbicular, abruptly narrowed below to a short claw; styles villous at base: fruit pyriform, red, 4 lines long. On high mountains near perpetual snow, Washington to California and the Rocky Mountains.

3 MALUS Tourn. (APPLE).

Small deciduous trees with simple more or less serrate leaves and reddish or white flowers in simple corymbose cymes at the ends of short lateral branchlets. Calyx tube urceolate, the limb 5-lobed, petals 5, usually rather large. Stamens 20. Styles 5, more or less united at base. Carpels 5, chartaceous in fruit, 2-seeded, 1-celled, wholly covered by the adnate calyx-tube. Fruit globose to oblong, depressed at both ends, the flesh containing malic acid and destitute of grit-cells.

M. rivularis Roem. Syn. Monog. ii., 215. *Pyrus rivularis Dougl.* A small tree 15–30 feet high: leaves ovate-lanceolate, sharply serrate, sometimes obscurely 3-lobed, more or less woolly-pubescent, 1–3 inches long; stipules setaceous: cymes shortly racemose, leafy at base; pedicels slender, 1–2 inches long, pubescent; calyx pubescent, the limb at length deciduous, the lanceolate acuminate lobes as long as the tube; petals orbicular, abruptly contracted below to a short claw, 4–6 lines long, white; styles 2–5, united at base: fruit oblong, 4–6 lines in diameter. Common in swales and along streams, northern California to Alaska.

4 AMELANCHIER Lobelius; Lindl. Linn. Trans. xiii, 100. (SERVICE-BERRY).

Shrubs or small trees with simple alternate deciduous leaves, small racemes of white flowers and black or purplish edible fruit.

liquely open on one side. On dry hillsides, southwestern Oregon to California.

7 GEUM L. Gen. n. 636.

Perennial herbs with mostly radical lyrate or pinnate leaves, adnate stipules and solitary or corymbose flowers. Calyx obconic at base, deeply 5-cleft, usually with 5 bracteoles alternating with the lobes. Petals 5, obtuse or emarginate. Stamens numerous, inserted into the disk that lines the base of the calyx; filaments somewhat persistent. Carpels numerous, 1-ovuled, on a dry, conical or clavate receptacle, becoming achenes; styles terminal, at least the base persistent, straight, or geniculate near the middle: stigma simple. Seed erect; radicle inferior.

§ 1 EUGEUM T. & G. Fl. i, 420. Flowers erect: segments of the calyx reflexed: head of carpels sessile: styles articulated and geniculate above the middle, the lower portion glabrous, hooked at the apex, persistent after the deflexed and mostly hairy terminal portion falls away.

G. macrophyllum Willd. Enum. i, 557. Hirsute throughout with spreading yellowish hairs: stems mostly solitary, 1–3 feet high, usually simple: stipules foliaceous, ovate, lacerate serrate, adnate to the petiole below the middle, acuminate above; radical leaves lyrate and interruptedly pinnate, 6–12 inches long or more the terminal leaflet very large, round-cordate, irregularly lobed and toothed, the others very unequal, often very small; cauline leaves similar but with a short rachis or reduced to the terminal leaflet only: flowers yellow, 6–9 lines broad, in an open panicle; bractlets small, often wanting; lobes of the calyx ovate, long acuminate, puberulent or nearly smooth reflexed, about equalling the obovate or oblong petals: style three lines long, at length reflexed; achenes hispid, upon a nearly naked oblong receptacle. In moist meadows and along streams. Alaska to California and across the continent.

G. strictum Ait. Hort. Kew ii, 218. Stems and petioles hirsute or hispid, with spreading hairs: stems stout, 2–3 feet high, simple, dichotomous at the summit: radical leaves interrupted and somewhat lyrately pinnate; leaflets cuneiform-obovate, incisely lobed and serrate; cauline leaves 3–5-foliolate; the leaflets rhombic-ovate or oblong, acute, sharply toothed and incised; appressed-pubescent; stipules large, incised: flowers rather large, numerous; bractlets shorter than the calyx-lobes; petals yellow, roundish-oval, longer than the calyx: carpels hispid at the apex; style glabrous, the upper joint hairy: receptacle densely pubescent. In fields and moist places, Idaho to the New England States and Canada.

§ 2. SIEVERSIA Willd. Berl. Mag. v, 398 as genus. Flowers rather large, erect; segments of the calyx erect or spreading: head of carpels sessile: style wholly persistent.

G. triflorum Pursh Fl. 736. Villous and hirsute: stems clustered, from stout branching rootstocks, 6–15 inches high, simple, nearly naked: radical leaves pinnate, with numerous cuneate-oblong irregularly incised leaflets: the cauline reduced to a few small linear-lobed leaves or bracts: flowers few, usually 3, on long peduncles; calyx often purplish, the linear bractlets 4–9 lines long usually exceeding the calyx-lobes and equalling the oblong purplish erect petals: tails of the small achenes plumose, at length 2–3 inches long: receptacle small, hemispherical. On bleak hilltops, from Arctic America to California and the Rocky Mountains.

8 FRAGARIA Tourn. L. Gen. n 633. (STRAWBERRY).

Acaulescent stoloniferous perennials with trifoliolate, coarsely toothed leaves and white flowers in few-flowered cymes upon erect scapes in early spring. Calyx concave, persistent, the limb 5–lobed with 5 alternate bractlets, valvate in the bud. Petals 5. Stamens many, in one row. Carpels numerous, smooth; style lateral, very short; ovule solitary, ascending. Receptacle large, fleshy, becoming conical and pulpy, bearing the small turgid crustaceous achenes upon its surface, at length separating from the conical central portion of the torus.

F. cuneifolia Nutt. T. & G. Fl. i, 448. Usually low; petioles and scapes villous with spreading hairs: leaves 1–6 inches high; leaflets cuneate-oblong, very obtuse and coarsely toothed at the summit, smooth above, appressed silky beneath: scapes shorter than the petioles, 1–few-flowered, decumbent or ascending; bractlets oblanceolate, entire, shorter than the lanceolate acuminate calyx-lobes: receptacle sparingly villous, in fruit semi-hemispherical to oblong 3–9 lines in diameter: achenes deeply imbedded in the receptacle. Very common in prairies and open places, Alaska to California.

F. Californica Cham & Schlecht. Linn. ii, 20. Comparatively tall, 2-12 inches high: pubescence of the petioles and scapes usually appressed, sometimes spreading and appressed on the same plant: leaflets obovate to oblong, more or less cuneate at base, coarsely toothed above the middle, appressed-silky beneath, sparingly villous above, 6–18 lines long: scapes equalling or surpassing the leaves, erect; bractlets linear-oblanceolate, entire or sparingly toothed, about equalling the triangular acuminate calyx-lobes: receptacle very sparingly if at all hairy; fruit oblong to obovoid, 3-6 lines in diameter: achenes slightly imbedded in the receptacle. Common throughout the Pacific States, always in wooded districts.

9 COMARUM L. Gen. n. 638.

Perennial herbs with pinnate leaves, mostly scarious wholly adnate stipules and purple flowers. Calyx flat, deeply 5–cleft, rarely 6–7 cleft, with as many smaller alternate deflexed bractlets. Petals 5, somewhat persistent. Stamens numerous, inserted into the thickened and hairy slightly lobed disk which lines the bottom of the calyx; filaments subulate, persistent. Achenes aggregated on the convex, at length very large and fleshy or spongy persistent receptacle: styles filiform, at length deciduous, inserted below the apex of the ovary; stigma simple. Seed inserted next the insertion of the style, pendulous. Radicle superior.

C. palustre L. Sp. 502. Stems stout, ascending from a decumbent rooting perennial base ½–2 feet long, glabrous below, minutely silky or glandular-pubescent above: lower stipules scarious, amplexicaul, long-adnate to the petiole; the upper broadly ovate, entire: leaves pinnate: leaflets 5–7, oblong 1–2 inches long, more or less pubescent beneath, dark green above, coarsely serrate: flowers dark purple, in an open few-flowered cyme; bractlets linear, acuminate, much shorter than the calyx; calyx-lobes purple within, ovate, acuminate, becoming 6–10 lines long; petals spatulate, acute, 2–3 lines long; stamens 20, with stout fleshy filaments, in one row: carpels very numerous, sessile upon the large fleshy receptacle. In marshes and bogs, Alaska to California and across the continent.

10 SIBBALDIA L. Gen. n. 393.

Procumbent or depressed suffruticose plants with trifoliolate leaves and rather small flowers on scape-like peduncles. Calyx rather flat, 5-cleft and 5-bracteolate. Stamens 5, alternate with the 5 petals, inserted into the margin of the villous disk which lines the base of the calyx; filaments short. Carpels 5–10, raised on short hairy stipes; styles lateral, attached near the base of the ovary; stigma capitate, depressed. Seed ascending, amphitropous. Radicle superior.

S. procumbens L. Sp. 284. Somewhat villous: stems creeping, leafy at the extremities: leaves trifoliolate; leaflets cuneiform, 3–12 lines long, 3–5 toothed at the apex: calyx-lobes 1–2 lines long; bractlets linear and shorter: petals much shorter, acute. Alpine and subalpine, from the Arctic regions to California and the Rocky Mountains: Greenland, Labrador and the White Mountains of N. H., Northern Europe.

11 POTENTILLA L. Gen. n. 634.

Herbaceous or suffruticose plants with pinnately or palmately compound leaves, adnate stipules and axillary or cymous inflorescence. Calyx concave at the bottom, deeply 4–5-cleft, with 4–5 alternate bractlets. Petals 4–5, obtuse or retuse or obcordate, deciduous. Stamens numerous, inserted into the margin of the disk which lines the base of the calyx: filaments filiform or subulate. Carpels numerous 1-ovuled, collected into a head on the flattish persistent dry villous receptacle: styles lateral or nearly terminal, deciduous: stigmas obtuse or somewhat capitate: ovule always inserted next the insertion of the style and accordingly either suspended or ascending. Radicle always superior.

§ 1 Styles thickened and glandular toward the base: carpels glabrous, numerous, sessile: inflorescence cymose.

* Style attached below the middle of the ovary: disk thickened and pentagonal; stamens 20–30, in one row on the margin of the disk; herbaceous perennials with pinnate leaves and glandular-villous pubescence.

P. glutinosa Nutt. T. & G. Fl. i, 446, under P. fissa var. Stems stout, erect, simple, striate, 1–4 feet high: radical leaves 7–11-foliolate 4–12 inches long, usually long-petioled; stipules ovate, entire or incised; leaflets rounded or subrhomboidal, incised or densely serrate, the terminal one 1–3 inches long: inflorescence loosely and regularly dichotomous, forming an almost flat-topped cyme 6–8 inches broad in fruit; calyx densely pubescent, the acute sepals 3–4 lines long; bractlets much smaller; petals rounded obtuse, 3–5 lines long, clear yellow: achenes very broadly oblique-ovoid, obtuse, distinctly carinate on the back above the middle, the sides marked with numerous rather coarse simple or forked veins. On stony hills, Vancouver Island to Oregon and Idaho.

P. ciliata. Loosely pilose throughout: stems cespitose, slender, 10–12 inches high, from short creeping rootstocks: radical leaves 4–6 inches long; stipules linear to obovate, 4–6 lines long, more or less lacerate; leaflets 5–9, with 2–6 small ones interspersed, mostly obovate with cuneate base, 4–12 lines long, coarsely lacerate toothed: flowers large, in a rather close corymbose cyme; sepals ovate, acuminate, 4–6 lines long,

conspicuously ciliate; bractlets linear-lanceolate, 3–4 lines long; petals broadly obovate or nearly orbicular, 6 lines long or more, bright yellow: achenes not known. In wet meadows on the Siskiyou Mountains near Ashland Butte, Oregon.

P. fissa Nutt. l. c. Viscidly pubescent: stems erect, branching, leafy, 8–10 inches high: leaves 9–11-foliolate on short petioles; leaflets unequal, roundish or oval, deeply incised or incisely toothed; cymes narrow, few-flowered; sepals ovate-lanceolate, long-acuminate; bractlets much smaller, often toothed; petals bright yellow, large, very concave, much exceeding the sepals. Idaho to the Rocky Mountains.

P. glandulosa Lindl. Bot. Reg. xix, t. 1583. Stems erect, slender, branched above, villous-pubescent, viscid toward the summit: radical leaves pinnately 5–9-foliolate: leaflets ovate or roundish, those of the nearly sessile cauline leaves obovate or oblong, all deeply and usually doubly serrate-toothed and often incised: branches of the cyme elongated and rather loosely-flowered; sepals ovate, acute, as long as the broadly oval yellow petals. Eastern Washington and Brit. Columbia to South Dakota and New Mexico.

P. Wrangelliana Fish. & All. Anim. Bot. Ind. Sem. Stems erect, 1-2 feet high, glandular-pubescent: leaves pinnately 5–9-foliolate; leaflets ovate or rhombic-ovate, coarsely and doubly serrate: cyme dichotomously branched, with a short-pedicelled flower in the forks, lax, leafy-bracted; sepals oval, abruptly contracted into a small almost mucronate point; petals pale yellow, obovoid, scarcely equalling the calyx; stamens 25, in one row on the margin of the thickened disk. Valleys of the coast range, Washington to California.

P. reflexa Greene Pitt. iii, 19. Stems erect or spreading, 1–2 feet high, rather slender; minutely villous-hirsute throughout and somewhat glandular: radical leaves 3–6 inches long, 5–9-foliolate; stipules entire; leaflets orbicular to oblong, coarsely and doubly serrate, an inch long or less: cymes open-paniculate; pedicels slender, often elongated: sepals narrowly triangular, acute, 3–4 lines long; the linear-lanceolate bractlets about half as long; petals obovate, 3–4 lines long, about equalling the sepals, yellow. Common on dry open hills and plains, Washington to California.

P. rhomboidea Rydberg Bull. Torr. Club xxiii, 248. *P. glandulosa var. Nevadensis Watson.* Sparingly villous to nearly glabrous; slightly if at all glandular: stems slender, 4–8 inches high, often solitary: radical leaves, 5–7-foliolate, short petioled: stipules ovate, subentire; leaflets rhombic-ovate, mostly acute, serrate with acute teeth, 4–8 lines long: cymes open, few-flowered pedicels stout and rather rigid; calyx sparingly hairy, the oblong acute lobes 2–4 lines long; bractlets linear-lanceolate, 1–2 lines long, petals yellow, 12 lines long obovate, tardily deciduous: stamens 15–25; styles nearly basal, filiform. On cliffs in the high mountains, Washington to California and Nevada.

* * Style terminal: disk not thickened; flowers small yellow, leaves pinnate or ternate.

+ Annuals or biennials; leaflets incisely serrate, not white tomentose.

P. Monspeliensis L. Sp. 499. *P. Norvegica L.* Hirsute: stems stout, erect, 1–3 feet high, leafy, at length dichotomously branched above: leaves trifoliolate, mostly short petioled; stipules large, ovate, coarsely incised or entire; leaflets obovate or oblong-lanceolate, 1–3 inches long: cyme leafy and rather loose; calyx large, becoming 3–5 lines long, the bractlets nearly equalling or exceeding the sepals; petals obovate, often emarginate, not longer than the sepals; stamens 15–20, in 2 rows; recep-

oblong-obovate by a more gradual attenuation of the base, 4–6 lines long. On rocky ridges and canyons, Idaho to the Eastern States and Canada.

R. spithamæa Watson Bot. Cal. ii, 444. Stems slender, 2–12 inches high, sparingly branched: stipules narrow, acuminate, glandular-ciliate: rachis of the leaves glandular and more or less prickly; leaflets 5–9, elliptical or oblong, smooth, rather coarsely and doubly serrate, 6–18 lines long: flowers 12–18 lines broad, in few-flowered corymbs, pedicels receptacle and calyx usually densely glandular-hispid; sepals lanceolate, with or without a foliaceous serrate appendage, 6–10 lines long; petals broadly obovate, 8–12 lines long; fruit not seen. Common on wooded hillsides, southwestern Oregon and northern California.

R. pisocarpa Gray Proc. Am. Acad. viii, 382. Stems slender, armed with straight, stout or slender, ascending or spreading spines, sometimes naked, not prickly: leaflets 5–9, oblong to oblong-ovate, shortly acuminate to obtuse, rounded or subcuneate at base, sessile or nearly so, smooth above, paler and pubescent beneath, simply toothed, 4–12 lines long: flowers small, corymbose or often solitary, on short branches; pedicels slender, smooth or rarely sparingly hispid: sepals more or less glandular-hispid, triangular acuminate, with entire lanceolate appendages; petals obcordate, 6–8 lines long: fruit globose, 3–5 lines in diameter, contracted above to a very short neck. Common in low places, Brit. Columbia to Oregon.

R. Californica Cham. & Schlecht. Linnæa ii, 35. Stems often tall, with usually stout more or less recurved or sometimes straight spines, frequently scattered or wanting, often prickly: stipules mostly narrow, usually naked, sometimes glandular-ciliate: rachis of the leaves pubescent or prickly; leaflets 3–7, round or broadly elliptical to oblong-ovate, usually sessile, slightly pubescent or glabrous above, villous or tomentose beneath, simply toothed, 6–18 lines long: flowers corymbose or sometimes solitary, on slender usually short and naked pedicels; sepals and receptacle glabrous or villous or rarely hispid; petals 5–6 lines long: fruit ovate-globose, with a usually prominent neck, about 6 lines long by 4 broad. Brit. Columbia to California.

R. Fendleri Crepin Bull. Soc. Bot. Belg. xv, 452. Stems often tall, with mostly rather slender straight or recurved spines, often scattered or wanting: stipules mostly narrow, usually naked; rachis pubescent or prickly; leaflets 5–9, oblong or oblong-obovate, more or less cuneate at base often petiolulate, usually glaucous, very finely pubescent beneath or glabrous or somewhat resinous, serrate with usually simple teeth, 6–18 lines long: flowers small, often solitary: the short pedicels receptacle and sepals glabrous; sepals lanceolate, with linear-lanceolate entire appendages: fruit globose or broadly ovate, with little or no neck. From the Columbia river to New Mexico and Texas, and north to beyond the British boundary.

* * Styles few, distinct, deciduous with the entire calyx from the very contracted top of the neck of the receptacle: sepals short and entire.

R. gymnocarpa Nutt. T. & G. Fl. i, 461. Stems slender and rather weak, 2–10 feet high, with straight slender infrastipular and scattered spines and more or less prickly: stipules usually narrow, glandular ciliate: rachis prickly and more or less glandular; leaflets 5–9, usually 7, from round elliptical and obtuse to narrowly oblong and acute, glabrous, rarely somewhat tomentose or resinous, doubly glandular-serrate, sessile or nearly so, usually small, 4–12 lines long: flowers in 1-few-flowered corymbs, on hispid or sometimes glabrous pedicels; sepals usually 3–4 lines long, lanceolate, the outer ones often glandular-ciliate all aristate and usually smooth; petals broadly obcordate, 6–8 lines long: fruit smooth; oblong-obovate to globose, few-seeded. Common in forests and wooded districts, Brit. Columbia to California and Montana.

* * * Naturalized species.

R. RUBIGINOSA L. Mant. 564. (SWEET BRIER). Stems stout, armed with stout, recurved spines, without prickles, 4–6 feet high: stipules often dilated: leaflets 5–7, elliptical or oblong-ovate, densely resinous beneath and aromatic, doubly serrate: flowers small, on short hispid pedicels; sepals pinnatifid, hispid: fruit large, subglobose to oblong ovate, 6–8 lines long. Becoming common throughout western Washington and Oregon.

Tribe II. Sanguisorbeæ Juss. Calyx-tube mostly indurated and contracted at the mouth; the segments valvate or rarely imbricate in the bud. Petals often wanting. Stamens 1–15, rarely more. Carpels 1–2, rarely 3–4, dry: style terminal or lateral: stigma often plumose. Seed suspended very rarely ascending. Radicle superior.

2 SANGUISORBA L. Gen. n. 146.

Herbs with pinnate leaves petiolulate leaflets adnate stipules and polygamous or perfect flowers in dense long-peduncled spikes. Calyx-tube turbinate, contracted at the throat, persistent, 2–3-bracteolate, the limb 4-parted, petaloid, deciduous. Petals none. Stamens 4–12 or none. Carpels 1–3, free from the calyx; styles terminal; stigma tufted, ovule solitary, suspended. Achenes dry included in the indurated 4-winged calyx-tube.

S. officinalis L. Sp. 169. Stem simple, usually glabrous, 1–2 feet high, much longer than the leaves, from a stout perennial root: leaflets about 4 pairs, ovate or oblong, cordate at base, coarsely serrate, ½–2 inches long, on petioles 2–6 lines long: flowers deep purple or red, polygamous, in ovoid-long spikes 6–12 lines long or more; bracts often pubescent; calyx-lobes ovate-lanceolate, often acute, 1 line long; stamens but little if any longer than the sepals: filaments filiform: fruit a line long. Common in cold mountain marshes, Alaska to California and the Rocky Mountains. Also Europe.

S. media L. Sp. ed. 2, 169. Stems slender, simple, but little longer than the leaves, glabrous, 1–3 feet high, from a stout perennial root: leaflets elliptical to ovate or oblong, cordate with a deep narrow sinus, coarsely serrate with rounded glandular-apiculate teeth, 1–3 inches long, on stout petioles 1–2 inches long, the lowest ones smallest: flowers dark purple, in a dense oblong head; stamens longer than the sepals; filaments flat. In marshes, Alaska and Brit. Columbia, perhaps northern Washington.

S. Sitchensis C. A. Meyer Trautv. & Meyer Fl. Ochot. 34. Stem stout, 2–4 feet high, from a stout perennial root, paniculately branched above: leaves ample, 1–3 feet long; leaflets 13–21, oblong to ovate, 1–3 inches long, coarsely and often doubly serrate with acute gland-tipped teeth, on pedicels 6–12 lines long: flowers white or slightly tinged with purple, in a dense cylindrical spike 2–6 inches long; stamens 3–4 times longer than the sepals, filaments flat. In salt-marshes along the coast and islands of Alaska, to be looked for in northern Washington.

S. annua Nutt. T. & G. Fl. i. 429. *Poterium annuum Nutt.* Glabrous; stems slender, branching, 6–15 inches high from an annual root: leaflets 3–6 pairs, ovate to oblong, deeply pectinate-pinnatifid, 4–8 lines long, sessile or nearly so: flowers perfect, greenish-white, in dense ovoid or oblong heads 3–12 lines long; bracts scarious, ovate, a line long, persistent; stamens 2–4, much shorter than the calyx, fruit shorter than the bracts. In dry open places, Washington to California, Indian Ter. and the upper Missouri valley.

3 AGRIMONIA Tourn. Inst. t. 155. (AGRIMONY.)

Tall perennial herbs with oddpinnate leaves and long slender terminal racemes of small yellow flowers. Calyx-tube turbinate, persistent, somewhat contracted at the throat and surrounded by a dense border of hooked prickles, or rarely 5–bracteolate the limb 5-lobed, at length connivent. Petals 5, yellow. Stamens 5–15 in one row. Carpels 2, free and distinct; styles terminal, stigma dilated, 2-lobed; ovule pendulous. Achenes 1 or 2, enclosed in the indurated calyx-tube.

A. **Eupatoria** L. Sp. i, 448. Hirsute: stems 2–4 feet high, sparingly branched above: leaflets 5–7, usually 2–4 inches long with smaller ones intermixed, oblong-obovate, coarsely toothed, acute at each end; stipules large, semicordate, incised: calyx 2 lines long, becoming 3–4 lines long, the tube at length 10-sulcate above: petals longer than the lobes of the calyx: achenes solitary, subglobose, 1 line in diameter. Washington to California and across the continent. Europe.

4 ALCHEMILLA Tourn. L. Gen. n. 165.

Low herbs with palmately lobed or compound leaves, adnate stipules and small flowers in axillary corymbs. Calyx-tube obconic, contracted at the throat by an annular disk, the limb 4–5-parted, with as many bractlets. Petals in ours none. Stamens 1–4; filaments short. Carpels 1–4, stipitate or sessile in the bottom of the calyx-tube; style attached near the base of the ovary, filiform; stigma mostly capitate. Seed fixed near the base of the carpel, ascending, almost orthotropous. Radicle superior.

A. **arvensis** Scop. Fl. Carn. ed. 2, i, 115. Annual; somewhat strigose-pubescent: stems weak, 3–8 inches long, diffusely branched from the base: leaves rounded, cuneate at base, on short petioles, 2–6 lines long by 2–4 broad, deeply 3-lobed, segments 2–4 cleft; stipules large, 2–5 cleft; flowers fascicled in the axils of the leaves, ½ of a line long, on slender pedicels or nearly sessile: bractlets very small: stamens 1–2: achene solitary, compressed. Common in meadows and open places, Vancouver Island to California: Europe.

Tribe 3. Dryadeæ Vent. Tabl. iii, 349. Calyx campanulate or turbinate, or rather flat, valvate in the bud; stamens numerous: carpels numerous, rarely few and definite, dry; ovule erect: radicle inferior.

5 KUNZIA Spreng. Anleit. ed. 2, ii, 869.
PURSHIA DC. not Raf. nor Spreng,

Diffusely branched shrubs with mostly fascicled leaves, small triangular stipules and subsessile yellow flowers at the ends of short lateral leafy branchlets. Calyx persistent, funnel-form, 5-lobed, without bractlets. Petals 5, unguiculate. Stamens about 25, in one row, inserted with the petals into the throat of the calyx. Carpels 1 or 2, free, slightly stipitate attenuate into the subulate style, 1-ovuled; stigma lateral, extending nearly the whole length of the style. Seed obovate, with membranaceous testa, separated from the inner coat by a layer of purple resin-like intensely bitter granulated matter; albumen none. Cotyledons broadly oval, flat.

K. tridentata Spreng. l. c. *Purshia tridentata DC.* A shrub or small tree 2–10 feet high, with brown or grayish bark, the young branches and branchlets pubescent: stipules connate at base, setaceous; leaves cuneate-obovate, 3–12 lines long, 3-lobed at the apex; attenuate at base to a thick petiole, white-tomentose beneath, green above: flowers nearly sessile; calyx 2–4 lines long, densely canescent-tomentose, with or without some glandular hairs below, the oblong obtuse lobes shorter than the tube; petals spatulate-obovate, unguiculate, 3–5 lines long, exceeding the calyx-lobes: carpels oblong, densely pubescent, striate, attenuate at each end, 4–6 lines long, exserted. Common on rocky hillsides and gravelly or sandy plains, Brit. Columbia to California and the Rocky Mountains.

6 CERCOCARPUS H. B. K. Nov. Gen. vi, 223 t. 556.

Small trees or shrubs with alternate leaves, small wholly adnate stipules and axillary or terminal inflorescence. Tube of the calyx cylindrical, long and pedicel-like, more or less persistent, the limb short, campanulate, 5-lobed, without bractlets, deciduous. Petals none. Stamens 15–25, inserted in 2–3 rows on the limb of the calyx; filaments short; anthers oval or rounded deeply emarginate or cleft at each end. Ovary solitary, free, with a single erect ovule: style terminal, villous: stigma capitate. Carpel linear-oblong, caudate with the long persistent plumose style which is more or less enclosed in the slender persistent tube of the calyx. Seed with a membranous testa and no albumen. Cotyledons long and linear.

* Leaves persistent, small, entire, thick-coriaceous with revolute margins, 1-nerved.

C. ledifolius Nutt. T. & G. Fl. i, 427. A small tree or shrub 6–15 feet high with moderately straight rigid branches: leaves lanceolate or oblong, acute, glandular apiculate, dark green and usually glabrous above, tomentose beneath, attenuate below to a thick petiole, 6–18 lines long, midnerve prominent: flowers sessile, 3 lines in diameter, tomentose; limb of the calyx 2 lines long, the oblong-obtuse lobes longer than the throat, tube becoming 3–5 lines long: tails of the achenes at length 2–3 inches long. In mountainous districts, eastern Oregon to California and the Rocky Mountains.

C. intricatus Watson Proc. Am. Acad. x, 346. A rigidly and intricately much branched shrub, 1–6 feet high with ashy-gray bark: leaves lanceolate or apparently linear by the involution of the margins, silky-pubescent both sides or glabrate above, acute, apiculate, sessile, 5–10 lines long: flowers sessile; tomentose; limb of the calyx 2 lines in diameter, 1–2 lines long, the short triangular lobes not half as long as the throat, the persistent tube becoming 2 lines long: tails of the achenes 1–2 inches long. On dry hillsides along streams, John Day valley eastern Oregon to Nevada and California.

* * Leaves deciduous, rather large, the margins not involute, pinnately veined.

C. betulæfolius Hook. l. c. t. 322. *C. parvifolius of recent authors not Nutt.* A shrub or small tree 2–15 feet high with gray thin flaky bark and long slender spreading or recurved branches: leaves obovate or oblong, with cuneate base, obtuse, coarsely serrate above the middle, green but finely pubescent above, densely white tomentose beneath, 1–2 inches long on short petioles, conspicuously veined: flowers on rather slender pedicels, tomentose, limb of the calyx 3–4 lines in diameter, the triangular obtuse lobes about equalling the throat; the tube becoming 4–6 lines long, ob-

tacle large, oblong. In damp places, Puget Sound to Alaska, Labrador and the Atlantic States.

P. rivalis Nutt. l. c. 437. Soft-villous with spreading hairs: diffusely branched from the base, or erect and branched above, 4–18 inches high: radical leaves 5-foliolate, or 3-foliolate and the terminal leaflet 3-parted; the upper ones 3-foliolate; stipules lanceolate to ovate, entire or toothed; leaflets ovate to oblong-cuneate, 6–18 lines long, more or less incised-serrate: cymes loose, leafy; pedicels slender; bractlets and sepals nearly equal, acute, 2–3 lines long; petals small; stamens 10–20; achenes usually smooth. In moist places along streams, Oregon and Washington to the Missouri river.

P. millegrana Engelm. Lehm. Ind. Sem. Hort. Bot. Hamb. 1849. *P. rivalis var millegrana Watson.* Pubescent throughout with minute soft appressed hairs: stems 6–18 inches long, spreading, profusely branched with divergent branches: leaves all 3-foliolate; stipules large, often nearly free, lanceolate to obovate, acutely 3-lobed, the lower ones often coarsely serrate; leaflets cuneate-obovate to oblanceolate, coarsely serrate with blunt teeth, 1–2 inches long: cymes very leafy, repeatedly dichotomous with a slender pedicelled flower in the forks; lobes of the calyx triangular, acute 2 lines long; the lanceolate bractlets nearly as long; petals obovate about 1 line long: achenes smooth, nearly white. On sandy bars along streams, Brit. Columbia to California and Ill.

P. lateriflora Rydberg l. c. 261. Soft pubescent with spreading hairs: stems often several from the root 4–20 inches high, terete, finely and rather densely glandular-pubescent, often tinged with red or purple, simple or sparingly branched with erect branches: leaves all 3-foliolate, the lower on petioles 1–4 inches long; stipules small, ovate or oblong, entire or toothed; leaflets broadly obovate, coarsely crenate, 1–2 inches long by 6–18 lines broad; flowers small, about 3 lines in diameter, on pedicels 2–7 lines long, from the axils of upper leaves, making the branches resemble leafy racemes: calyx glandular-pubescent in fruit, about 3 lines in diameter; bractlets ovate-lanceolate or oblong, acute, a little shorter than the ovate; acute sepals: petals yellow, obovate-cuneate, sometimes slightly emarginate, shorter than the sepals; stamens about 10; carpels very numerous; style terminal, thickened and glandular at base: achenes smooth, whitish. In moist places and along streams, Brit. Columbia to California, Montana and Arizona.

§ 2. Styles filiform, not glandular at base: inflorescence cymose.

* Style terminal; carpels glabrous: disk not thickened: stamens 20–25: herbaceous perennials.

+ Leaves pinnate; carpels usually 10–30: bractlets shorter than the sepals.

P. Drummondii Lehm. Nov. Stirp. Pug. ii, 9. Stems cespitose, 1–2 feet high, finely appressed-pubescent, simple; leaves pinnate with 2–5 pairs of leaflets, the lower long-petioled; stipules lanceolate, entire; leaflets obovate to oblong, cuneate at base, 6–18 lines long, incisely 8–10-lobed; flowers somewhat panicled at the summit of the stem, on long slender pedicles; bractlets narrowly lanceolate, 2 lines long, nearly equalling the acuminate-ovate, acute calyx-lobes; calyx hirsute; petals oblong-obovate with broad rounded, or almost truncate apex, 6 lines long: achenes smooth, brown. In mountain meadows at high elevations, Brit. Columbia to California and the Rocky Mountains.

P. Newberryi Gray Proc. Am. Acad. vi, 532. *Ivesia gracilis T. & G. Pac. R. Rep. vi, 72.* Canescently villous with spreading hairs: stems slender, from an apparently annual or biennial root, 6–8 inches long:

leaflets 5–10 pairs, scattered on the slender rachis, 3–5-parted with oblong segments, 2–4 lines long: flowers on slender pedicels in a very diffuse panicle; calyx nearly 2 lines long, broadly campanulate; bractlets lanceolate, nearly equalling the lanceolate acuminate calyx-lobes; petals white, very broadly obovate, 2 lines long, nearly as broad, exceeding the calyx; stamens 15–20; carpels numerous; achenes rugose. On sandy plains, Washington, at Wallula, to California.

+ + Leaves digitately 5–7-foliolate.

P. gracilis Dougl. Hook. Bot. Mag. t. 2984. Villous and more or less tomentose: stems erect, 2–3 feet high: stipules ovate or lanceolate, often long acuminate, entire or sub incised: leaflets mostly 5–7, rarely 3, cuneate-oblong, obtuse, incisely serrate or pinnatifid, white-tomentose beneath, green and subvillous or appressed-silky above, 1–3 inches long: flowers in a loose subfastigiate cyme, the pedicles at length elongated and slender; bractlets narrow, lanceolate, shorter than the broad acute or lanceolate sepals; petals broadly obcordate, 3–4 lines long, exceeding the calyx: achenes very numerous, oblong, dark brown. Common on dry praries and plains, Brit. Columbia to California and the Rocky Mountains.

P. flabelliformis Lehm. l. c. 12. Appressed-silky and more or less white tomentose: stems rather stout, 2–4 feet high, erect, branched above; leaves 5–9-foliolate, the lower long-petiolate; the upper sessile or nearly so; stipules linear-lanceolate, long-acuminate, mostly 3-toothed, 1–2 inches long; leaflets linear-oblong in outline, 2–4 inches long, deeply pinnatifid with linear-lanceolate segments, white-tomentose beneath, green and more or less silky above: flowers in ample flat-topped cymes; bractlets lanceolate, 2–3 lines long, about half as long as the broad triangular-ovate acute sepals; petals bright yellow, orbicular or broadly obovate, but little exceeding the sepals. Plains of Eastern Oregon and Washington to the Saskatchawan.

+ + + Low, arctic or alpine species: densely villous or subglabrous: leaves ternate: flowers few, in a loose cyme, or solitary: the obcordate petals exceeding the calyx: carpels 10–40.

P. villosa Pall. Pursh Fl. 353. Densely white-tomentose: stems 6–12 inches high: stipules large, oblong, acuminate; leaflets cuneate-obovate, 6–15 lines long, sessile, coarsely incised-serrate: flowers few or solitary, very large: bractlets ovate, obtuse, shorter than the ovate, acute sepals; petals obcordate, 3–6 lines long, exceeding the sepals. On Mount Rainier Washington to Alaska.

P. flabellifolia Hook. T. & G. Fl. i, 442. *P. gelida American authors* not Meyer. Nearly glabrous or with scanty minute villous pubescence: stems slender, erect or spreading, 6–10 inches long, 1–3-flowered: stipules oval or oblong, mostly entire: leaflets flabelliform, 6–9 lines long, rounded at the apex and incisely 7–9-toothed, entire at base, the middle leaflet shortly petiolulate: bractlets oblong, obtuse, 3 lines long, equalling the triangular, acute, sepals; petals broadly obovate, 4–6 lines long, bright yellow carpels numerous. Wet banks and meadows of the highest mountains, Oregon to Alaska.

P. brevifolia Nutt. T. & G. Fl. i, 442. Minutely glandular-pubescent, the calyx very sparingly villous: stems decumbent or ascending, 2–3 inches long: stipules ovate, entire; leaflets suborbicular, 2–3 lines long, 2–3-lobed and crenately toothed, the middle one petiolulate: bractlets acute shorter than the acute sepals: petals obovate, scarcely exceeding the calyx; style attached below the apex of the ovary. Alpine peaks of Oregon.

* * Style attached below the middle of the ovary: carpels on short stipes: receptacle densely villous: disk not thickened: more or less woody perennials.

P. fruticosa L. Sp. 495. Shrubby, much branched, 1–4 feet high: leaves pinnately 5–7-foliolate; stipules scarious; leaflets crowded, oblong-lanceolate, 2–12 lines long, entire, usually whiter beneath and the margin revolute: flowers on slender pedicels in loose cymes or solitary: bractlets equalling the acute sepals; petals yellow, orbicular, 2–6 lines long, exceeding the calyx; stamens 30; carpels 20. On high mountains, Washington to California and the Eastern States.

§ 3. Style filiform, attached to the middle of the ovary or below the apex: peduncles axillary, 1–flowered: carpels glabrous, short stipitate, the stipe and receptacle villous: herbaceous perennials with mostly creeping or decumbent stems and yellow flowers.

P. anserina L. Sp. 495. Creeping; ascending stem none; stolons slender, rooting and proliferous: leaves pinnate; stipules multifid; leaflets 9–19, with several minute pairs interposed, oblong sharply pinnatifid-serrate, nearly glabrous above, silvery-canescent beneath: pedicels scape-like, solitary, as long as the leaves. Borders of lakes and streams, Idaho to the Eastern States and far northward.

P. Pacifica. *P. anserina var. grandis Lehm.* Spreading by slender jointed runners: ascending stems none: leaves pinnate, 10–30 inches long; stipules scarious; leaflets 11–35, with small ones interposed, oblong, coarsely and sharply serrate, densely white-tomentose and silky beneath, smooth above, ½–2 inches long; peduncles scape-like, as long or longer than the leaves; bractlets lanceolate, acute, glabrate, about 3 lines long, equalling the oblong acute silky sepals; petals broadly ovate, 6 lines long, nearly as broad; style attached in the middle of the ovary: achenes ovoid, 1 line long. In salt marshes along the coast, Alaska to California.

12 HORKELIA Cham. & Schlecht. Linnæa ii 26.

Perennial herbs with pinnate or pinnately parted leaves, adnate stipules and white or rose-color flowers in crowded or subcapitate cymes. Calyx-tube campanulate, with 5 erect lobes and 5 alternate bractlets. Petals 5, linear or spatulate, more or less unguiculate. Stamens 5 in one series or 10 in two series; filaments shorter than the calyx-lobes, triangular and petaloid or subulate, those alternate with the petals broadest and persistent. Carpels few to many, attached by their middle to the dry conical villous receptacle: style filiform or thickened at base, nearly terminal: stigma obtuse. Achenes reniform-ovate. Seed suspended, with a thick and firm brownish testa. Leaflets not crowded; 3 to many-lobed or -toothed.

* Style short, thickened at base.

H. fusca Lindl, Bot. Reg. xxiii, t. 1997. Viscous-pubescent; stem rather slender, 2–3 feet high: radical leaves 12–19-foliolate, leaflets cuneate-oblong, pinnatifid and incised; stipules deeply laciniate: flowers crowded on the branches of the compound many-flowered cyme: bracts palmatifid, much shorter than the golmerules bractlets shorter and much smaller than the triangular-lanceolate calyx-lobes; petals cuneiform-obcordate, much longer than the calyx. In the mountains of eastern Oregon to California.

H. tenella Rydberg Rev. Pot. *H. fusca var. tenella Watson Bot. Cal. 181.* Glandular-pubescent: stems slender, simple, 6–18 inches high: radical leaves pinnately 11–19-foliolate; stipules linear, the free portion

setaceous; leaflets oblong-cuneiform, 6–8 lines long, deeply cut into 5–9 linear-oblong or filiform segments; cauline leaves similar, with nearly free pinnatifid stipules and more simple leaflets with linear segments: flowers crowded on the branches of the almost capitate or at length open-paniculate cyme; bractlets linear, shorter and much smaller than the triangular acuminate calyx-lobes; petals white or pinkish, cuneate-obovate, attenuate to a slender claw, 3 lines long, longer than the sepals; filaments broadly oblong: achenes oblique-ovoid. In high mountain valleys, Washington to California.

H. pseudocapitata Rydberg l. c. Sparingly pilose and more or less glandular: stems rather slender, 6–14 inches high: leaves 2–6 inches long, 9–15-foliolate; stipules linear or the upper ones broadly subulate; leaflets broadly obovate with cuneate base to narrowly cuneate, 3–8 lines long, more or less deeply incised and toothed with obtuse to acute teeth: flowers in small subcapitate cymes; bractlets linear, a line long, about half as long as the broadly subulate calyx-lobes; petals oblong, attenuate below to a short claw, retuse at the apex, about 3 lines long, but little exceeding the calyx, filaments triangular, obtuse. In moist meadows and along streams, southern base of the Blue Mountains in Oregon.

H. capitata Lindl. Bot. Reg. under t. 1997. Somewhat glabrous: stems viscous-pubescent toward the summit: radical leaves about 13-foliolate; stipules entire or 3-parted; leaflets laciniate-incised, the lower ones roundish-cuneiform, the upper oblong and attenuate at base: heads of flowers dense, shorter than the laciniate bracts; bractlets lanceolate-subulate, about as long as the calyx-lobes: petals broadly cuneiform, longer than the calyx. Cascade Mountains of Oregon.

H. Hendersoni Howell P. C. Pl. Col. 1887. Densely silky-pubescent; not glandular: stems densely tufted, 4–6 inches high: simple: stipules setaceous, or those of the cauline leaves lanceolate: leaves very numerous at the ends of the much branched caudex: leaflets 11–17, mostly crowded, broadly cuneate and palmately 3–5-lobed, or the lowest ones often obovate and entire, 1–3 lines long, flowers rather few, in compact terminal cymes, bractlets linear, nearly equalling the subulate calyx-lobes; petals narrowly lanceolate, about equalling the calyx; filaments broad-subulate, half as long as the sepals: achenes not seen. On top of Ashland Butte, Siskiyou Mountains, Oregon. First collected by L. F. Henderson, July 1886.

H. parviflora Nutt. T. & G. Fl. i, 435. Tomentose; upper part of the stem viscidly villous: radical leaves 9–13-foliolate; stipules ovate-lanceolate, small, entire or toothed: leaflets short, roundish, the upper ones cuneiform, incised: flowers small, much crowded on the branches of the fastigiate cyme; bractlets linear subulate, shorter than the narrowly triangular calyx-lobes; petals narrow, spatulate longer than the calyx. Plains of eastern Oregon and Washington.

* * Style filiform, about equalling the stamens: stipules much divided into linear lobes.

H. congesta Dougl. Hooker Bot. Mag. t. 2880. Hirsute with long spreading hairs below, nearly smooth above: stems slender, erect, 6–20 inches high or more: radical leaves 7–15-foliolate, the rachis hirsute below with long white spreading hairs: leaflets narrowly spatulate, or the earliest ones oblong, 6–10 lines long, 2–3-toothed at the apex, sparingly to densely silky both sides: flowers rather small, in open paniculate cymes; bractlets linear, more than half as long as the triangular-acuminate calyx-lobes: petals obovate, attenuate below to a narrow claw, rounded at the apex, 2–3 lines long, exceeding the calyx: filaments very short, triangular: achenes ovoid, a line long, whitish. On low hills and dry prairies, southwestern Oregon and adjacent California.

H. carnifolia Rydberg l. c. Hirsute with long white hairs and more or less glandular: stems ascending, 6–20 inches long: stipules cut into many filiform segments: radical leaves 4–6 inches long, 13–21-foliolate; leaflets broadly cuneiform, 3–6 lines long, deeply cut into 5–9 linear lobes: flowers rather large, in close paniculate cymes: bractlets linear-lanceolate, a little shorter than the acuminate-triangular calyx-lobes: petals suborbicular or broadly obovate attenuate below to a claw; filaments deltoid, a line broad at base: achenes very smooth ovoid, fully a line long. In clayey soil southwestern Oregon.

H. sericata Watson Proc. Am. Acad. xx, 364. White-silky throughout, not at all glandular: stems slender, flexuous, 6–12 inches high: leaves densely white-silky, the numerous leaflets crowded, 2–3 lines long, oblong or obovate, unequally bifid: cymes open and few-flowered; bractlets linear, nearly equalling the narrowly lanceolate acuminate calyx-lobes; petals narrowly obcordate, white or tinged with pink: filaments short-subulate: carpels 5. On barren slopes of the Coast Mountains near the Oregon and California boundary.

H. Howellii Rydberg l. c. *Potentilla Howellii Greene Pitt. i, 104.* Pubescent with white spreading hairs: stems slender, ascending, 10–20 inches long: paniculately branched above: leaves narrow, on short almost filiform petioles; leaflets 21–31,2–3 lines long, broadly cuneiform and deeply 2-3-lobed, or narrow and entire: flowers in crowded few-flowered cymes; bractlets lanceolate, nearly as long as the lanceolate-acuminate calyx-lobes; petals spatulate, obtuse, 2 lines long: filaments oblong, abruptly acuminate. On barren plains, southwestern Oregon.

H. tridentata Torr. Pac. R. Rep. iv, 84, t. 6. More or less villous with mostly appressed hairs: stems erect from a decumbent base, 10–20 inches high: radical leaves 5–9-foliolate; leaflets cuneate-obovate to narrowly oblong, usually 3-toothed at the apex, 3–6 lines long: flowers on slender pedicles, in an open paniculate cyme; bractlets linear, shorter than the lanceolate acuminate lobes of the more or less scarious calyx; petals linear to broadly spatulate, but little longer than the calyx: filaments subulate. On dry hillsides, Southwestern Oregon to California.

13 IVESIA T. & G. Bot. Wilkes 288.

Low herbs with pinnate leaves, numerous small palmately or pedately lobed, often crowded and closely imbricate leaflets and white purple or yellow flowers in cymes. Calyx campanulate or cyathiform at base, 5–lobed with 5 alternate bractlets. Stamens definite, 5, 10, 15, or 20; filaments slender, narrowly subulate or filiform. Carpels few or solitary, upon a small villous receptacle; style filiform, subterminal.

I. Baileyi Watson Bot. King 90. Viscidly glandular and villous: stems several, 3–6 inches long, from a thick perennial branching caudex, slender, branching above, exceeding the leaves; leaflets 7–21, broadly ovate or flabelliform, 2–3 lines long, 3–7-toothed: or parted; stipules ovate, entire or 2–3 toothed: flowers on slender pedicels, in a loose open cyme; calyx concave or broadly turbinate, the ovate-triangular acute lobes but little longer than the oblong obtuse bractlets; petals yellow or white, spatulate-oblong, not longer than the calyx; stamens 5; carpels 1–5. On cliffs in the mountains of Southeastern Oregon to Nevada and California.

I. Pickeringii Torr. Bot. Wilkes 288 t. 4. Densely villous with white silky hairs: stems 8–10 inches high: leaflets very numerous, at first closely imbricated, 2–5-lobed or parted or often entire, 1–4 lines long; stems panicled above; cymes densely many-flowered; calyx 2 lines long or less; bractlets linear; petals yellowish, spatulate, equalling the calyx; stamens 20; carpels 4–6. On the Klamath river and southward.

I. alpicola Rydberg l. c. Viscid-pubescent: throughout: stems 3-8 inches high, several from a thick resinous caudex, exceeding the leaves; leaflets 21–41, 2-3-lines long, 3-5-parted into cuneate-oblong or linear-oblong, obtuse, entire lobes the single cauline leaf similar, with ovate-lanceolate, entire stipules: cyme capitate, many-flowered; calyx somewhat scarious, campanulate, 2 lines long; bractlets linear, obtuse, ⅔ as long as the lanceolate acute calyx-lobes; petals oblong to spatulate, shorter than the calyx; stamens 5; carpels 1-3; receptacle densely long-wooly. On Mount Adams Washington at 5000–6000 feet elevation.

Tribe 4. Rubeæ B. & H. Gen. i, 616. Calyx flattish, 5-parted, mostly imbricate in the bud: stamens numerous; carpels numerous, or rarely few, drupaceous, crowded on the conical receptacle: ovules 2 colateral: style terminal or nearly so: seed suspended: radical superior.

14 RUBUS Tourn. L. Gen. n. 632.

Shrubs or somewhat woody, erect or trailing often prickly plants or herbs with simple or pinnately 3–7-foliolate leaves, adnate stipules and white or purple flowers in panicles or corymbs or solitary. Calyx 5-lobed, persistent, without bractlets, tube short and open. Petals 5, conspicuous, deciduous. Stamens numerous, inserted into the border of the disk which lines the bottom of the calyx-tube. Ovaries numerous, rarely few, with colateral suspended ovules, becoming globose 1-seeded drupelets: style nearly terminal, deciduous

§ 1. Carpels forming a somewhat hemispherical fruit, concave beneath and falling away from the dry receptacle together when ripe sometimes few in number and falling away separately.

* Leaves simple, palmately lobed: shrubs without prickles.

R. parviflorus Nutt. Gen. i, 308. *R. Nutkanus Moc.* Stems shrubby, erect, 3–8 feet high; bark green and smooth or more or less glandular-pubescent, becoming brown and shreddy: leaves round-cordate in outline, palmately 3–5-lobed, the lobes acuminate, unequally serrate, 4–12 inches long, tomentose on one or both sides, the veins beneath and the petioles and peduncles usually hispid with gland-tipped hairs; petioles stout, often with a small leaflet near the summit; stipules linear, acuminate, the upper half free, ciliate: peduncles terminal, few-flowered calyx-lobes oblong-ovate, 4–6 lines long with linear appendages nearly as long, more or less tomentose; petals broadly ovate to elliptical, 6–10 lines long: carpels very numerous, tomentose; fruit red, large, hemispherical, sweet and pleasant-flavored. Common in forests and wooded districts, Alaska to California and East to Lake Superior.

* * Leaves trifoliolate, sometimes simple on the flowering branches, rarely 5-foliolate: stems more or less prickly.

R. spectabilis Pursh. Fl. 348 t. 16. Stems perennial, shrubby and branching, 6-12 feet high, with yellowish shreddy bark, copiously armed when young with straight stout prickles: leaves usually trifoliolate; leaflets ovate, acute or acuminate, doubly incised-serrate, often 2-3-lobed, the veins beneath and the petioles sparingly villous-pubescent and prickly; flowers mostly solitary, large and showy; calyx-lobes pubescent, broadly ovate, acuminate, 4–5 lines long; petals red, ovate to elliptical, acute, 6–8 lines long: fruit large, ovoid, red or yellow, the drupelets smooth and tipped with the slender subpersistent style: achenes deeply pitted. Common along streams and moist places, Alaska to California.

Var. Menziesii Watson Bot. Cal. i, 172. More or less densely tomentos and silky. Southern Oregon and southward.

R. leucodermis Dougl. T. & G. Fl. i, 454. Stems soft-woody, biennial, erect, 3–8 feet high, glaucous, armed with stout straight or recurved prickles: leaves trifoliolate, rarely 5-foliolate; leaflets ovate to lanceolate, acute or acuminate, doubly serrate, 1–2 inches long, white-tomentose beneath, smooth above, the petioles and veins beneath prickly; flowers in small terminal corymbose cymes; calyx-lobes lanceolate, long-acuminate, closely reflexed, 3–4 lines long, longer than the spatulate petals: carpels tomentose; fruit dark purple when ripe, rather large, with a white bloom and agreeable flavor: achenes minutely pitted. Common in rich moist woods, Alaska to California.

R. strigosus Michx. Fl. i, 297. Stems erect, suffruticose, biennial, armed as well as the peticles, peduncles and calyx, with straight spreading rigid bristles which are glandular when young, slightly glaucous: leaves pinnately 3–5-foliolate: leaflets oblong-ovate, acuminate, often narrow, but sometimes broadly ovate, occasionally confluent, incisely serrate, canescently tomentose beneath, the terminal one often cordate at base, the lateral ones sessile; stipules setaceous, deciduous: peduncles axillary and terminal; often aggregated at the summit of the branches so as to form a leafy panicle 4–6-flowered; petals white, erect, about as long as the spreading sepals: carpels pruinose; fruit light red, very juicy. Hillsides and rocky places, Eastern Oregon and Idaho to the Atlantic States and Canada.

* * * Stems herbaceous, more or less trailing, unarmed: leaves trifoliolate or 3-lobed: carpels few.

R. arcticus L. Sp. i, 494. Stems low, somewhat pubescent, mostly erect, 1–2-flowered: leaves trifoliolate; leaflets rhombic-ovate, or obovate, coarsely and often doubly serrate, petiolulate; stipules ovate: sepals lanceolate, acute, often shorter than the obovate entire or emarginate petals: fruit amber-color, very delicious. Marshes and river banks, Idaho to the Rocky Mountains and far north.

R. pedatus Smith Inc. Ined. t. 63. Stems trailing, filiform, 1–3 feet long or more, rooting at the nodes, pubescent: leaves trifoliolate; leaflets cuneate-obovate, 8–12 lines long, incised and serrate, the lateral ones often parted to the base, smooth or sparingly villous; stipules ovate-oblong: flowers usually solitary, on long slender pedicels, white, 6–9 lines broad; sepals ovate-lanceolate, nearly glabrous, entire or incised, exceeding the petals, at length reflexed: carpels glabrous; styles filiform, not thickened upward: fruit 1–6 large red juicy drupelets. Common in the Coast and Cascade Mountains, Alaska to California.

R. lasiococcus Gray Proc. Am. Acad. xvii, 201. Stems slender, creeping, 2–12 inches long, cinereous-pubescent: leaves 3–5-lobed, rarely 3-foliolate, the obtuse lobes irregularly and doubly serrate; stipules ovate to lanceolate, entire or lacerate: peduncles slender, equalling or exceeding the leaves, 1–3-flowered: flowers white, 6–10 lines broad; calyx-lobes ovate, acuminate, entire, exceeding the obovate petals; carpels densely tomentose; styles thickened upward: fruit 1–3 large red tomentose juicy drupelets. In shaded places, base of Mount Hood and other peaks of the Cascade Mountains.

§ 2. Fruit persistent upon the somewhat juicy receptacle which is at length deciduous from the calyx: stems biennial, trailing, prickly.

R. nivalis Dougl. Hook. Fl. i, 181. Stems slender, trailing, 1–4 feet long, armed with small recurved prickles: leaves round-cordate, obscurely to prominently 3-lobed, or rarely 3-foliolate, unequally serrate, usually

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acute, smooth and shining above, sparingly pubescent beneath, 1–2 inches long or more, persistent, the veins beneath and the petioles armed with recurved prickles; stipules a pair of ovate acuminate lacerate-serrate leaflets, contracted at base, situated on the petiole a line or more from the base: peduncles short, one to few-flowered; flowers perfect; sepals nearly distinct, broadly lanceolate, acuminate, 3–4 lines long, ciliate and more or less pubescent: petals narrowly lanceolate, acuminate, longer than the sepals; carpels few, pubescent, those that mature becoming large red juicy drupelets; achenes flattish, a line long, conspicuously pitted. In forests, Washington to Northern California and Idaho.

R. ursinus Cham. & Schlecht. Linnæa ii, 11. Stems slender, trailing, 5–20 feet long, armed with straight rather slender prickles, somewhat glaucous: leaves deciduous, 3-foliolate, rarely 5-foliolate, often simple and 3-lobed on the flowering branches; leaflets ovate to oblong coarsely and doubly serrate, more or less pubescent or tomentose, veins, petioles, peduncles and calyx more or less armed with prickles; stipules oblanceolate to linear, often long and toothed: flowers dicœcious, in small cymes terminating the numerous lateral branchlets or leafy peduncles; calyx-lobes ovate-lanceolate acuminate or often foliaceously tipped, densely tomentose inside, glandular outside; petals of the staminate flowers lanceolate to obovate, unguiculate, 6–8 lines long, much exceeding the calyx; of the pistilate smaller, but little if at all exceeding the calyx; carpels numerous, glabrous: fruit oblong to ovoid, black, pleasant flavored: achenes small, flattish, reticulated. Common in wooded districts, Alaska to California.

Tribe 5. Spirææ Juss. Calyx campanulate, imbricate, or sometimes valvate in the bud: carpels 1–8, mostly 5, verticillate, follicular or 2-valved in fruit: style terminal: seeds 1–8 or 10 in each carpel, pendulous or ascending.

15 HOLODISCUS Maxim. Act. Hort. Petrop. vi.

Shrubs with alternate simple leaves without, stipules and numerous flowers in loose panicles that terminate the short branchlets. Flowers perfect, disk wholly coherent. Calyx deeply 5-cleft, persistent. Stamens numerous, perigynous. Carpels 5, opposite the calyx-lobes, distinct, shortly stipitate, with two pendulous ovules, becoming woolly achenes. Stigma capitate, 2-lobed.

H. discolor Maxim Adn. Spir. 150. *Spiræa discolor Pursh.* A diffuse shrub 2–6 feet high with grayish-brown bark and short rigid pubescent branches: leaves ovate, obtuse or acutish, cuneately narrowed at base to a winged petiole, pinnately lobed or toothed above the middle, 6–18 lines long, more or less silky-pubescent beneath, nearly smooth above: panicle small, 1–4 inches long; more or less tomentose; calyx-lobes oblong, acute or acutish; petals obovate, obtuse, barely a line long, exceeding the calyx, white, changing to tawny-white in age: achenes densely tomentose with long white hairs. Common on bluffs and rocky banks, Brit. Columbia to California and the Rocky Mountains, east of the Cascade range.

H. ariæfolia. *Spiræa ariæfolia Smith.* A rather large shrub 4–16 feet high, with slender spreading or recurved striate branches: leaves ovate, often abruptly contracted below to a short more or less margined petiole, 1–4 inches long, pinnately lobed, the mostly obtuse lobes often sharply toothed, finely tomentose beneath, smooth above: panicles large and diffuse, 4–8 inches long, tomentose, white, changing to tawny; petals oblong, a line long, exceeding the ovate acute calyx-lobes; carpels pubescent with long white hairs. Common in forests, Puget Sound to California, west of the Cascade Mountains.

16 FILIPENDULA Erndt. Virid. Warsaw, 43.

Perennial herbs with palmately lobed or pinnate, alternate leaves, foliaceous persistent stipules and numerous small flowers in terminal compound panicles or cymes. Flowers perfect, calyx 5-cleft, sometimes only 3- or 4-cleft, persistent. Disk obsolete. Petals 5, rarely fewer. Stamens in 2–3 rows on the calyx-tube. Carpels 6–10, distinct, often stipitate, with two pendulous ovules, becoming one-seeded achenes. Stigma capitate, usually large. Seed small with thin membranous testa.

F. occidentalis. *Spiræa occidentalis Watson.* Stems simple, 2–6 feet high, glabrous or nearly so: stipules broadly ovate, acute, laciniately toothed, 4–6 lines long or more; leaves ample, 5–7-lobed, the lobes acute or acuminate, doubly lacerate-toothed, appressed-silky on the veins beneath, 3–6 inches long; petioles stout, with 1–3 pairs of small ovate to linear-lanceolate toothed leaflets below the large terminal one: inflorescence a compound cymose panicle, pubescent with short somewhat appressed hairs, calyx-lobes subulate, twice as long as the tube, smooth or nearly so, soon reflexed: petals white, elliptical, sessile, 2–3 lines long, carpels about 9, erect, narrowly lanceolate, long-stipitate, beaked by the elongated style, villous on the margins from the summit of the style to the base. Rocky banks of the Trask river, Tillamook county, Oregon.

17 NEILLIA Don. Prodr. Fl. Nep. 228.

Shrubs with simple toothed or lobed alternate leaves, membranaceous deciduous stipules and rather large white flowers in simple terminal corymbs. Flowers perfect. Disk wholly coherent to the tube of the calyx. Calyx 5-cleft, persistent. Petals 5, rounded, sessile. Stamens numerous, perigynous. Carpels 1–5, distinct, often stipitate, becoming membranaceous, inflated pods. Ovules few to several, some ascending, some pendulous. Seeds with shining stony testa and distinct albumen.

N. capitata Greene Pitt. ii, 28. *N. opulifolia var. mollis Brewer and Watson.* A shrub 3–20 feet high with slender spreading or recurved branches and ash-colored shreddy bark: stipules linear, 5–6 lines long, remotely toothed, caducous; leaves roundish, often subcordate, 3-lobed, doubly serrate, 1–3 inches long on slender petioles, stellately soft-pubescent beneath, smooth or nearly so above: flowers on long slender pedicels in simple hemispherical tomentose corymbs; bracts all scarious; calyx-lobes triangular, apiculate, as long as the tube, shorter than the orbicular petals pubescent on both sides: carpels 2–5, at length 4–6 lines long, glabrous, 2–4-seeded; seeds slenderly and obliquely pyriform, a line long. Common along streams and moist places. Brit. Columbia to California and the Rocky Mountains.

N. Torreyi Watson Proc. Am. Acad. xi, 136. A small shrub, barely 2 feet high, erect, scarcely surculose, freely branching: leaves of rather deltoid-ovate outline, incisely 3-lobed to the middle, the lobes nearly equal, the whole with slight secondary lobes, these crenately or incisely toothed, about 1 inch long: flowers few, in usually compound corymbs; petals comparatively large, often rose-tinted; carpels mostly 2, coherent to above the middle, but little longer than the calyx, divergent at apex, only slightly inflated, minutely tomentose, 1-seeded: seeds obovoid. In dry soils on rocky slopes at 8000-9000 feet elevation, Idaho to Nevada and the Rocky Mountains.

N. malvacea Greene Pitt. ii, 30. "Shrubs 3–5 feet high, stout, the shoots erect: leaves digitately 5-veined, with or without 3 broad and

shallow lobes above the middle, the general outline orbicular or oval, with many slight-rounded and crenately toothed secondary lobes: corymbs mostly simple, short-stalked: calyx tomentose, very large, broadly campanulate, its lobes in maturity connivent over the fruit: carpels 2 (sometimes 3) not inflated, connate above the middle, compressed, erect and straight at apex, indehiscent, 1- or 2-seeded: seeds large, oblong-obovate. Dry rocky banks, above the northern shore of Lake Pend d'Oreille in Northern Idaho.

18 SPIRÆA Tourn. L. Gen. n. 630.

Shrubs with simple alternate leaves without stipules and white or rose-color perfect flowers in compound corymbs or elongated panicles or spikes. Calyx 5-cleft, persistent, the disk more or less free at the margin. Petals 5, rounded, nearly sessile, stamens numerous, perigynous, inserted with the petals into the disk. Carpels 5, alternate with the calyx-lobes, distinct, sessile, becoming dry cartilaginous several-seeded follicles, not inflated. Seeds small, pendulous, linear, with a thin membranaceous testa and no albumen.

S. lucida Dougl. (see Greene Pitt. ii, 221). *S. betulæfolia* of American authors in part, not Pall. Stems erect, mostly simple, 1–2 feet high, from horizontal running and woody not deep-seated rootstocks or roots: lowest leaves small, obovate to oblanceolate, the upper oval to oblong, 1–2 inches long, acutish, often obscurely lobed, sharply and doubly serrate above the middle, narrowed below to a short petiole, glabrous throughout, pale and glaucescent beneath: flowers white, in a terminal glabrous compound fastigiate corymb: calyx-lobes triangular, shorter than the tube, reflexed; petals elliptical, shortly unguiculate; stamens 15–20, filaments three times as long as the petals; carpels 5, glabrous a line or more long, tipped with a style half as long, 5–8-ovuled. Common on dry wooded hillsides, Brit Columbia to Oregon and Montana.

S. pyramidata Greene Pitt. ii, 221. *S. betulæfolia* of American authors in part, not Pall. Stems erect, sometimes cespitose, often branched, 1–3 feet high: leaves elliptical to oblong, mostly obtuse, narrowed at base to a short petiole, coarsely serrate above the middle, 1–2 inches long: flowers white to rose-color, in a dense pyramidal compound panicle; calyx more or less pubescent, its broadly ovate lobes about equalling the short campanulate tube; petals orbicular, less than a line long; filaments very slender, not twice the length of the petals; follicles glabrous, scarcely a line long, tipped with a style of equal length. On rocky ridges, Oregon and Washington.

S. arbuscula Greene Erythea iii, 63. *S. betulæfolia var. rosea Gray.* Stems erect, 2–4 feet high or more, red, shedding annually a thin bark: leaves ovate to elliptical, serrulate at the apex, entire below, narrowed at base to a very short petiole or the lowest sessile, dark green both sides, 6–8 lines long: flowers deep rose-color, in small roundish leafy-bracted corymbs, terminating the numerous branches; calyx-lobes deltoid-ovate, not reflexed, about as long as the broad tube; petals oblong, narrowed at base to a very short claw; filaments twice as long as the petals: free edge of the disk obsolete or reduced to a mere ring: carpels glabrous; styles shorter than the petals. Along brooks at subalpine elevations in the Cascade and Sierra Nevada Mountains.

S. Douglasii Hook. Fl. i, 172. Stems erect, 3–8 feet high, with reddish-brown bark, cespitose and forming dense patches several yards in extent, branching, young branches and inflorescence more or less densely tomentose; leaves elongated-oblong, 1–4 inches long by 6–12 lines broad,

unequally serrate toward the rounded or acutish apex, often cuneate at base, very shortly petioled, densely white-tomentose beneath, smooth above: flowers deep rose-color, densely crowded in a narrow usually elongated sessile leafy panicle; calyx campanulate, the ovate acute lobes as long as the tube, reflexed; petals obovate, narrowed at base to a short claw; stamens twice as long as the petals; free edge of the disk obsolete or reduced to a mere ring: carpels glabrous, 9–11-ovuled. Common in low grounds and swales, Brit. Columbia to California.

S. Menziesii Hook l. c. 173. Stems erect, 3–4 feet high, with light brown bark: leaves obovate to elliptical. 1–3 inches long by 8-16 lines broad, coarsely and unequally serrate above the middle, glabrous and of nearly the same color both sides or paler beneath, narrowed below to a very short petiole: flowers rose-color, in a rather small somewhat pyramidal obtuse panicle; calyx pubescent, the broadly ovate acute lobes as long as the broad shallow tube; petals ovate, a line long, exceeding the sepals; stamens more than twice as long as the petals; carpels glabrous. In cold marshes, Alaska to Oregon.

S. cæspitosa Nutt. T. & G. Fl. i, 418. Cespitose, with simple or branching scape-like stems: leaves rosulate on the short tufted branches of the prostrate and root-like stems, oblanceolate or linear-spatulate, acute silky on both sides, 2–12 lines long, those of the scape scattered and narrower: scapes 2–6 inches high; flowers white, in small oblong spiks 6–20 lines long; calyx-lobes silky, exceeding the tube and nearly equalling the spatulate petals, not reflexed; filaments twice as long as the petals; disk of the calyx-tube conspicuous, entire; carpels 3–5, villous or glabrate, 2–3-ovuled. On high shelving rocks, in the Cascade Mountains of Southern Oregon to Arizona and the Rocky Mountains.

19 LUETKEA Bong. Veg. Sit. 230, t. 2.

ERIOGYNIA Hook. Fl. i, 255, t. 88.

Low, nearly herbaceous perennial plants with palmately cleft or entire leaves without stipules and scape-like stems terminated by a short spike or panicle of small white flowers. Flowers perfect. Disk wholly coherent with the tube of the 5-cleft persistent calyx. Petals 5, rounded. Stamens numerous, perigynous. Carpels 4–6, membranaceous, becoming 2-valved. 4-seeded pods. Seeds small, attenuate at each end, with thin membranaceous testa and no albumen.

L. sibbaldioides Bong. l. c. *Eriogynia pectinata Hook.* Glabrous stems cespitose, creeping, very leafy, 1–2 inches long; flowering stems erect, 2–6 inches high; leaves trifoliolate persistent; leaflets deeply 2–4-lobed, usually 3-lobed, the lateral ones decurrent and forming a broad flat petiole: flowers rather large, white, in short terminal racemes; inflorescence more or less pubescent; pedicels stout, 1–2 lines long; calyx-lobes ovate, acute, equalling the tube; petals obovate, 1–2 lines long, exceeding the calyx; filaments united at base, shorter than the petals; carpels 3–5, villous along the inner suture. On the highest mountains near perpetual snow, Alaska to California and the Rocky Mountains.

L. Hendersonii Canby, Greene Pitt. ii, 119. Stems cespitose, 1–2 inches long, very leafy: leaves spatulate, entire, the margin slightly involute, acutish, attenuate below to a broad petiole, 6–8 lines long, silky, pubescent, both sides coriaceous, persistent: flowers white, in oblong racemes that terminate the slender scapes; calyx almost rotate, the oblong obtuse lobes longer than the tube; petals oblong, 1½ lines long, rounded at the apex; filaments distinct; carpels 3–5, villous along the sutures. "In rock crevices 7000 feet altitude Mount Steele, Olympic Mountains Washington." Piper.

20 ARUNCUS L.

Herbaceous perennials with repeatedly ternately divided leaves without stipules and loose panicles of small white flowers terminating the branches. Flowers dioecious. Calyx 5-cleft, marcescent in fruit; disk entire, coherent to the tube. Petals 5. Stamens numerous, hypogynous. Carpels 3–5, distinct, sessile, becoming cartilaginous several-seeded follicles. Seeds with a loose membranaceous testa and no albumen.

A. vulgaris Raf. Sylv. Tell. 152. *Spiræa Aruncus L.* Glabrous: stems stout, 2–8 feet high or more, branching: leaves large, ternately decompound; leaflets thin, sparingly villous beneath, ovate to lanceolate, acuminate, 2–5 inches long sharply and laciniately doubly toothed, the terminal ones broadest: panicles large, compound, pubescent; flowers a line broad, nearly sessile; petals spatulate; filaments twice as long as the petals; styles short; carpels 3–5, several seeded, globose, the pedicels reflexed in fruit. Along streams in mountainous districts, Alaska to California and across the Continent.

ORDER XXX SAXIFRAGACEÆ Dumort. Anal. Fam. 36.

Herbs with bland watery often astringent juice, alternate or opposite leaves without true stipules and mostly perfect flowers. Sepals 4–5, united or nearly distinct, imbricate in the bud. Petals as many as sepals and alternate with them, rarely wanting. Stamens as many or twice as many as petals, rarely fewer, inserted into the throat of the calyx; anthers introrse. Ovary either free from the calyx or coherent with its tube, 1–3-celled with parietal placentæ: ovules mostly numerous: styles distinct or more or less united. Fruit capsular, usually beaked with the distinct summits of the carpels, opening along the inner suture of each, septicidal. Seeds anatropous, usually small and numerous. Embryo straight, in the axis of fleshy albumen: radical cylindrical: cotyledons short.

*Ovary with 2 or rarely more cells and placentæ in the axis, or of as many distinct carpels: fruit capsular or follicular.

1. **Leptarrhena.** Petals 5; stamens 5: carpels 2, distinct, free and exserted from the small calyx.
2. **Peltiphyllum.** Petals deciduous: stamens 10, inserted at the union of the ovary and calyx-tube: carpels distinct, adnate to the tube of the calyx: leaves peltate, radiately veined.
3. **Saxifraga.** Petals deciduous: stamens 10, rarely more, inserted under the ovary: carpels 2, rarely 3, more or less united at base, free from or adnate to the base of the calyx.
4. **Saxifragopsis.** Petals persistent, soon deflexed: stamens 10, inserted at the base of the calyx: carpels united at base, adnate to the lower part of the calyx-tube: leaves palmately veined, the blade obscurely articulated to the petiole.
5. **Sullivantia.** Petals persistent: stamens 5, inserted on the throat of the calyx: carpels united at base, adnate to the tube of the calyx.
6. **Boykinia.** Petals deciduous, stamens 5 or 10, inserted on the calyx-tube at its union with the ovary: carpels united at base and adnate to the calyx-tube.

8. **Bolandra.** Petals 5, linear, persistent: stamens 5, inserted in the throat of the calyx: carpels 2, united at base free from but included in the inflated calyx.

9. **Hemieva.** Petals persistent: stamens 5, inserted on the throat of the calyx: carpels united and wholly adnate to the tube of the calyx: leaves not peltate

* * Ovary 1-celled, with 2-3 parietal or basal placentæ alternate with the styles or stigmas; filaments all antheriferous.

9. **Leptaxis.** Petals 4, filiform, entire, persistent: stamens 2-3, inserted in the throat of the calyx: capsule 2-valved, attenuate below to a stipe, free from the calyx.

10. **Tellima.** Petals 5, deciduous, pectinately lobed or parted: stamens 9 or 10, short, inserted in the throat of the calyx: capsule 2-valved, sessile, adnate to the base of the inflated calyx.

11. **Lithophragma.** Petals 5, deciduous, unguiculate, palmately lobed or entire: stamens 5 or 10, inserted in the throat of the calyx: capsule mostly 3-valved, free or adnate to the base of the calyx.

12. **Mitella.** Petals 5, deciduous, pinnately lobed or parted: stamens 5 or 10, very short, inserted in the throat of the calyx: capsule 2-valved, depressed, adnate to the base of the calyx: inflorescence racemose.

13. **Mitellastra.** Stamens 5, included connivent: petals 5, deciduous, styles 2, recurved: inflorescence cymose.

14. **Tiarella.** Petals 5, entire: stamens 10, inserted at the base of the calyx: capsule very unequally 2-valved, free from the calyx.

15. **Heuchera.** Petals 5, entire, deciduous: stamens 5, inserted in the throat of the calyx: capsule equally 2-valved, the lower half adnate to the calyx.

16. **Chrysosplenium.** Petals always wanting: stamens 8-10, short, inserted in the throat of the calyx: capsule short, equally 2-valved, the lower half adnate to the calyx.

* * * Ovary 1-celled, with 3-4 parietal placentæ directly under as many obtuse sessile stigmas: stamens 5, alternating with as many clusters of united sterile filaments.

17. **Parnassia.** Petals 5, large: calyx 5-parted, free from the ovary: flowers solitary.

1 LEPTARRHENA R. Brown, Parry's 1st voy. Suppl. 273.

Herbs with coriaceous persistent leaves crowded at the base of the nearly naked stems and rather numerous flowers in bracted paniculate racemes. Calyx campanulate, 5-parted, the base adherent to the ovary. Petals 5, entire. Stamens 10, inserted into the tube of the calyx: filaments subulate: anthers 1-celled, 2-valved. Ovary of two nearly distinct carpels, tapering into very short styles. Seeds numerous, ascending, scobiform; the testa loose, elongated and subulate at both ends, including the oval nucleus.

L. pyrolifolia Ser. DC. Prodr. iv, 48. Scape-like stems 8-16 inches high, rigid, a little pubescent or glandular toward the summit, and 1-2 small leaves with sheathing petioles near the base; radical leaves obovate oblong or spatulate, 1-6 inches long, coriaceous, glabrous both sides, coarsely serrate above the middle, attenuate below to a short winged

petiole which is dilated and sheathing at base; cauline similar: petals linear, 1–2 lines long, scarcely longer than the calyx, white: carpels becoming 4–6 lines long, purplish, but slightly divergent. In high mountain marshes, Alaska to Washington and the Rocky Mountains.

2 PELTIPHYLLUM Engler Nat. Pfl. iii, Abt. 2, 61.

Coarse perennial herbs with peltate leaves and rather large flowers in paniculate cymes on scapes that appear before the leaves. Calyx flat, deeply 5-cleft, the very short tube adherent to the base of the ovary. Petals 5, entire, deciduous. Stamens 10, persistent, inserted at the base of the calyx; anthers 2-celled. Carpels 2, distinct, becoming many-seeded follicles with placentæ on the margin. Stigma capitate. Seeds angular, obconic with a loose testa.

P. peltatum Engler l. c. *Saxifraga peltata Torr.* Rootstock large and creeping, 1–3 inches in diameter, branching; scapes and leaves from the ends of scaly branchlets: leaves centrally peltate, at length 6–18 inches in diameter, orbicular, 9–14-lobed and sharply serrate, on stout petioles, 2–4 feet high: scapes rather stout, at length equalling the leaves, striate, more or less hispid with brownish hairs; flowers numerous, in rather large paniculate cymes; calyx-lobes oblong, obtuse, 2 lines long, much longer than the shallow tube; petals round-oval to obovate, 3–4 lines long, white or pinkish, tardily deciduous; filaments subulate with a broad flat base: mature follicles turgid, 3–4 lines long, dehiscent to the base. In mountain streams, central Oregon to California.

3 SAXIFRAGA L. Gen. n. 559.

Herbs with alternate simple leaves, their petioles commonly sheathing at base, and usually rather small flowers in one to many-flowered cymose thyrsoid or panicled clusters. Sepals 5, united at base or nearly distinct, valvate in the bud. Petals 5, inserted on the tube of the calyx, entire. Stamens 10, inserted with or below the petals on the base of the calyx, or between it and a fleshy disk: anthers 2-celled, opening longitudinally. Carpels 2-beaked, rarely 3–6-beaked, as many-celled below, many-seeded, opening by a roundish hole between the diverging beaks. Seeds numerous, smooth or rugose, not winged, the testa mostly thin and conformed to the nucleus.

§ 1 HIRCULUS Tausch Hort. Canal. i. Caudex perennial, leafy: leaves flat, mostly persistent, often bristly ciliate, the margins not punctate nor cartilaginous: flowering stems annual, leafy: sepals united at the base, slightly coherent with the base of the ovary: cilia of the leaves not articulated.

S. bronchialis L. Sp. 572 Stems ascending, slender, producing short branchlets: leaves somewhat coriaceous, narrowly lanceolate, acuminate-cuspidate, sessile with a broad base, finely ciliate, 2–3 lines long, crowded on the short branches: flowering stems 1–4 inches high; flowers solitary or few in an open corymb, on slender pedicels; sepals lanceolate, sub-mucronate, spreading; petals obovate-oblong, white marked with orange spots; capsule opening only half way down, there diverging at right angles. Alaska to Mt. Adams, Washington, and the Rocky Mountains.

S. cherlerioides D. Don Monogr. Saxifr. 382. *S. bronchialis var. cherlerioides Engler.* Cespitose, with many creeping branches and short branchlets forming dense masses 6–18 inches in diameter: leaves spatulate, rounded or obtuse and cuspidate at the apex, finely ciliate, 1–3 lines long, crowded on the short branchlets: flowering stems 2–4 inches long; flowers white, in a loose open cyme on slender pedicels; sepals nearly distinct, ovate, obtuse, glabrous, a line long; petals oblong-obovate, 3-nerved, thrice longer than the sepals; styles connivent in flower. On rocky slopes along the Columbia river near the Cascade falls.

S. tricuspidata Ritz. Prodr. Fl. Scand. ed. 2, 104. Stems erect, thick, 2-3 inches high: leaves densely imbricated below, thick-coriaceous, 3-cuspidate, with cartilaginous points, the margins very slightly ciliate: flowers somewhat corymbose, on short stout pedicels; sepals ovate, somewhat coriaceous; petals obovate-oblong, longer than the sepals: capsule ovoid, apiculate with the conical divergent styles. Arctic America: said to have been found on Mount Hood.

§ 2 DACTYLOIDES Tausch l. c. Caudex perennial, leafy: leaves persistent, the margins not punctate nor cartilaginous: flowering steins annual, somewhat leafy: sepals united at base and coherent with the base of the ovary: ciliæ of the leaves articulated.

S. cæspitosa L Sp. 404 (?). Cespitose, the slender running stems and short branchlets forming dense tufts 6–16 inches in diameter: leaves pale or yellowish, thin, pubescent, spatulate, 2–5-cleft or entire, the segments usually obtuse, closely imbricate on the short branchlets, persistent, flowering stems slender, 2–6 inches high, glandular, 1–5-flowered: calyx cleft to the middle, with oblong acute lobes; petals white, 3–5 lines long, oblong, 3-nerved, rounded above, twice as long as the calyx: capsule open only at the top the slender beaks but slightly diverging. On cliffs and rocky slopes, along the Columbia river near the Cascade falls.

S. Tolmæi T. & G. Fl. i, 567. Cespitose with leafy running diffusely branching stems, forming dense tufts 4–20 inches in diameter: leaves succulent, nearly terete when young, glabrous, sometimes sparingly ciliate near the base, 4–6 lines long, clavate, obtuse, closely imbricated on the slender branches, persistent: flowering stems scape-like, 2–4 inches high, 1-4-flowered; sepals ovate, 3-nerved, about 2 lines long; petals white, narrowly lanceolate, unguiculate, 3-nerved, longer than the sepals; capsule large, 4–5 lines long, ovoid, united only at the base, the acute beaks diverging, sometimes abnormally 3-4-celled. In sand along rivulets on the highest mountains near perpetual snow. Brit. Columbia to California.

§ 3 HYDATICA Tausch. l. c. Caudex perennial, commonly subterranean; stems or scapes annual; calyx nearly free from the ovary; sepals almost distinct, reflexed; filaments more or less dilated upward.

* Leaves all clustered at the crown of a ligneous more or less creeping caudex

S. Lyallii Engler Index Crit. Saxifr. 31. Glabrous: caudex creeping and sparingly branched: leaves obovate, attenuate below to a margined petiole, coarsely toothed at the summit. 6–12 lines long: stems erect, slender, 6–12 inches high, 6–10-flowered; calyx parted nearly or quite to the base, the ovate acute segments soon reflexed, 2 lines long; petals round-obovate, subunguiculate, 1-nerved, but little if any longer than the sepals; filaments flat, broadest in the middle: capsule united only at the base, rarely 3-4-celled, the beaks erect. Along streams, northern Idaho to Brit. Columbia and the Arctic Coast.

Var. laxa Engler l. c. Leaves ovate. the whole margin dentate: panicle 10–12-flowered; pedicels long and slender. With the type.

S. æstivalis Fisch. Ind. Sem. Petr ii, 37. *S. punctata of American authors not L.* Glabrous or somewhat pubescent: caudex short, slightly creeping: leaves reniform to round-cordate, on long slender petioles, coarsely and almost equally many-toothed or somewhat incised, 1–2 inches in diameter: stems erect, 6–18 inches high, bearing many flowers in a loose open panicle; pedicels long and slender; calyx cleft to near the base; sepals narrowly oblong, acute, soon reflexed: petals oblong, obtuse, rather abruptly narrowed below to a short claw; filaments dilated toward the top: capsule oblong, cleft to near the middle. the short beaks abruptly diverging. Along high mountain streams, Alaska to California and the Rocky Mountains.

* * Leaves and stems from the summit of a fleshy or bulb-like caudex.

S. Mertensiana Bong. Veg Sitch. 141. *S. heterantha Hook.* Sparingly pubescent: caudex bulb-like propagating by bulblets in the axils of the leaves; leaves round-cordate, 10–12-lobed, the lobes 2–5-toothed, 1–3 inches in diameter, on petioles severel times longer than the blade: stems erect, 6–12 inches high, often bearing bulblets in the axils of the much branched, many-flowered, open panicle; flowers white, on slender pedicels; petals ovate, attenuate below to a short claw, spreading, white with two yellow spots near the base, 2 lines long, longer than the lanceolate reflexed calyx-lobes: filaments dilated upward; ovary free from the calyx: capsule inflated-ovate. united only at base, the beaks widely divergent in fruit. On wet rocks and cliffs, Alaska to California, west of the Cascade Mountains.

S. Marshalli Greene Pitt. i, 159 Scurffy-pubescent: caudex fleshy, propagating by oblong tubers at the ends of long filiform runners: leaves oval or oblong to ovate, abruptly contracted at base to a broad petiole, obtuse, rather coarsely dentate, 6–20 lines long: stems 6–12 inches high: panicle loose, many-flowered, not bulblet-bearing; flowers on slender pedicels; calyx free from the ovary, cleft to the base, the lanceolate obtusish segments soon reflexed: petals oblong-oval, white with two yellow spots near the base; filaments dilated about the middle. becoming lanceolate on long claws; capsule short, united only at base, the beaks diverging at right angles in fruit. On wet banks, southern Oregon, on the Rogue river, to Humboldt Co., California.

S. Californica Greene l. c. 286. White-pubescent or glandular-tomentose: caudex fleshy, propagating by small oblong tubers at the ends of filiform underground runners: leaves ovate to oblong or elliptical, 1–2 inches long, narrowed below to a broad petiole, the margin from coarsely crenate to repandly denticulate or almost entire, more or less ciliate: stems 6–18 inches high, few–many-flowered; flowers white, on slender pedicels; calyx nearly free from the ovary, divided almost to the base. with oblong rather acute soon reflexed segments; petals white not spotted, elliptical to spatulate, obtuse; filaments flattened but not dilated upward; carpels united only at the base, strongly diverging in fruit. On open hillsides, southern Oregon to California.

S. fragosa Suksdorf, Small Bull. Torr. Club xxiii, 363. Perennial by an ascending or horizontal rootstock that increases by branching at the crown, glandular-pilose with rigid hairs: stems erect or assurgent. 12–18 inches high: leaves ovate or oblong-ovate, entire or repand. 1–2 inches long, abruptly narrowed or truncate at base, decurrent on the winged petiole which is slightly dilated at base, somewhat coriaceous, glabrate: stems 12–18 inches high, erect or assurgent, paniculately branched at the top: flowers white, on slender pedicels, in many-flowered cymules, calyx

broadly campanulate, the tube adnate to the ovary, the lobes triangular or triangular-ovate, obtuse, 3-nerved, about a line long, at length reflexed; petals obovate, obtuse or notched at the apex, nearly 2 lines long, strongly 3-nerved, the lateral nerves arising below the middle and converging toward the apex; filaments subulate, shorter than the petals; carpels flat, surrounded by a disk, becoming globose-ovoid, nearly distinct follicles 2–3 lines long, the short beaks strongly diverging: seeds obovoid, more or less pointed at both ends. On wet cliffs along the Columbia and Willamette rivers.

S. claytoniæfolia Canby, Small l. c. 365. Perennial by a short horizontal rootstock, slender, glandular-pilose above, glabrate below: leaves fleshy, orbicular-elliptic, more or less oblique, 3–4 inches long, glabrate, obtuse, entire, undulate, palmately 6–8-nerved, narrowed into a winged ribbed petiole which is as long as the blade or longer: stems erect or assergent 8–12 inches high, glabrate near the base; inflorescence thyrsoid-corymbose, its branches subtended by small linear or linear-oblong bracts: calyx flattish, 1 line high, its lobes spreading and recurved, thin, oblong, acute, 3-nerved, longer than the tube; petals white, spatulate or obovate-spatulate, about 1 line long, slightly emarginate or minutely apiculate, gradually narrowed into a claw, marked with a stout mid-nerve which gives off two lateral nerves about the middle; filaments subulate, shorter than the petals, incurved at the summit; carpels each ovoid, 1½ lines long, the short stout beaks strongly diverging; seeds irregularly oblong, reddish, smooth or very faintly striate. Damp crevices of rocks, The Dalles, Oregon.

S. nidifica Greene Eryth. i, 222. "Near *S. integrifolia*, but crown and roots imbedded in a dense subglobose mass of small bulblets: leaves ovate or obovate, entire or merely denticulate, an inch long, on dilated petioles rather shorter: scapes 8–12 inches high, stoutish, glandular-hirsute: cymes several-flowered and pedicillate, forming a thrysoid panicle toward the summit: calyx-segments ascending, oblong-ovoid, acutish and mucronulate: petals round-obovate, not unguiculate, white: filaments very short; anthers dull red: ovary very broad at summit, depressed and even slightly concave: carpels not known." In wet springy places, eastern Washington to the Sierra Nevada Mountains of California.

S. plantaginea Small l. c. "Perennial by a thick rootstock, stout, scapose, glandular-pilose: leaves elliptic or elliptic-spatulate, 2–4 inches long, obtuse, undulate or distinctly and shallowly toothed, leathery, ciliate, 5–7-ribbed, narrowed into a winged petiole, which is usually much shorter than the blade: scape erect, 8–10 inches tall, sparingly branched near the top, the branches subtended by elliptic bracts; flowers greenish; in dense cymules; calyx flat, its segments ovate, 2 lines long, obtuse, 3-nerved, longer than the tube; petals suborbicular-oblong or some inclined to be broadly spatulate, 1–2 lines long, greenish, shorter than the calyx-segments, obtuse, marked with a midnerve and several branches, narrowed into a broad claw; filaments converging, subulate, shorter than petals; ovaries immersed in a lobed disk, fruit not seen." Spokane, Washington.

S. intergrifolia Hook Fl. i, 249, t. 86. Glandular-pubescent throughout; leaves and stems from a somewhat woody caudex: leaves ovate to oblong or lanceolate, usually obtuse, entire or slightly sinuate-crenate, somewhat membranaceous; stems 6–20 inches high, rather stout: flowers many, in an elongated panicle, on short pedicels, clustered at the ends of the branchlets of the narrow panicle; petals white, obovate, twice the length of the glabrous spreading sepals; filaments short, subulate; ovary free: styles divergent: carpels united only at the base. In moist prairies and wet places, Washington to California.

S. parvifolia Greene Pitt. iii, 116. Stems stoutish, 6–16 inches high, from a small somewhat woody caudex, pubescent with coarse glandular hairs: leaves ovate, obtuse, entire or slightly toothed, 6–10 lines long, on winged petioles as long or longer, somewhat fleshy, glabrous: branches of the panicle each cymosely 3–5-flowered; calyx cleft to the middle into deltoid erect segments; petals white, spatulate-oblong, obtuse; nearly 2 lines long, more than twice as long as the calyx; filaments filiform; anthers orbicular; mature carpels red, united to near the middle, adnate to the tube of the calyx, only the beaks divergent. On damp open hillsides about Grants Pass, Oregon.

S. Oregana Howell Eryth. iii, 34. Canescently pubescent: leaves and stem from a thickened fleshy caudex: leaves spatulate to lanceolate, 1–8 inches long, obtuse, obscurely repand-dentate, sessile or attenuate below to a broad petiole: stem stout, 1–4 feet high, leafless, branched near the top, the branches subtended by linear-lanceolate mostly cuminate bracts; flowers in dense cymules, sessile or nearly so; calyx adnate to the base of the ovary, cleft to the middle, with short triangular obtuse or acute at length reflexed segments; petals yellowish-white, 2 lines long, oblong, attenuate below to a short claw; filaments subulate, half as long as the petals: carpels distinct or nearly so, diverging, the short beak at length bent at a right angle; seeds oblong. In marshes and about springs, Washington and Oregon.

§ 5. ARABIDIA Tausch. l. c. Caudex above the ground scarcely any: stems annual, mostly leafless: calyx free from the ovary; the sepals nearly distinct: petals with slender claws, often unequal: filaments filiform: seeds longitudinally striate.

S. Nutkana Mog. Engler Monog. Sax. 135. Pubescent: stems and leaves from the crown of a small fleshy caudex: leaves cuneate-spatulate, sessile or some of the outer ones attenuate below to a broad petiole, 10-[illegible] lines long, unequally ciliate, rather coarsely dentate above the middle: stems 3–12 inches high, paniculately branched above, bearing numerous propagula in the axils of the floral bracts; flowers numerous, in a lax usually secund panicle; calyx free from the ovary, cleft to the base; sepals broadly lanceolate, acute, very early reflexed, barely a line long; petals white, with a yellow or red spot at the base of the blade, somewhat unequal, lanceolate, long-clawed; filaments clavate, as long as the petals; carpels lance-ovate, united to above the middle, the short slender beaks erect. In moist places on the highest mountains, Alaska to Oregon.

S. reflexa Hook. Fl. i, 249, t. 85 Canescently pubescent: leaves ovate, rather coriaceous, opaque, incisely serrate, attenuate into a petiole: stem naked; panicle glabrous, compact, corymbose; petals obovate, marked with two orange spots, scarcely twice the length of the obtuse reflexed calyx-segments; filaments dilated upward or petaloid, often abortive; ovary free from the calyx Northeastern Washington and Idaho to the Arctic Sea shore.

S. occidentalis Watson Proc. Am. Acad. xxiii. 264. Leaves somewhat fleshy, 6–18 lines long, roundish to oblong or ovate, coarsely dentate, contracted below to a short petiole, tomentose beneath with red or reddish hairs, smooth above: stems 2–1[illegible] inches high, more or less pubescent with glandular; flowers numerous, in [illegible]newhat corymbose cyme: calyx free from the ovary, cleft nearly or [illegible] to the base, the oblong or ovate obtuse segment not reflexed; petals white, oblong-obovate, obtuse, twice as long as the sepals; filaments slender-subulate about equalling the sepals; carpels lanceolate, united below, the stout beaks divergent: seeds oblong, apiculate at one or both ends, with a loose smooth testa. Common on wet rocks, Brit. Columbia to California.

S. Howellii Greene Pitt. ii, 163. Leaves thin, less than an inch long, oblong to obovate, tapering to a rather long slender petiole, coarsely dentate, smooth both sides: stems 3–6 inches high: flowers rather few, in a loose corymbose cyme: calyx free from the ovary, cleft nearly to the base, the narrow oblong segments obtuse or acutish, spreading in flower; petals oblong, obtuse, but little longer than the sepals, the claw very short or obsolete; filaments filiform, as long as the petals: seeds obscurely tuberculate, the testa loose at the ends. On wet banks along the Coquell river, Oregon.

§ 6. NEPHROPHYLLUM Gaud. Fl. Helvet. iii, 103. Caudex above the ground none: stems annual, leafy; bracts at the base of the pedicels often geminate: calyx free or adnate to the base of the ovary; the sepals erect or spreading: filaments subulate.

S. Nuttallii Small Bull. Torr. Club xxiii, 368. *S. elegans Nutt. not Sternb.* Annual, smooth or nearly so: stems slender, leafy, simple or branched, 2–12 inches high: leaves rotund to ovate or lanceolate, contracted below to a short petiole, 2–6 lines long, entire or with one or two coarse teeth toward the apex; flowers white in open few-flowered racemes on long slender pedicels; calyx campanulate, with short erect triangular acute lobes, the tube coherent to the lower half of the ovary in fruit: petals oblong, obtuse, 2–3 lines long, more than twice the length of the calyx; carpels united to the middle, the slender beaks diverging: seeds striate with scabrous ridges. On wet banks and cliffs at Oregon City and other places in western Oregon.

4 SAXIFRAGOPSIS Small Bull. Torr Club xxiii, 19.

"Low caulescent cæspitose, sparingly glandular-pilose plants perennial by woody rootstocks. Stems straw-like, rather slender, not fleshy, sparingly leafy. Leaves alternate, membranaceous, the blade articulated to the petiole and not decurrent: petiole wiry, dilated into a scarious ribbed base. Inflorescence consisting of a terminal thyrsoid-panicle, its cymules peduncled, subtended by small bracts: pedicels usually bearing several opposite or nearly opposite bractlets below the flower. Calyx hemispheric, its tube ribbed, united to the ovary, its segments 5, unequal in size and shape, reflexed. Petals 5, inserted just below the sinuses of the calyx-tube, long-clawed, at length deflexed. Stamens 10, converging; filaments inserted at the base of the calyx-segments, dilated below into two thin wings; anthers sagittate, 4-angled. Ovary very short when young, soon elongating, immersed in a glandular disk; placentæ central. Follicles slender, the bodies united, the tips erect. Seeds minute, smooth, somewhat curved."

S. fragarioides Small l. c. 20. *Saxifraga fragarioides Greene.* Cespitose, the short, much branched woody caudex leafy at the ends: leaves thin, broadly cuneate to oblong, coarsely dentate above the middle, sparingly pubescent both sides, 8–14 lines long, on slender petioles as long or longer than the blade: flowering stems 3–10 inches high, slender, glandular-pubescent, leafy; flowers numerous, in an elongated panicle; calyx hemispheric; its segments longer than the tube or at length shorter, ovate, acute, obtuse, reflexed, a line long; petals oblong-spatulate or spatulate, persistent, white, ⅓ longer than the calyx-lobes, at length reflexed: capsule cleft to the middle, the slender beaks slightly diverging. On dry cliffs in the Siskiyou Mountains, Oregon and adjacent California.

5 SULLIVANTIA T. & G.

Slender herbs with running roots, palmately veined leaves and small flowers in paniculate cymules. Calyx campanulate, coherent with the base of the ovary, 5-cleft. Petals 5, broad, entire, alternate with the calyx-lobes, withering-persistent. Stamens 5, shorter than the petals. Ovary 2-celled, with the placentæ in the axis, many-ovuled: carpels united to the middle, the beaks flat and early open down the inner side. Seeds numerous, wing-margined.

S. Oregana Watson Proc Am. Acad. xiv. 292. Smooth below, pubescent and glandular above: stems slender, 3–10 inches high, sparingly leafy, from slender running rootstalks: propagating by long filiform runners: leaves round-cordate, 1–2 inches in diameter, laciniately cut and toothed, on long petioles with dilated scarious base: flowers numerous, in an elongated panicle: calyx campanulate; with acute triangular lobes; petals white, oblong-ovate, obtuse, a half longer than the calyx-lobes, somewhat cuneate at base: carpels membranaceous, the beaks exserted and slightly diverging in fruit: seeds oblong, dark brown and shining, narrowly winged. On wet cliffs along the Columbia river near the Cascades, and at Elk Rock on the Willamette.

6 BOYKINIA Nutt. Jour. Acad. Philad. vii, 113.

Perennial herbs with creeping caudex, alternate leaves with dilated stipule-like base and corymbose cymes of white flowers. Calyx campanulate, adnate to the lower part of the ovary, the tube at length urceolate, the limb spreading, valvate in the bud. Petals 5, entire, deciduous. Stamens 5, inserted in the throat of the calyx, shorter than its segments: anthers 2-celled. Styles 2-3, short: stigmas simple. Capsule 2–3-celled, with a central many-seeded placentæ, 2–3 beaked, dehiscent between the beaks. Seeds small, ovoid, with a close somewhat crustaceous testa, very minutely and evenly papillose.

B. major Gray Bot. Cal. i, 196. Sparingly pubescent; glandular above: stems stout, 1–3 feet high, from a creeping lignious caudex: leaves round-reniform, deeply 5–7-lobed, the lobes irregularly toothed and cut, 2–8 inches in diameter, the lower on long slender petioles with merely enlarged base, the upper similar but smaller, on shorter petioles with foliaceous stipular base: flowers many, in a corymbose at length elongated cyme: calyx campanulate, the lower half of the tube coherent with the ovary, enlarging and becoming urceolate in fruit; petals white, rounded above, little longer than the triangular acute erect calyx-lobes: carpels united above the middle, erect, the tips of the beaks divergent in fruit. In mountain streams, Oregon and California.

B. occidentalis T. & G. Fl i, 577. Sparingly pubescent with fuscous hairs: stems rather slender, erect or declined, 1–2 feet high, from a creeping somewhat woody caudex: leaves round-cordate, incisely 3–9-lobed, the lobes 3–5-toothed, 1–2 inches in diameter, all on slender petioles with dilated ciliate base: flowers numerous, in elongated paniculate cymes; calyx campanulate, adherent to the lower half of the ovary, enlarging and becoming urceolate in fruit; petals white, early deciduous, spatulate, narrowed below to a long claw, 2–3 lines long, much longer than the acuminate calyx-lobes: carpels united to the middle, the long slender beaks slightly diverging. Common along mountain streams, western Washington to California.

7 BOLANDRA Gray Proc Am. Acad. vii, 341.

Perennial herbs with palmately veined, thin leaves and loose panicles of purple flowers. Calyx broadly campanulate, 5-lobed, valvate in the bud, the tube free from the ovary. Petals 5, linear, entire, inserted in the throat of the calyx and alternate with its lobes, persistent. Stamens 5, alternate with the petals: filaments filiform: anthers cordate, 2-celled. Ovary included in but wholly free from the inflated calyx, many-ovuled with the placentæ in the axis: stigma truncate. Capsule membranaceous, ovate, with a broad 2-celled base. Seeds numerous, with a rather loose testa.

B. Californica Gray l c. Stems 6–18 inches high, weak and ascending apparently from a filiform rootstock, granulate-bulblet-bearing at the base of the stem, glabrous or nearly so: leaves alternate, membranaceous; the lower round-reniform, 1–2 inches in diameter, about 5-lobed, on long-filiform petioles; the upper sessile or clasping, merely incised or few-toothed, gradually reduced upward to small ovate or lanceolate bracts, borne on or subtending the slender 1-flowered somewhat paniculate peduncles: petals dull purple, attenuated, 2 lines long. On wet rocks near the Yosemite falls, California, said by Mr. Wheelock to have been found in Oregon.

B. Oregana Watson Proc Am Acad. xiv, 292. Minutely-pubescent and glandular, at least above, stems slender, 6–20 inches high, from a small bulbiliferous caudex: lower leaves round-reniform, incisely lobed and toothed, 1–3 inches in diameter, on long slender petioles with dilated stipule-like base: the upper similar but smaller, gradually passing into sessile bracts: flowers rather numerous, in loose panicles, on slender pedicels; calyx inflated, campanulate, becoming urceolate, the tube 3–4 lines long, the subulate acuminate lobes, as long as the tube; petals dark purple, filiform, 6 lines long or more; filaments a line or more long: capsule ovate, the long acuminate beaks but slightly diverging, included in the calyx; carpels united to the middle. On wet cliffs along the Columbia river near the Cascades.

8 HEMIEVA Raf. Fl. Tell. ii, 70.

SUKSDORFIA Gray Proc. Am. Acad. xv, 42.

Low herbs with small bulb-like caudex, round lobed leaves and few flowers in loose paniculate cymes. Calyx campanulate, the tube coherent with the ovary, the 5 erect lobes imbricate in the bud. Petals 5, alternate with the calyx-lobes, persistent. Stamens 5, alternate with the petals. Ovary 2-celled, many-ovuled, with the placentæ in the axis. Stigma truncate.

H. ranunculifolia Raf. l. c. *Saxifraga ranunculifolia Hook.* Pubescent and glandular: stems erect, 6–12 inches high, from a small bulb-like caudex, propagating by bulblets in the axils of the lowest leaves: lower leaves round-cordate, 6–12 lines in diameter, 3-lobed, the lobes 3–9-toothed, on long petioles with dilated base, upper ones similar, on short petioles, or reduced to oblong or lanceolate bracts: flowers white, in a loose open or short capitate cymouse panicle; calyx campanulate, cleft to about the middle, with oblong acute erect lobes; petals oblong, acute, attenuate below to a short claw, 3–4 lines long; stamens 5, filaments less than a line long: carpels united only near the base, the beaks diverging. On wet cliffs on the highest mountains, Brit. Columbia to Oregon.

H. violacea Wheelock Bull. Torr. Club xxiii, 71. *Suksdorfia violacea Gray.* Viscid-pubescent throughout: stems slender, 6–10 inches high, from a small bulb-like caudex which is covered with bulblets that are borne in the axils of the radical leaves: lower leaves round-cordate, crenately lobed and toothed, on slender petioles with scarious dilated base, upper ones obovate, 3–5-lobed, on short petioles with foliaceous stipular base: petals violet, entire or sometimes 2-3-lobed, spatulate, attenuate below to a long claw, 5-6 lines long, much longer than the acuminate at length connivent lobes of the calyx: capsule oblong; carpels united to near the top, the short beaks diverging: seeds oblong, with a close light-colored testa. On moss-covered rocks, along the Columbia river near Viento Oregon and on the opposite side of the river near the mouth of the White Salmon river.

9 LEPTAXIS Raf. Fl. Tel. ii. 75.

TOLMIEA T. & G. Fl. i, 582; not Hook.

Perennial herbs with cordate leaves on long petioles bearing a bud at the base of the blade, and simple stems with long ebracteate racemes of purple flowers on short pedicels. Calyx cylindrical, free from the ovary, unequally 4-cleft, the tube split down the lower side and gibbous at base, imbricate in the bud. Petals 4, filiform, entire, inserted between the lobes of the calyx, persistent. Stamens 8, scarcely exserted, inserted into the throat of the calyx opposite the three larger lobes: filaments subulate, unequal: anthers reniform, 2-celled, the cells confluent at the apex. Ovary stipitate at base, 1-celled, with two parietal placentæ; stigma obtuse. Capsule 1-celled, many-seeded, 2-valved at the apex, the valves equal. Seeds small, globose, muricate-hispid.

L. Menziesii Raf. l. c. 76. *Tolmiea Menziesii T. & G.* Hispid-pubescent throughout: stems clustered, 1–3 feet high, from a creeping branched caudex: leaves cordate, acute, obscurely lobed and repandly cuspidate-toothed, ciliate, 1–4 inches long, the lower on long petioles, the upper ones with petioles successively shorter until they become sessile bracts: racemes many-flowered, elongated; calyx cylindraceous, purple-veined, the upper lobes oblong, obtuse, the lower one narrow, acuminate, shorter; petals brown, filiform, somewhat dilated in the middle, recurved; filaments subulate, the upper one inserted lower down on the tube of the calyx than the other 2: capsule oblong, 2-valved, the valves beaked with the indurated styles, the valves spreading in age. Common along mountain streams from Brit. Columbia to California.

10 TELLIMA R. Br. App. Frankl. Journ. 765.

Perennial herbs with roundish-cordate leaves on petioles with dilated and somewhat stipuliform base and rather large flowers in elongated simple somewhat spicate racemes. Calyx campanulate, obconic and coherent with the ovary at base, free and inflated above, 5-toothed, valvate in the bud. Petals 5, inserted in the throat of the calyx, laciniate-pinnatifid, deciduous. Stamens 5 or 10, inserted on the tube of the calyx; anthers 2-celled, ovate. Styles 2, short and distinct: stigmas capitate, obscurely 3-lobed. Capsule 1-celled with 2 parietal many-seeded placentæ, 2-beaked, opening between the beaks. Seeds horizontal.

* Stamens 10.

T. Grandiflora R. Br. l. c. 759. Hispid-pubescent throughout, glandular above: stems clustered, 1–2 feet high, from stout short tufted rootstocks: leaves round-cordate, 2–4 inches in diameter, 3–9-lobed, the lobes coarsely toothed, prominently reticulate-veined, on long petioles with scarcely dilated base, the few cauline ones smaller and nearly sessile: flowers not fragrant, on short reflexed pedicels: calyx 4 lines long, thick-cylindraceous, with turbinate tube and short triangular erect lobes, inflated, coherent with the ovary only at the base; petals lanceolate in outline, laciniately cut into long filiform segments, abruptly narrowed below to a short claw, soon bent at the lower third, the upper part closely reflexed, bright red; styles short, persistent, with broad flat stigmas, approximate: capsule ovate, open at the top, the indurated styles divergent in fruit: seeds oblong, tuberculate. Common in moist woods, Brit. Columbia to California.

T. odorata. Coarsely pilose below, glandular-pubescent above: stems rather slender, clustered, 1–2 feet high, from a multiceptal caudex: leaves broadly cordate, acute, obscurely lobed and crenately toothed, 1–3 inches long, on long petioles with dilated scarious base, the few cauline ones smaller and nearly sessile: flowers fragrant, numerous, on short pedicels in a long terminal raceme; calyx campanulate, the inflated tube 3–4 lines long, coherent with the lower half of the ovary, the oblong erect lobes about half as long as the tube: petals red, lanceolate in outline, laciniately cut into long filiform segments, narrowed below to a long claw, bent at the middle, the upper half spreading or at length loosely reflexed; styles short, with broad capitate stigmas: capsule elliptical, the very short styles divergent in fruit: seeds oblong, rough tuberculate. In wet places and springs, along the Columbia river near the Cascades to Southern Oregon.

* Stamens 5.

T. racemosa Greene Eryth. iii, 55. *Heuchera racemosa Watson.* "Glandular-hispid, leaves reniform-cordate, crenately lobed and toothed, 1 or 2 inches broad: flowering stems 4–10 inches high, bearing 2 or 3 petiolate leaves and a loose few (6–15) flowered raceme; pedicels short (a line long or less): calyx very broadly campanulate, 2 (becoming 3) lines long, acutely lobed; petals glandular, linear, entire and acuminate or more or less laciniately toothed toward the top, a little exceeding the calyx-lobes: stamens 5, very short, opposite to the calyx-lobes: styles very short; capsule sub-globose, very shortly beaked: seeds very numerous, brownish, with wrinkled testa, not muricate." On cliffs of Mount Adams Washington at 7–8000 feet altitude. *Suksdorf.*

11 LITHOPHRAGMA Nutt. Journ Acad. Phila vii, 26.

Small and slender herbs with fibrous at length grumous roots, 3–5-parted or lobed leaves on petioles with stipuliform base and rather large flowers in simple few-flowered racemes. Calyx cyathiform or campanulate, coherent with or free from the lower part of the ovary: the limb short, 5-cleft, valvate in the bud. Petals 5, inserted in the sinuses of the calyx just below the margin, cuneiform, unguiculate, much exserted, 3-cleft, or rarely entire, deciduous. Stamens 10, inserted in the throat of the calyx: anthers cordate, 2-celled. Styles 2–3, short; stigmas obtuse or somewhat dilated. Capsule 1-celled with 2–3 parietal many-seeded placentae, 2–3 valved at the apex. Seeds horizontal, ovate, with a distinct raphe; the testa smooth and membranaceous.

L. campanulata. Minutely pubescent below, glanular above: stem slender, 12–20 inches high: radical leaves round-cordate, 3-lobed, the lobes coarsely 3–5-toothed, 8–12 lines in diameter, on long, slender petioles with a bulblet in the axil of each; cauline usually only one, similar or more deeply lobed: flowers few, very remote, on short pedicels; calyx campanulate, 3–4 lines long, with rounded base and short, triangular, acute teeth; petals incisely 3–5-lobed, white to pink, broadly ovate, 6 lines long, narrowed below to a filiform claw: capsule conical, divided nearly to the middle. On high open ridges of the Siskiyou mountains near the Oregon boundary.

L. parviflora Nutt. T. & G. Fl. i, 584. *Tellima parviflora Hook.* Roughish hirsute or scabrous-pubescent: stems slender, 8–20 inches high: radical leaves round-cordate, deeply 3–5-lobed, the lobes coarsely toothed, 6–10 lines in diameter, on slender petioles 1–4 inches long; cauline leaves usually 2, trifoliolate, leaflets deeply 3-lobed, the lobes 2–3-toothed; flowers few, in a subcapitate at length elongated raceme; calyx obconical, with triangular acute lobes; petals white or pinkish, deeply 3-cleft into linear or oblong lobes, attenuate below to a slender claw, 4–6 lines long, capsule oblong, often 3-valved, open only at the top. Common in moist or shady places, Brit. Columbia to California and Colorado.

L. tenella Nutt. T. & G. Fl. i, 584. *Tellima tenella Walp.* Roughish with a minute glandular pubescence: stems slender, branching from the base, 4–12 inches high: leaves trifoliolate: leaflets 2–3-parted, with cuneiform 2–3-lobed segments: flowers few, in a capitate at length elongated often bulblet bearing usually simple raceme; calyx campanulate, 2 lines long, with very short triangular teeth; petals pink, 6 lines long, irregularly 3–7-parted into mostly linear-lanceolate, acute divisions: capsule almost free from the calyx, elliptical, usually 3-valved opening ¼ its length from the top: seeds short-oblong, rough-tuberculate. Common on prairies, Brit. Columbia to California and Colorado.

L. rupicola Greene Eryth. iii, 102. "Stems often 2 or 3 from the small grumous root, not very slender, a foot high or more, rather strongly hispidulous-scabrous throughout: lowest leaves from round-reniform to round-ovate in outline, deeply 3–5-lobed, the lobes again 3-lobed; petioles long, each with a large bulblet in its axil; cauline leaves of more angular outline, doubly cleft into narrow segments: racemes elongated, 12–20-flowered; fruiting pedicels nearly twice the length of the calyx: hemispherical base of the calyx adherent to the ovary, the body in maturity obviously 10-striate, the lobes short and obtuse: petals white, all deeply palmatifid, the 2 upper much smaller than the others: capsule 3-valved at the apex and the valves well exserted: seeds striate lengthwise but neither muriate nor obviously granular. Lava beds of Modoc Co., California, growing in the shade of Junipers." Perhaps in adjacent Oregon.

12 MITELLA L. Gen. n. 561.

Perennial herbs with mostly radical leaves, slender stems and small flowers in simple spicate racemes. Calyx 5-cleft, short-campanulate, more or less coherent with the ovary. Petals 5, lobed or pinnatifid, inserted into the throat of the calyx, deciduous. Stamens 5 or 10, not exserted; anthers cordate or reniform, 2-celled. Styles 2, short and distinct. Capsule 1-celled, with 2 parietal or somewhat basal many-seeded placentæ, 2-valved at the summit. Seeds obovoid, horizontal or ascending, smooth and shining.

* Stamens 5, alternate with the petals.

M. Breweri Gray Proc. Am. Acad. vi, 533. Sparingly pubescent with long crisp brownish hairs: scapes slender, 4–8 inches high: leaves round-cordate to reniform, obscurely 3–5-lobed, irregularly crenately toothed, with callous-apiculate teeth, 1–3 inches in diameter, on petioles 3–4 inches long that are subtended by scarious ciliate brownish bracts: racemes 4–20-flowered: flowers on short spreading pedicels subtended by minute scarious bracts; calyx short-campanulate, with short and rounded somewhat scarious lobes, petals greenish-yellow, pectinately pinnate with 3–5 filiform pinnæa; stigma distinctly 2-lobed. On the highest mountains, Brit Columbia to California.

M. ovalis Greene Pitt. i, 32. Pubescent with long whitish hairs: scapes 6–18 inches high: leaves oblong-cordate, obscurely 5–7-lobed, repandly toothed, 6–18 lines long, on rather stout petioles 1–4 inches long: flowers numerous, on short erect pedicels that are subtended by minute scarious bracts, often two or three together on a short peduncle and thus somewhat paniculate; calyx saucer-shaped, its short rounded lobes greenish-yellow; petals pectinately pinnate, with 3–5 rather short and distant pinnæa; filaments subulate, inflexed; stigma slightly 2-lobed [illegible]ng mountain streams in wet places, Brit. Columbia to California.

M. trifida Graham Edinb. New Phil. Journ. 185. Sparing[illegible] cent with coarse whitish hairs: scapes slender, 6–18 inches hig[illegible] stout rootstock: leaves broadly cordate to reniform, 12–18 lines [illegible]re nately toothed, ciliate: flowers several, in a short secund somewhat circinate raceme, on very short pedicels subtended by scarious white bracts: calyx campanulate, its oblong or triangular acute lobes white and petal-like, glabrous; petals ovate, on long slender claws, 3-toothed or 3-parted at the apex; stigma 2-lobed. On the high mountains of Washington and Oregon to the Rocky mountains.

* * Stamens 5, opposite the petals.

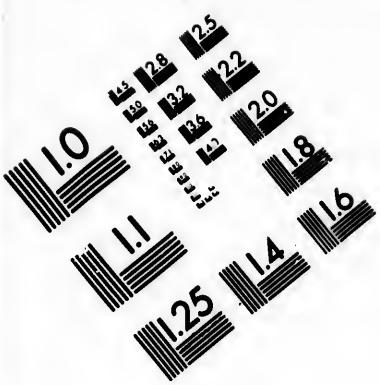
M. pentandra Hook. Bot. Mag. t. 2938. Sparingly pubescent with short white hairs: scapes slender, 6–12 inches high: leaves cordate to round-reniform, obscurely 3–5-lobed, unequally serrate, an inch or more in diameter: flowers numerous, in a subpaniculate raceme, calyx short-campanulate, its very short obtuse lobes green; petals pinnate with 7–9 approximate filiform pinnæa; filaments very short, inflexed. In wet places, on the highest mountains. Alaska to Oregon and the Rocky mountains.

13 MITELLASTRA.

MITELLA § MITELLASTRA T. & G. Fl. i, 586.

Low herbs with alternate leaves without stipules and small flowers in spicate cymes. Calyx short-campanulate, 5-cleft, coherent with the base of the ovary. Petals 5, pinnatifid, inserted into the throat of the calyx. Deciduous. Stamens 5, not exserted, alternate with the petals. Styles 2, short and distinct. Stigmas simple. Capsule 1-celled with 2 parietal many-seeded placentæ, 2-valved. Seeds black and shining.

M. caulescens. *Mitella caulescens Nutt.* Retrorsely hispid and minutely scabrous, especially on the petioles and stems: stems simple, solitary, slender, bearing 1–3 leaves with 1–2 scarious bracts below them, 6–12 inches high, from a scaly slender caudex, propagating by long filiform runners: leaves broadly cordate, 3–5-lobed, the lobes crenately apiculate-toothed, 1–2 inches in diameter: flowers numerous, in a long slender simple cyme, on long slender pedicels, reflexed in bud, soon spreading or erect; calyx saucer-shape, its lobes ovate, colored and petal-like; petals pectinately pinnatifid with 7–9 filiform pinnæa; filaments subulate, nearly



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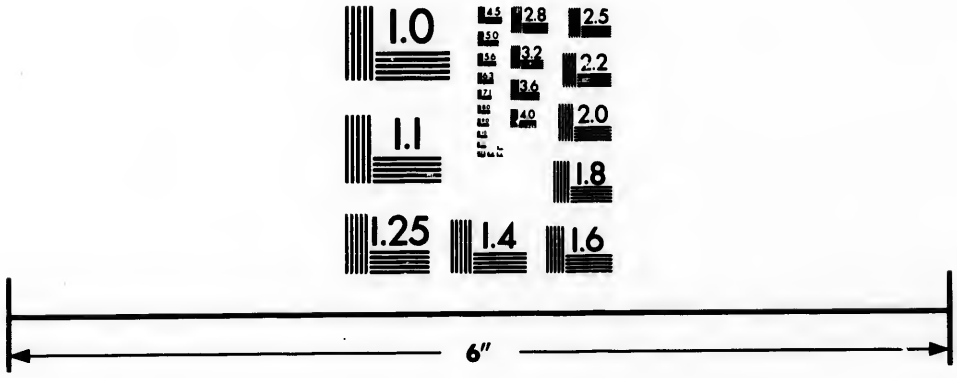

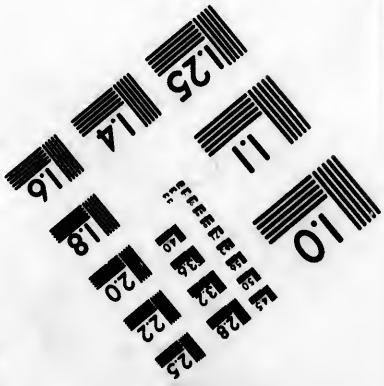

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a line long, connivent over the recurved styles: capsule globose nearly free from the calyx Common along mountain streams at low elevations. Brit. Columbia to Oregon.

14 TIARELLA L. Gen. n. 560.

Perennial herbs with simple or trifoliolate leaves and small white flowers in simple or paniculate racemes. Calyx campanulate, nearly free from the ovary, 5-parted, white and petal-like, valvate in the bud. Petals 5, entire, small, with short claws, in ours persistent. Stamens 10, inserted with the petals into the base of the calyx: filaments filiform, exserted, the 5 opposite the sepals longest: anthers ovate, 2-celled: styles 2; stigmas simple. Capsule 1-celled, with 2 parietal placentæ, 2-valved, the valves very unequal. Seeds rather large, subglobose, smooth and shining.

T. trifoliata L. Sp 406. Softly hirsute: stems slender, ascending, 6–12 inches high, from slender creeping rootstocks: leaves trifoliolate, the middle leaflet ovate with cuneate base, slightly 3-lobed; the lateral ones oblique, 2-lobed, all coarsely and repandly apiculate-dentate, on slender petioles: flowers numerous, in an elongated narrow panicle: calyx cleft nearly to the base, the lanceolate lobes about a line long, acute; petals filiform, nearly twice as long as the calyx; filaments filiform, as long as the petals; valves of the capsule membranaceous, tipped with the slender persistent styles, the larger one 6 lines long, more than twice as long as the other. Common in forests, Alaska to California.

T. laciniata Hook. Fl. i, 239, t. 77. Scabrous-hirsute: stems about 3-leaved: leaves trifoliolate, the terminal leaflet deeply 3-cleft, the lateral ones 2-cleft, the segments broadly lanceolate, laciniate-pinnatifid: panicle loose: petals filiform and resembling the filaments. Vancouver Island to Washington.

T. unifoliata Hook. l. c. 238 t. 81. Sparingly pubescent or nearly glabrous: stems slender, erect or ascending, 6–16 inches high from slender running rootstocks: leaves simple, cordate, acute, obscurely 5–7-lobed, coarsely apiculate-dentate, 1–3 inches in diameter, on long slender petioles: flowers numerous, in a narrow panicle; calyx cleft to near the base; petals filiform, twice the length of the rather obtuse oblong-ovate calyx-lobes: valves of the capsule merely convex, the largest one oblong, acute, 5 lines long, twice as long as the other. Common in the forests of the high mountains, Alaska to California.

15 HEUCHERA L. Gen. n. 320.

Perennial herbs with mostly radical palmately veined leaves with partly free stipules and rather small flowers in terminal panicals or spikes. Calyx campanulate, coherent with the ovary below, 5-cleft, the segments imbricate in the bud. Petals 5, sometimes wanting, small, entire. Stamens 5, inserted alternately with the petals into the throat of the calyx; anthers 2-celled; styles 2; capsule 1-celled with 2 parietal placentæ, many-seeded, 2-beaked, dehiscent between the beaks; seeds horizontal, oval, minutely muriate or hispidulous.

* Filaments and styles filiform, much exserted: calyx short obconic or campanulate, the lobes spreading, equal: petals mostly persistent, at length often revolute or twisted: panicle effuse.

H. glabra Willd. Roem. & Schult. Syst. vi, 216 Glabrous: stems 1-3-leaved, 12-20 inches high, clustered at the ends of a much branched caudex: leaves roundish-cordate, acurately and irregularly lobed and doubly serrate, sparingly ciliate, 2-4 inches broad; on slender petioles 6-10 inches long; flowers numerous in an open cymulose panicle; calyx glandular-pubescent; 2 lines long, cleft to the middle, the oblong obtuse lobes about as long as the tube; petals white, little more than a line long, about equalling the stamens with ovate-lanceolate blade and long slender claw, recurved; styles at length much exserted: seeds oblong or oval, minutely hispid in lines. On cliffs and rocks along streams, Alaska to the highest peaks of the Cascade and Rocky mountains.

H. micrantha Dougl. Lindl. Bot. Reg. xv, t. 1302. Pilose with long crinkly hairs below: stems nearly naked, 1-2 feet high, from the ends of slender creeping rootstocks: leaves round-cordate to reniform, 1-3 inches broad, slightly and obtusely lobed, mucronulately crenate, ciliate, on slender pedicels 2-8 inches long; panicle diffuse, many-flowered; flowers small, on slender pedicels, in small dichotomous cymules; calyx turbinate, the rounded lobes about equalling the tube; limb of the petals linear-lanceolate as long as the claw, soon curled or twisted: styles slender, long exserted: capsule ovate-lanceolate, at length exserted, the slender beaks erect. Common on rocky banks and cliffs, Brit. Columbia to California.

* * Filaments and styles subulate, short: calyx campanulate, the lobes equal: flowers small, in narrow panicles.

H. cuneata. Smooth or the leaves and inflorescence minutely pubescent: stems slender, 6-18 inches long, leafless but with a few ovate ciliate sessile bracts below: leaves elliptical to ovate or oblong, more or less cuneate at base, 6-12 lines long, obscurely 3-5-lobed, coarsely serrate and ciliate: flowers rather numerous, on short pedicels; calyx purplish, pubescent, 2 lines long, cleft to the middle, with oblong acutish lobes; petals minute, scarcely equalling the calyx-lobes; stamens and styles not exceeding the calyx: capsule ovoid scarcely exserted. On dry cliffs, Harney Valley eastern Oregon.

H. pilosissima F. & M. Ind. Sem Hort. Petrop. v, 56. Villous or hirsute with spreading viscid hairs: stems 6-18 inches high, rather stout, leafless or with a few small leaves: leaves round-cordate, obtusely lobed and crenate, 1-3 inches in diameter: flowers in a close and clustered or sometimes loose panicle, usually as long as their pedicels: calyx somewhat globular; rounded or obtuse at base and the broad short lobes more or less incurving, densely hairy; stamens about equalling the calyx; short styles and narrow spatulate petals but little exserted. On dry cliffs in the Coast Mountains, from the border of Oregon southward.

H. parvifolia Nutt. T. & G. Fl. i, 581. Scabrous-pubescent: stems leafless, 10-20 inches high: leaves forming a small radical cluster, round-cordate, crenately 5-7-lobed with short and rounded lobes, rather coarsely dentate, ciliate: panicle racemose; flowers very small; calyx campanulate, the limb spreading, dilated; petals minute; stems shorter than the lobes of the calyx; styles very short, conical: capsule ovate, the beaks exserted: seeds minutely hispid. From the Blue Mountains of Oregon to the Rocky Mountains.

* * * Filaments and styles very short; subulate; calyx campanulate, the lobes erect and somewhat unequal: petals minute or wanting: flowers often large, glomerate or spicate.

H. cylindrica Dougl. Hook. Fl. i, 236. Stems 1-3 feet high, leafless the lower portion with the petioles and veins beneath very villous or hirsute with spreading fulvous hairs: leaves ovate-cordate, glabrous above,

5–7-lobed, the lobes obtuse, crenate with mucronate teeth: panicle spike-like, cylindrical, 2–4 inches long, the subsessile branches subtended by lanceolate ciliate bracts 6 lines long; calyx campanulate, 4 lines long, the somewhat unequal narrowly oblong lobes longer than the tube; petals filiform rudiments or none; stamens shorter than the calyx-lobes; filaments a line long; styles very short: capsule ovate, the acuminate beaks slightly exserted at maturity: seeds hispid. On gravelly plains at low elevations, Brit. Columbia to California.

H. glabella T. & G. Fl. i, 581. (?) Glabrous or the upper part of the stem and inflorescence pulverulent-pubescent: stems wholly naked, rather slender, 1–2 feet high: leaves round-cordate, 1–3 inches in diameter primarily 5-lobed, the lobes often again 2–3-lobed, crenately toothed, the broad teeth bristly apiculate and ciliate, somewhat coriaceous, very glabrous both sides, persistent, on slender petioles 3–6 inches long; stipules conspicuous, the free portion broadly subulate, long acuminate, ciliate: flowers rather small, numerous, in a rather loose spike-like panicle, 3–4 inches long, the subsessile branches subtended by setaceous pectinately ciliate bristly acuminate bracts; calyx campanulate, 2–3 lines long, cleft to the middle, with somewhat unequal oblong obtuse lobes; petals white, shorter than the calyx-lobes, the lanceolate blade but little longer than the slender claw; anthers subsessile: styles short, stout: mature capsule not seen. On rocks along the Columbia river between the Cascades and The Dalles.

H. ovalifolia T. & G. l. c. Minutely and somewhat glandularly pubescent throughout: somewhat cespitose stems leafless, 4–12 inches high: leaves ovate, subcordate to somewhat cuneate at base, incisely 5-lobed, the lobes coarsely toothed with obtuse to acute bristly apiculate ciliate teeth, 6–12 lines long, on petioles 1–2 inches long, persistent; stipules narrow, acute, ciliate: flowers rather few, in an almost or quite simple spike; bracts lanceolate; long acuminate, laciniate and ciliate above the middle; calyx tubular, becoming urceolate, 3 lines long cleft to the middle, the lanceolate mostly acutish lobes white and petal-like; petals usually if not always wanting; filaments subulate, a line long: capsule obovoid, cleft nearly to the base, the acuminate beaks scarcely equalling the calyx: seeds somewhat reniform, hispid. On cliffs and dry rocky ridges, throughout eastern Oregon and Washington.

16 CHRYSOSPLENIUM Tourn. L. Gen. n. 320.

Small depressed herbs growing in swamps and brooks with fleshy simple leaves and small yellowish green flowers solitary in the forks of dichotomous branches or terminal. Calyx rotate, its short tube coherent with the ovary, the 4–5 obtuse lobes colored within. Petals none. Stamens twice as many as the calyx-lobes, inserted on the margin of the evident epigynous disk: anthers reniform, 2-celled. Styles 2, distinct: stigmas simple. Capsule obcordate, compressed, 1-celled with 2 parietal placentæ at the base, 2-valved at the summit, seeds numerous, with a crustaceous testa.

C. glechomæfolia Nutt T. & G. Fl. i, 589. Glabrous: stems ascending, 2–6 inches high: leaves opposite, roundish, abruptly cuneiform at base, crenate above, 2–6 lines broad: flowers usually solitary, in the forks of the upper branchlets: calyx 2 lines broad with rounded entire lobes; stamens about equalling the calyx: capsule at length exserted. About springs and in marshes, Brit. Columbia to California west of the Cascade mountains.

17 PARNASSIA Tourn. L. Gen. n. 384.

Smooth perennial herbs with entire petioled leaves in a clus-

ter on the short caudex, and simple scape-like stems not rarely bearing a small sessile leaf or two near the middle and a large terminal solitary flower. Calyx rotate, deeply 5-cleft, the base free from or adnate to the base of the ovary, the lobes herbaceous, somewhat imbricate in the bud. Petals 5, imbricate in the bud, with a cluster of more or less united gland-tipped filaments at the base of each. Stamens 5, alternate with the petals: anthers 2-celled. Ovary entire, 1-celled with 3–4 parietal placentæ: stigmas as many, closely sessile, very obtuse. Capsule 3–4-valved from the apex, the valves bearing the many-seeded placentæ on their middle. Seeds with a loose thickish somewhat winged testa.

P. Californica Greene Pitt. ii, 102. Leaves ovate to broadly oval, 6–18 lines long, narrowed below to a slender petiole: stems slender, flexuous, 1–2 feet high, with a small sessile bract borne above the middle; calyx-lobes lanceolate, obtuse, 4 lines long; petals white, broadly ovate to elliptical, 8–10 lines long by 6 lines broad, bristles of the appendages 20–24, almost capillary, united below into a broad cuneiform base; filaments subulate, about half as long as the petals. In marshes at the eastern base of the Coast Mountains southern Oregon and adjacent California.

P. fimbriata Banks Sims 7 Kœn. Ann. Bot. i, 391. Leaves cordate to reniform, 6–12 lines long, on long slender petioles: stems slender, 6–18 inches high, with a comparatively large leaf-like bract above the middle: sepals oblong, acutish: petals spatulate, 4–6 lines long, conspicuously fimbriolate ciliate at base; bristles of the appendages 5–9, often short or reduced to mere teeth on the cuneiform base; filaments filiform, about half as long as the petals. In high mountain marshes, Alaska to California and the Rocky Mountains.

ORDER XXXI. HYDRANGEACÆ Dumort Anal. Fam. 36, 38.

Shrubs with opposite leaves without stipules, the flowers in terminal or axillary panicles or cymes. Calyx 4- 5-cleft, valvate in the bud. Petals as many as the sepals and alternate with them, convolute in the bud. Stamens few or numerous inserted with the petals into the throat of the calyx: anthers introrse. Ovary either free from or coherent with the tube of the calyx, of 3–5 or more carpels with as many cells as carpels and the placentæ in the axis. Fruit capsular, with septicidal or loculicidal dehiscence. Seeds anatropous, small and numerous or solitary. Embryo straight, in the axis of fleshy albumen.

1. **Philadelphus.** Calyx-tube coherent with the 4–5-celled ovary: stamens 20 or more: seeds numerous.
2. **Whipplea.** Calyx nearly free from the 3–5-celled ovary: stamens 8–12; ovules and seeds solitary in the cells.

1 PHILADELPHUS L. Gen. n. 614.

Rather large shrubs with opposite simple leaves without stipules, and large showy flowers in paniculate cymes or sometimes solitary in the axils. Calyx with turbinate tube coherent with

the ovary nearly or quite to the summit, the limb 4–5-parted, valvate in the bud, persistent. Petals 4–5, large, convolute in the bud. Stamens 20–40, shorter than the petals. Styles 3–5, usually 4, united sometimes nearly to the summit: stigmas oblong or linear. Capsule mostly 4-celled, free at the summit; 4-valved, loculicidal, the placentæ projecting into the cells, many-seeded. Seeds pendulous and densely imbricated downward on the thickened placentæ, with a loose coat, usually prolonged at both ends or fimbriate at the hilum.

P. Lewisii Pursh Fl. 329. Shrub 3–12 feet high: leaves broadly lanceolate, entire or serrate, acute, more or less pubescent both sides: flowers in small cymes at the ends of the branchlets; lobes of the calyx acute, twice the length of the tube: petals white, oblong-ovate, 6–10 lines long; filaments unequal the longer ones about half as long as the petals; styles about equalling the shorter stamens, deeply 2–4-cleft. Common in open woods and rocky hillsides, Brit. Columbia to California.

2 **WHIPPLEA** Torr. Pac. R. Rep. iv, 90, t. 7.

Small diffuse shrubs with opposite simple leaves and small white flowers in cymous clusters on terminal naked peduncles. Calyx 5-cleft, the tube coherent with the lower part of the ovary, the lobes thin and petal-like. Petals 5. Stamens 10, rarely more or less; anthers short, 2-celled. Ovary 3–5-celled with a single suspended ovule in each cell; styles distinct; stigmas introrse. Capsule septicidally dehiscent into 3–5 cartilaginous 1-seeded closed valves which open down the ventral suture only. Seeds oblong with a closed coat.

W. modesta Torr. l. c. Stems slender, spreading or trailing, rooting at the nodes, 1–2 feet long or more: leaves ovate or oval, obtusely few-toothed or entire, somewhat 3-ribbed, 8–12 lines long, tapering below to a short petiole, acute or acutish, pubescent both sides: flowers white, few, in in a close cyme at the end of a rather long slender peduncle hardly 2 lines broad; calyx campanulate, the white oblong lobes longer than the tube; petals white, with a lanceolate blade and broad claw, longer than the calyx-lobes: capsule globose: styles at length deciduous: seeds oblong. In open woods, from near the Columbia river to California.

Order XXXII. RIBESACEÆ.

Spiny or smooth shrubs with alternate often fascicled palmately veined leaves without stipules, and few to numerous, mostly perfect, flowers in racemes, either produced from the bud with the leaves and terminating the very short axillary branchlets, or sometimes leafless buds. Calyx campanulate or tubular, colored, the tube adherent to the ovary, the limb 4–5-cleft, with mostly equal segments, marcescent, imbricate in the bud. Petals distinct, equal in number to the segments of the calyx and alternate with them, inserted in the throat of the calyx. Stamens as many as petals and inserted alternately with them: anthers introrse. Ovary 1-celled with two parietal placentæ: ovules numerous, or sometimes few; styles 2, rarely

3-4. Fruit a berry, crowned with the remains of the flower, 1-celled, usually many-seeded. Seeds anatropous, the raphe at length distinct from the gelatinous testa: the inner integument somewhat crustaceous, adhering firmly to the fleshy albumen. Embryo minute excentric.

1 RIBES Juss. Gen. 281. L. Gen. n. 281.

Shrubs with alternate palmately veined and lobed leaves, the flowers in few to many-flowered racemes. Calyx campanulate, 4–5-cleft with mostly equal marcescent lobes. Petals distinct as many as the lobes of the calyx and alternate with them. Stamens as many as petals, inserted alternately with them into the throat of the calyx. Ovary 1-celled, closely adnate to the tube of the calyx, with 2 parietal mostly many-ovuled placentæ. Fruit a berry.

§ 1 SIPHOCALYX Berlandier Mem. Soc. Gnev. iii, t. 2 as genus. Stems neither prickly nor thorny: leaves convolute in the bud: racemes many-flowered: bracts foliaceous: flowers yellow; calyx long and tubular: berries smooth.

R. aureum Pursh Fl. 164. A smooth shrub 4–8 feet high: leaves 3-lobed, often broader than long, the lobes usually divaricate, few-toothed at the apex, ciliate when young, otherwise very glabrous: racemes 10–30-flowered, leafy at base; bracts lanceolate, more or less acuminate, 2–6 lines long or more, about equalling the pedicels: calyx yellow, tubular, the narrow tube 6–8 lines long, about twice as long as the oblong merely spreading lobes; petals cuneiform, truncate and erose-dentate at the apex, little more than a line long: berries yellow or black, 2–3 lines in diameter. On rocky banks along streams, eastern Oregon and Washington to Missouri and Arkansas.

R. tenuiflorum Lindl. Hort Trans. vii, 242. A slender shrub 6–12 feet high, glabrous or the young branches and leaves pubescent with spreading hairs: leaves round-cordate, 3-lobed, the lobes often again 2–3-lobed, crenate at the apex, 1–3 inches in diameter: racemes usually about 9-flowered, leafy at base: bracts foliaceous, broadly lanceolate, 6–9 lines long, usually longer than the pedicels; calyx-tube 7–8 lines long, by a line in diameter, the unequal lobes about 3 lines long by less than a line broad; petals about a line long, narrowly o long, narrowed below to a broad claw: berries 2–3 lines in diameter. Along streams, southern Oregon and adjacent California.

§ 2 RIBESIA Berlandier (CURRANT). Stems neither prickly nor spiny: leaves plicate in the bud: racemes several-flowered: calyx campanulate or cylindrical: ovules numerous, in 2 or more rows.

* Calyx produced into a campanulate or cylindrical tube: fruit and foliage more or less glandular: bracts conspicuous: stamens not produced beyond the petals.

+ Flowers dull white or light-colored; racemes corymb-like and few-flowered.

R. viscosissimum Pursh Fl. 163. A shrub 3–5 feet high with reddish shredy bark and stiffish branches: young branches, leaves and inflorescence viscid-pubescent: leaves round-cordate, shallowly 3-lobed, incisely crenate, 1–2 inches in diameter: racemes short; bracts spatulate, 6–8 lines long, about equalling the glandular pedicels; calyx-tube cylindrical, 5–6

lines long, abruptly inflated above its union with the ovary, twice as long as the oblong lobes: petals oblong, rounded at the summit, about half as long as the lobes of the calyx; styles smooth. 2-cleft at the apex about equalling the short included stamens: fruit ovoid, black, viscid-pubescent. On mountains, Brit. Columbia to California and the Rocky Mountains.

R. cereum Dougl. Hort. Trans. vii, 312. A low shrub 2–3 feet high with rather stiff branches and whitish bark: leaves roundish-cordate, usually broader than long, incisely 3–5-lobed and doubly crenate-toothed 6–9 lines in diameter, more or less viscid-pubescent and dotted with white waxy glands on one or both sides: racemes nodding, 1–5-flowered; bracts ovate to lanceolate, often toothed, appressed to the ovary, 3–4 lines long, longer than the very short pedicels; calyx tubular, 6 lines long, viscid-glandular, the ovate spreading lobes less than a line long; petals minute, broadly cuneiform; stamens inserted on the tube of the calyx and included in it; style minutely pubescent above, 2-lobed: fruit bright red, minutely glandular. On dry rocky ridges, Brit. Columbia to California and the Rocky Mountains.

+ + Flowers bright red varying to white; racemes drooping, many-flowered.

R. sanguineum Pursh l c. 164. A stout shrub 3–12 feet high with erect branches: young branches and petioles glandular-pubescent: leaves cordate, 3–5 lobed, deeply serrate, glabrous above, canescent-pubescent beneath, 1–3 inches in diameter: racemes 1–4 inches long, pubescent and glandular, rather loosely many-flowered; bracts spatulate to obovate, entire or erose dentate, 6 lines long, about equalling the slender pedicels; calyx-tube cylindrical, 4 lines long, about equalled by the ample obovate or broadly lanceolate red lobes; petals oblong, obtuse, narrowed below to a broad claw, 2 lines long; style smooth, minutely 2-cleft: fruit subglobose, sparingly glandular-hirsute, black with a dense white bloom. Very common in wooded districts, Brit. Columbia to California.

* * Calyx with very short or no tube and rotate or saucer-shaped limb.

R. ciliosum. Stems prostrate, 2–4 feet long: leaves broadly cordate, 1–2 inches in diameter, acutely 3–5-lobed acutely serrate and ciliolate, minutely pubescent on the veins beneath smooth above, on petioles about as long as the blade with dilated ciliate base: racemes 6–10-flowered; bracts small, ovate, about half as long as the smooth pedicels; calyx dark red, saucer-shaped, with broad rounded lobes and very short tube; petals broadly obovate, ½ line long; anthers broader than long, sessile or nearly so; style very short, entire: fruit red, about the size of the common red currant and much like it in flavor. In marshy ground about the base of Mount Hood on the south side.

R. laxiflorum Pursh Fl. 731. *R. acerifolium Howell: R. Howellii Greene.* Stems cespitose, erect to ascending, 3–9 feet long: leaves triangular, 2–3 inches in diameter, truncate or more or less cordate at base, deeply 5-lobed, the acute lobes laciniately doubly serrate, smooth above, often resinous-dotted beneath; petiole as long or longer than the blade, rather abruptly dilated and ciliate at base: racemes finely pubescent, 5–12-flowered; bracts usually linear-lanceolate, 1–2 lines long, about equalling the slender pedicels; calyx rotate, with broad spatulate lobes; petals red, narrowly spatulate, a line long; anthers broader than long, on flat pedicels a line or more long; style deeply 2-lobed: fruit purple or black, with a whitish bloom, 2–3 lines in diameter. About springs and wet places along the coast and in the highest mountains, Alaska to Oregon.

R. erythrocarpum Covill & Leiberg Proc. Biol. Soc. of Wash. x. 132. Stems trailing, rooting and giving rise to ascending branches 4–8 inches high: leaves round-cordate, 6–18 lines in diameter deeply 3-lobed, the

lobes coarsely crenate and the crenature uneven; apiculate-dentate, glandular-ciliate, more or less glandular: racemes erect, usually 10–20-flowered: bracts herbaceous, lanceolate to obovate, 1–3 lines long, equalling or shorter than the slender pedicels; calyx saucer-shaped, the oblong lobes spreading, yellow dotted with red, 1½ lines long; petals broadly spatulate, glabrous; ⅓–½ as long as the calyx-lobes; filaments glabrous, equalling the petals, style glabrous, 2-parted: fruit scarlet, 4–5 lines long, subpyriform to spherical, glandular. Common on Mount Mazama around Crater Lake, Oregon.

R. bracteosum Dougl. Hook. Fl. i, 233. Stems ascending, 2–8 feet long: leaves long-petioled, cordate, 7–8 inches in diameter, deeply 5–7-lobed, the lobes acuminate, coarsely and doubly serrate or incised, resinous dotted beneath: pedicels 6–12 inches long, loosely many-flowered; bracts foliaceous, lanceolate to linear, the lower ones broad and petioled the upper reduced and sessile, all as long or longer than the pedicels; calyx rotate, the purplish oblong lobes nearly 2 lines long; petals broadly cuneiform, rounded at the apex, less than a line long; style shorter than the petals, deeply cleft; fruit black, resinous dotted. Common along mountain streams in deep shade, Alaska to California.

R. Hudsonianum Richard. Franklin Journ 2 ed. 6. Stems erect, 4–6 feet high; leaves round-cordate in outline, 2–4 inches in diameter, smooth above, resinous dotted beneath, 3–5-lobed, the lobes acute, coarsely and doubly serrate: racemes erect, with or without a few small leaves at base, 2–4 inches long, many-flowered; bracts setaceous, much shorter than the pedicels; calyx campanulate deeply 5-parted, the oblong obtuse lobes more than a line long; petals oblong, minute; style glabrous, deeply cleft: fruit globose, resinous dotted. Along mountain streams, Brit. Columbia to Eastern Washington.

§ 3. GROSSULARIA Tourn. as genus. (GOOSEBERRY). Stems usually armed with subaxillary spines and often prickly: leaves plicate in the bud: peduncles (except in the first) 1–4-flowered: calyx more or less campanulate: ovules very numerous, in several rows: berries often prickly.

* Calyx-tube saucer-shaped, spreading immediately above the ovary: peduncles racemously several-flowered: anthers very short, pointless berries small and currant-like, sparingly bristly-glandular.

R. lacustre Poir. Suppl ii, 85[illegible]. Stems prostrate or ascending, 3–4 feet long, very prickly when young; subaxillary spines several, weak and scarcely differing from the prickles: leaves cordate, 3–5-parted, the lobes deeply incised and toothed, the teeth bristly apiculate, 6–18 lines long; petioles slender, 1-2 inches long ciliate with long brownish bristles: racemes 5–9-flowered; calyx rotate; stamens about the length of the petals; styles short glabrous, 2-cleft; ovary glandular-hispid; fruit small, black. In cold mountain marshes and along streams, Alaska to California and the Atlantic States and Canada.

R. molle *R. lacustre var molle Gray Bot. Cal. i, 206.* Stems 1–4 feet high, intricately much branched: young shoots often prickly: subaxillary spines triple or multiple, rigid: leaves round-cordate in outline, 6–12 lines in diameter, 3–5-parted, the divisions 3-lobed and incisely toothed, soft-pubescent and sparingly glandular both sides: racemes 1–9 flowered short-peduncled; bracts ovate, acute, as long as the pedicels; flowers greenish-white, the open calyx three lines in diameter, its short lobes rounded; petals small; stamens very short: berries light red, not larger than peas. On rocky ridges in the mountains of Southeastern Oregon to California.

* * Calyx-tube campanulate to cylindrical: peduncles 1–4-flowered.

\+ Anthers oval or didymous, very obtuse and pointless.

++ Tube of the calyx above the ovary very short.

R. velutinum Greene Bull. Cal. Acad. i, 85. Stout and rigid, 2–6 feet high, with strongly recurved branches, these not prickly; subaxillary spines solitary: leaves orbicular, palmately 3–5-cleft, the lobes crenately 3-toothed, 6–8 lines in diameter, densely velvety-tomentose to nearly glabrous: racemes short, 2–3-flowered, the orbicular bracts not half as long as the pedicels; calyx cylindrical, its lanceolate lobes twice longer than the tube; petals oblong, shorter than the calyx-lobes: stamens shorter than the petals; styles glabrous, equalling the stamens; ovary and fruit velvety-pubescent. On dry hillsides at the southern base of the Siskiyou Mountains.

R. montanum. Stems slender, creeping, 3–4 feet long: subaxillary spines 3, unequal: leaves round to oblong, less than an inch in diameter, slightly cordate or truncate, deeply 3-lobed, the lobes doubly toothed, pubescent but not glandular: peduncles usually one-flowered, bracts conspicuous, longer than the pedicels: calyx pubescent, its linear-oblong lobes 2 lines long, longer than the cylindraceous tube; petals narrowly oblong, a line long: stamens longer than the petals, anthers broadly oblong; style glabrous, entire or nearly so; ovary and fruit spinose. In the forests of the Siskiyou Mountains near the summit.

R. ambiguum Watson Proc. Am. Acad. xviii, 193. Stems erect or ascending, 4–6 feet high: leaves roundish, 1–2 inches in diameter, villous and glandular, 5-lobed, the lobes crenately toothed, peduncle 1–3-flowered, calyx 6 lines long, more or less villous, the ligulate lobes several times longer than the tube, ciliate equalling the linear petals; anthers small elliptical, ovary and fruit densely spinose. Mt. Adams, Washington, to Northern California at high altitudes.

++ ++ Calyx-tube longer than the limb.

R. cognatum Greene Pitt. iii, 115. Slender shrub 3–10 feet high: younger branches stiffly and densely setose-hispid, the 1–3 subaxillary spines short, not very stout: leaves and the long and slender petioles villous pubescent: flowers 3–5, at the ends of long and slender pendulous peduncles: calyx salver-form, the long cylindric tube villous-pubescent, twice the length of the oblong segments, the whole white or pale flesh-color: petals spatulate-obovate, truncate or retuse, not equalling the calyx-lobes: ovaries glabrous, fruit not seen. Along the Umatilla river, near Pendleton, Oregon.

++ ++ ++ Flowers small, dull-colored, fruit smooth.

R. gracile Michx. Fl. i, 111. Branches slender: subaxillary spines 1–3, leaves roundish, obtusely 3-lobed, crenately incised, entire at base, glabrous: peduncles elongated, 1–3-flowered; lobes of the calyx ligulate, twice or thrice longer than the short tube; stamens long exserted hairy, longer than the hairy style: fruit black smooth. Brit Columbia to Oregon and the S. E. States.

R. oxyacanthoides L. Sp. 201. Stems sometimes clothed with bristly prickles; subaxillary spines 1–3, often united at the base: leaves roundish, subcordate 5-lobed, pubescent or nearly glabrous, the lobes deeply toothed or crenate: peduncles very short 2–3-flowered; calyx tube cylindraceous, pubescent at the base within, the segments spreading, rather longer than the stamens, about twice the length of the obovate petals; style cleft to the middle, hairy at base a little exceeding the stamens. Along streams, eastern Oregon to California and N. E. States.

R. divaricatum Dougl. Trans. Hort. Soc. vii, 515. Stems 3–12 feet

high, variously branched: subaxillary spines 1-3, usually stout and deflexed, leaves roundish, more or less cordate,3-5-lobed, the lobes crenately incised; peduncles slender, usually 3-flowered: bracts broad, scarious: lobes of the calyx ligulate about twice the length of the campanulate tube: stamens exserted; anthers small, oval; style about equalling the stamens and calyx, 2-parted, hairy below; fruit small black. Brit. Columbia to California.

++ ++ ++ ++ Flowers large and showy.

R. Lobbii Gray Am. Nat. x, 274. Stems 2-6 feet high, much branched, subaxillary spines 3, usually unequal: leaves roundish, truncate or slightly cordate at base, more or less pubescent and glandular: peduncle almost filiform, 1-3-flowered; bracts broad about equalling the short pedicels: calyx campanulate, pubescent, the dark red ligulate lobes about equalling the tube, twice as long as the white truncate cuneate petals, strongly reflexed; stamens long exserted, slightly unequal; anthers nearly orbicular: style about equalling the longest stamens: fruit 6-8 lines in diameter densely glandular hispid. Washington to California, west of the Cascade Range.

R. Marshallii Greene Pitt. i, 31 (?). Stems 2-4 feet high; subaxillary spines 3; roundish, 3-5-lobed, crenately toothed, an inch or less in diameter, smooth not glandular; peduncles short, usually 1-flowered: bracts broadly lanceolate: calyx dark red, campanulate, 8-12 lines long, the lanceolate acute lobes much longer than the tube: petals oblong, rounded at the summit, 2-3 lines long, yellow: stamens and style exserted but shorter than the calyx-lobes; anthers oblong, obtuse at both ends, fruit large an inch long or more, covered with fleshy spines but not glandular. In forests in the Siskiyou Mountains.

+ + Anthers sagittate, mucronate-tipped.

++ Bracts presistent.

R. Menziesii Pursh. Fl. 732. Stems 5-10 feet high, branches strongly hispid or varying to glabrous: leaves deeply 3-cleft, the lobes coarsely incised, usually soft-pubescent beneath: pedicels slender, 1-2-flowered; bracts broadly ovate, acute; calyx 6-10 lines long, the lanceolate obtuse lobes twice as long as the campanulate tube: petals broadly cuneate, rounded at the summit; stamens equalling the calyx, anthers lanceolate, a line long, style longer than the stamens; ovary densely glandular hispid. In the coast ranges, Southern Oregon to California.

++ ++ Bracts deciduous.

R. amictum Greene l. c. 69. Stems 2-4 feet high, intricately branched: subaxillary spines 1-3, slender: leaves orbicular to oblong, less than an inch long, 3-5-lobed, the lobes crenately toothed: peduncle short, usually one-flowered; bract broadly ovate, longer than the very short pedicel, clasping the ovary when young: calyx 6-10 lines long, the lanceolate acute lobes but little longer than the narrow tube: fruit densely spinose. On dry rocky ridges, southwestern Oregon and adjacent California.

ORDER XXXIII. CRASSULACEÆ D. C. Fl. France. iv, 382.

Succulent or fleshy herbs with simple leaves without stipules and usually cymose inflorescence. Sepals 4-5, rarely 3-20, imbricate in the bud, more or less united at base, persistent. Petals as many as sepals and alternate with them, not unguiculate, imbricate in the bud, inserted on the base of the calyx, sometimes united at base. Stamens as many as petals and

alternate with them or twice as many, inserted with the petals or adnate to their base: filaments subulate or linear filiform: anthers introrse. Ovaries always equal in number to the petals and opposite to them with numerous, or rarely few, ovules in two rows: carpels follicular in fruit, subulate with the persistent style, usually many-seeded, opening by the inner suture. Seeds anatropous, with a membranaceous often loose testa. Embryo straight in the axil of thin fleshy albumen.

1. **Tillæa.** Parts of the flowers 3–5. Small annuals with opposite leaves and minute axillary flowers.
2. **Sedum.** Parts of the flowers 4–7: stamens twice as many: petals distinct:
3. **Cotyledon.** Parts of the flower in five, stamens ten. Petals somewhat united.

1 TILLÆA Micheli Gen. t, 20.

Small and slender somewhat succulent glabrous annual with opposite entire leaves and minute axillary flowers. Sepals and petals 3–4, distinct or united at base. Stamens as many; carpels distinct: style short-subulate: ovules one to many. Seeds longitudinally striate.

* TILLÆA PROPER. Flowers clustered: petals acuminate, hypogynous; scale minute or none: carpels 1-2-seeded.

T. minima Miers Trav. Chil. ii, 530. Diffusely branched, 1–3 inches high, erect or ascending: leaves ovate to oblong, connate at base, acute, about a line long: flowers in short leafy axillary panicles, nearly sessile or on pedicels a line or two long: sepals 4 scarcely half a line long, oblong-ovate, acute, a little exceeding the linear-lanceolate acuminate petals: carpels not longer, acute: seed usually solitary. On wet rocks etc., Southern Oregon to California and Chile.

* * BALTARDIA DC. Flowers solitary; petals oval or oblong, hypogynous: scale linear: carpels, several-seeded.

T. angustifolia Nutt. T. & G. Fl. i, 558. Branching from the base, 1–2 inches high, rooting; leaves linear, acute connate; flowers axillary, usually solitary, on very short pedicels; segments of the calyx 4, ovate about half the length of the ovate obtuse-petals, carpels broad obtuse many-seeded, styles none, seeds linear-oblong. On muddy flats, Washington to California.

2 SEDUM L. Gen. n. 579.

Herbs or rarely suffrutescent plants with alternate or scattered (rarely opposite or verticillate) leaves and flowers in cymes. Sepals usually 5, rarely 4 or 6–7, more or less united at base, usually turgid. Petals distinct, mostly spreading. Stamens twice the number of the petals. Carpels as many as the sepals, many-seeded, with an entire scale at the base of each.

* Flowers mostly dicœcious in a regular compact compound cyme, deep purple or becoming so, leaves flat, serrate.

S. Rhodiola DC. Fl. Franc. ed. 3, iv, 386. Stems simple, nearly erect, rom a thick perennial root 1–10 inches high, leafy: leaves alternate, oblong-

oblanceolate, acute rarely entire: 6–18 lines long: cyme sessile often an inch or two in diameter: flowers on short naked pedicels, usually 4-merous sepals short, oblong: petals 1–2 lines long linear-oblong: carpels becoming 3 lines long shortly beaked. In the high mountains Alaska to California.

* * Flowers perfect, decandrous; secund upon the branches of a forked cyme, mostly yellow: style filiform: leaves entire, very fleshy.

+ Leaves broad and obtuse, narrowed toward the base: perennials.

S. spathulifolium Hook Fl. i, 227. Glabrous and sometimes mealy; stems ascending from a branched rooting caudex, 4–8 inches high, simple: leaves obovate or spatulate, 6–10 lines long: branches of the cyme approximate: flowers on short pedicels or sessile, 3 lines long: petals yellow, lanceolate, acute, twice longer than the ovate acute sepals and scarcely exceeding the stamens and style. On rocks, etc., Brit Columbia to California. Flowering in May.

S. Oreganum Nutt. T. & G. Fl. i, 559. Glabrous, not glaucous, leaves all scattered, cuneate, rounded at the summit: stems erect simple; from a creeping branched caudex: cymes compound; the flowers on very short pedicels, petals yellow linear-lanceolate, acuminate 3–4 times the length of the ovate-lanceolate acuminate sepals and about twice the length of the stamens. On rocky banks along the Columbia river near the Cascades.

S. divergens Watson Proc. Am. Acad. xvii, 372. Stems rather stout, 2–4 inches high from a creeping-branched caudex: leaves broadly ovate or obovate, sessile, 3–4 lines long: inflorescence close with short branches, flowers yellow, the lanceolate petals thrice longer than the triangular-ovate sepals and equalling the stamens: carpels united at base, widely divergent above. Eastern slopes of the Cascade Mts. mcClean.

S. debile Watson Bot. King v, 102. Stems weak, 2–4 inches high, from very slender running root stocks: leaves rounded or obovate, 1–3 lines long: flowers on rather long pedicels in small cymes, 3 lines long, yellow: petals lanceolate, acuminate, twice the length of the acute sepals and little exceeding the stamens and styles. Southeastern Oregon to Nevada and Utah.

S. divaricatum Watson Proc. Am. Acad. xvii, 372 Cespitose with slender branching rootstock: the lower rosulate leaves oblanceolate or acutish, roughish on the margin, 6 lines long or less, flowering stems 2–8 inches high, branches of the cymes once forked: flowers nearly sessile, bright yellow, with short lanceolate sepals and narrowly lanceolate, acuminate petals: carpels united at base strongly divergent above. Eastern Oregon and Washington.

++ Leaves lanceolate to subulate, mostly acute.

++ Perennials.

S. Douglasii Hook. Fl. i, 228. Branching at base from a stout proliferous root-stock: the rather stout stems 6–10 inches high: leaves lanceolate or the lowest linear-subulate 6–12 lines long, smooth on the margins, flat above, carinate beneath: flowers yellow, sessile, in an open cyme: petals 2–3 lines long, acuminate-lanceolate, twice the length of the ovate acuminate sepals and exceeding the stamens: carpels united at base, strongly divergent. Brit. Columbia to Oregon west of the Cascade Range.

S. uniflorum Stems rather slender, branching at the base, from a short proliferous caudex, 4–8 inches high, leaves lanceolate; acuminate, flat above, carinate beneath, 4–8 lines long: stems bearing numerous propagula and terminated by a single flower: petals lanceolate; sepals a little longer than the stamens. On rocks along the Willamette and Columbia rivers near Portland.

S. ciliosum. Stems branching from a short proliferous root-stock, 2–4 inches high: leaves lanceolate from a broad base, long acuminate, 6–10 lines long, ciliate on the margin or the cauline smooth: flowers yellow in small compact cymes, sessile: petals lanceolate, acuminate, a little longer than the stamens, twice as long as the ovate long-acuminate sepals: carpels divergent above. On rocks in the Coast mountains near Roseburg, Oregon.

S. stenopetalum Pursh. Fl. 324. Cespitose: stems erect from a decumbent base, 2–4 inches high: leaves lanceolate, closely sessile, 2–4 lines long, granular-puberulent: flowers yellow, crowded in close compound cymes, on short pedicels: petals lanceolate acute equalling or a little exceeding the stamens, twice as long as the ovate sepals: carpels erect, tipped by the long divergent styles. On the higher ridges of Eastern Washington and Oregon to the Rocky Mountains.

+ + Annuals.

S. pumilum Benth. Pl. Hartw. 310. Slender, branching or single, 1–3 inches high: leaves ovate-oblong, a line or two long: flowers sessile, in sparingly branched cymes, yellow: calyx-lobes very small, triangular, acute; petals linear, acute, 1–2 lines long, exceeding the stamens and style: follicles short, 1-seeded, the seed erect, filling the cavity. On gravelly soil Oregon *Nuttall* to California.

COTYLEDON L. Gen. n. 578.

Herbs or soft-wood plants with thick fleshy entire leaves and often showy, mostly scarlet and yellow flowers in scorpioid cymes or long racemes. Calyx 5-parted, petals united into a 5-lobed pitcher-shaped or cylindrical corolla. Stamens 10 inserted on the corolla-tube: carpels distinct or rarely united at base, many-seeded beaked by the subulate style.

C. Oregonensis Watson Proc Am. Acad. xvii, 373. Stems ascending from a stout branched rooting caudex 6–8 inches high, the rosulate basal leaves spatulate, obtuse, 8–15 lines long, the cauline oblong-spatulate, 6 lines long or less: peduncles axillary along the upper part of the stem 6–12 lines long, bearing short simple or compound few-flowered racemes, pedicels 1–2 lines long, with small bractlets; sepals deltoid, a line long: petals pale yellow, united below the middle, 4 lines long; stamens slightly shorter, carpels oblong, rounded at the top, apiculate with the slender style. Eastern base of the Cascade Mts. near Mt. Hood.

C farinosa Baker Refug. Bot i, t. 71. Caulescent: more or less mealy-pulverulent: rosulate leaves rather flaccid, ascending, lanceolate, acuminate, the larger ones 2–4 inches long, very acute: flowering branches a span high or less with scattered broadly ovate to lanceolate clasping leaves: flowers in a rather close short compound cyme; bracts ovate-lanceolate, rather large; pedicels stout, 1–3 lines long: sepals broadly lanceolate, about 3 lines long; petals yellow, oblong-lanceolate, mostly acuminate, 4–6 lines long; carpels ovate-oblong about three lines long. At the mouth of the Chetco River, Oregon and Southward along the Coast.

ORDER XXXIV. DROSERACEÆ S. F. Gray Arr. Brit. Pl. ii, 664.

Herbs or rarely suffrutescent plants with alternate or crowded entire, usually viscid-glandular leaves without stipules and perfect flowers. Sepals 5, persistent, equal, sometimes united at base; imbricate in the bud. Petals 5, alternate with the sepals, marcescent, stamens distinct, usually as many as petals

and alternate with them, rarely 2 or 3 times as many, marcescent; anthers extrorse or innate, the cells distinct or somewhat connivent above, opening down the sides or rarely by a terminal pore. Ovary composed of 2–5 united carpels: placenta parietal or filling the base of the cell. Styles 2–5, distinct or united at base, each 2-parted, or multifid and pencil-shaped, sometimes all united into one. Capsule loculicidally 2–5-valved or indehiscent mostly many-seeded. Seeds anatropous; the testa sometimes arilliform. Embryo short, at the base of cartilaginous or fleshy albumen.

1 DROSERA L. Gen. n. 391 (SUNDEW).

Small herbs growing in sphagnous or sandy marshes, with the leaves all radical and furnished with numerous long glandular hairs, and small flowers on simple scapes. Stamens 5, styles 3–5, 2-parted with the divisions somewhat thickened toward the apex, or multifid. Capsule subglobose or ovoid, usually 3-valved at the top; the valves placentiferous to the top. Seeds numerous, in 2–5 rows on each placenta.

D. rotundifolia L. Sp. i, 281. Leaves spreading, orbicular, abruptly attenuate to a long hairy petiole: scapes 2-6 inches high, 5–10-flowered: petals oblong, 2 lines long, a little exceeding the oblong sepals: styles short, 2-parted: capsule included in the calyx: seeds linear with a loose coat. In cold marshes Alaska to California, the Atlantic States and Europe.

D. Anglica Hudson Fl. Angl. 135. Leaves ascending, oblong, attenuate into the slender naked petioles: scapes 3–10 inches high, sometimes forked at the top, few-flowered: petals linear-oblanceolate 3–4 lines long nearly twice longer than the oblong sepals: capsule exceeding the calyx: seeds linear with a loose coat. In cold marshes Alaska to California, Siberia and northern Europe.

ORDER XXXV. CERATOPHYLLACEÆ. Gray, Ann. Lyc. N. Y. iv. 41.

Perennial submerged aquatic herbs with cylindrical jointed stems and branches, verticillate, sessile, filliformly 2–3-chotomous leaves without stipules, and sessile axillary-flowers. Flowers monœcious without perianth but surrounded by a persistent 8-12-cleft involucre; anthers numerous sessile, fleshy, 2-3-cuspidate at top, ovary solitary, 1-celled, with a pendulous orthotropous ovule; achene beaked by the slender persistent style, seeds with membranous transparent testa and no albumen; radicle inferior very short; the cotyledons thick and oval, the highly developed plumule consisting of several nodes and leaves.

1 CERATOPHYLLUM L. Gærtn. Fr. t. 44.

Characters as of the order.

C. demersum L. Sp. 1409. Stems very slender, a foot or two long,

smooth or nearly so: leaves in numerous whorls of 6–8, the filiform or linear segments acute, more or less aculeate-dentate, ¼ to one inch long. achene 2 lines long or more, elliptical, somewhat compressed, shortly stipitate, with a short spine or tubercle on each side near the base, not margined : style as long as the achenes. Washington to California, the Eastern States and Europe.

ORDER XXXVI. LYTHRACEÆ Lindl. Nat. Syst. ed. 2, 184.

Herbs, rarely shrubs or trees, with usually 4-sided branches opposite, rarely alternate, entire leaves without stipules and flowers in the axils or in terminal racemes. Sepals combined into a 4–7-toothed or lobed calyx; the lobes valvate or distant in the bud; the sinuses sometimes produced into accessory lobes or processes. Petals alternate with the proper lobes of the calyx and inserted on its throat, deciduous, sometimes wanting. Stamens inserted into the tube of the calyx below the petals, equal to them in number, or 2–4 times as many, rarely fewer: anthers short, introrse. Ovary enclosed in but free from the calyx, 2–4-celled, with numerous ovules in each cell; the placentæ in the axis: style filiform, sometimes short or almost none: stigma usually capitate Capsule membranaceous, surrounded by the calyx, often one-celled by the obliteration of the partitions, dehiscent either longitudinally or irregularly. Seeds numerous and small, rarely few and large, anatropous, without albumen. Cotelydons flat and foliaceous.

1. **Ammannia.** Calyx barely 4-angled, short: stamens 4 or 8: capsule globular.

2. **Lythrum.** Calyx striate, cylindrical: petals usually 6: stamens as many or twice as many: capsule oblong or cylindrical.

AMMANNIA Houst. L. Gen. n. 155.

Herbs with square stems, opposite entire leaves and axillary bracteolate flowers. Calyx more or less campanulate, 4–5-toothed or lobed, the sinuses usually expanding into spreading accessory teeth or horns. Petals as many as lobes of the calyx or wanting. Stamens as many or twice as many as lobes of the calyx: Ovary 2–4-celled: style short or rather long: stigma capitate, capsule globose or ovoid, included in the calyx, either bursting transversely or opening by valves. Seeds numerous, attached to thick central placentæ.

A. latifolia L. Sp. 115. Stems erect, branching, 6–24 inches high: leaves linear-lanceolate, acute, dilated and obtusely cordate-auriculate at base, closely sessile, 2–3 inches long: flowers 1–5 in each axil, somewhat pedunculate, at least when solitary: calyx 4-angled or pleated, with 4 short lobes and as many small spreading horn-like processes: petals 4, caducous; stamens 4; style more than half as long as the capsule: capsule 4-celled. Wet places along the Columbia River and the Eastern States.

A. humilis Michx. Fl. i, 99. Stems ascending, 2–10 inches high, branching from the base: leaves linear-oblong or lanceolate, obtuse, tapering below to a short petiole or sessile: flowers sessile or 2–3 in the lower axils; calyx 4-angled with 4 short lobes and as many small spreading pro-

cesses; petals 4, caducous; stamens 4; style very short or none; capsule 4-celled. On wet banks, along the Columbia River and the Eastern States.

2 LYTHRUM Juss. Gen. 132.

Herbs, rarely suffrutescent plants, with opposite or scattered entire leaves and purplish or white flowers. Calyx cylindrical, striate, with 4–6 short lobes and usually as many intermediate teeth or processes. Petals 4–6. Stamens as many or twice as many as petals, inserted on the tube of the calyx. Style filiform: stigma capitate. Capsule oblong, 2-celled, many-seeded, enclosed in the calyx-tube.

L. adsurgens Greene Pitt. ii, 12. Stems 1–3 feet long, from a stoloniferous perennial base, stoutish but tough and flexible, 5-angled, decumbent or nearly prostrate, herbage pallid and glabrous: leaves scattered, linear, sessile: calyx 2-3 lines long the small lobes subulate, the intermediate processes broad and mucronulate: petals pale purple, but little exceeding the calyx-lobes. In wet or springy places, Puget Sound to California.

Order XXXVII. HALORAGEÆ Endl. Gen. 1155.

Herbs or suffruticose plants growing in water or wet places with various leaves and small axillary sessile perfect, rarely monœcious or diœcious flowers. Limb of the calyx 3–4-lobed or entire, sometimes wanting. Petals 3–4 small or wanting. Stamens as many or twice as many as the lobes of the calyx, sometimes fewer, inserted with the petals into the summit of the calyx. Ovary coherent with the calyx, 1–4-celled, with a solitary pendulous ovule in each cell. Styles 1–4 or none: stigmas as many as cells of the ovary, distinct. Fruit dry and indehiscent. Seeds anatropous with a straight embryo and thin fleshy albumen.

* Stamens one.

1. **Hippuris.** Ovary 2-celled: leaves verticillate, linear or oblong, entire.
2. **Callitriche.** Ovary 4-celled: leaves opposite, linear or spatulate, entire.

* * Stamens 5–8.

3. **Myriophyllum.** Ovary 4-celled: leaves verticillate subverticillate or scattered, the emersed entire toothed or pectinate, the submerged pinnatifid.

1 HIPPURIS. L. Gen. n. 11.

Aquatic perennial herbs with simple stems, verticillate entire leaves and minute axillary flowers. Flowers perfect, or by abortion sometimes neutral or pistillate. Calyx-tube adherent to the ovary, the limb minute, entire. Petals none. Stamen one, inserted on the margin of the calyx. Style filiform, stigmatic its whole length and lying in a groove of the stamen. Fruit 1-celled, 4-seeded.

H. vulgaris L. Sp. i, 4. Stems erect, 10–20 inches high, rather stout: leaves in whorls of 6–12, linear, 8–12 lines long or more, one-nerved:

stamen with large thick filament and rather large 2-celled anther: fruit oval or somewhat 4-sided, 2–3 lines long; stigma persistent. In ponds and marshes, Alaska to California, the Eastern States and Europe.

Var. fluviatilis Hart. Larger; leaves 2–3 inches long, grass-like, in closely crowded whorls Oregon to Canada and Sweden.

H. tetraphyllum L. f Suppl. 81. Stems 10–12 inches high, leaves in whorls of 4 or 6, oval to obovate, often feather-veined; fruit less than 2 lines long. Alaska, perhaps northern Washington.

H. montana Ledeb. Reichenb. Incon. Bot. i, 71. Stems 2–4 inches high: leaves 1-nerved, linear mucronate, in whorls of 5–6, 4–6 lines long: flowers often monœcious: fruit almost oval, a line or more long, minutely granulate. In wet turfy places, Alaska to Washington.

2 CALLITRICHE L. Gen. n. 13.

Small, mostly aquatic, herbs with opposite entire leaves without stipules and small axillary monœcious flowers without petals. Calyx adherent to the ovary the limb very short or obsolete. Petals none. Stamen one with slender filament and cordate 4-celled anther. Ovary 4-celled, with 2 filiform styles. Fruit 4-celled, flattened and emarginate, 4-seeded, indehiscent, the cells separating at maturity into 1-seeded nutlets.

* Emersed leaves obovate-spatulate, 3-nerved, the submersed linear, (all uniform and narrow in terrestrial forms): carpels connate.

+ Fruit pedicillate, wing-margined; bracts none

C. marginata Torr Pacif R. Rep. iv, 135. Stems slender, branching, rooting in the mud growing in water: submersed leaves linear, 1-nerved, running gradually into the emersed oblanceolate or spatulate 3-nerved ones, or the terrestrial form with linear spatulate 3-nerved leaves 4–5 lines long: peduncles about two-thirds as long as the leaves, spreading or reflexed: styles as long or shorter than the fruit reflexed deciduous: fruit broader than long with conspicuous membranaceous wings and divergent lobes. From Arizona and California to The Dalles, Oregon.

C. sepulta Watson Proc. Am. Acad. xiv, 298. Terrestrial, prostrate and rooting in the mud: the numerous narrowly linear leaves 2–3 lines long: fruit broader than long emarginate at both ends, the thick carpels with acute divergent margins, on stout pedicels 1–3 lines long soon deflexed and buried in the soil: stigmas elongated. reflexed, soon deciduous. Oregon. (*Hall 1871.*)

C. verna L. Sp. i, 2. Perennial, with elongated stems and floating rosulate obovate often emarginate leaves which are more or less narrowly petioled the submerged ones from spatulate to linear: sometimes terrestrial and rooting with short linear leaves: bracts often longer than the fruit rarely wanting: stigmas erect or spreading, usually shorter than the fruit, deciduous: fruit oblong flat on the face mostly with a small apical notch and narrow apical wings the grooves between the lobes deep. Common from Alaska to California, the Eastern States and Europe, Asia and S. America.

C. heterophylla Pursh. Perennial with elongated stems and obovate floating leaves, the submerged ones linear-lanceolate, long acuminate, 4–8 lines long, sometimes terrestrial and rooting, with short linear leaves: stigmas longer than the fruit persistent: fruit obovate, broader than long, with a deep broad notch at the apex. thick, almost ventricose near the base, the lobes obtusely angled, with a small groove between them, wing-

less or with a narrow wing or raised border on the upper margin. Oregon to Colorado and the Eastern States.

C. **Bolanderi** Hegelm. Verhandl. Bot. Verein Brandenb. x, 116. Stems stout, elongated, floating: leaves rhombic-obovate, the submerged ones linear: stigmas twice as long as the fruit persistent or sub-persistent: fruit orbicular or slightly obcordate, with obtuse closely approximate margins, the lobes scarcely winged. Brit Columbia to California.

* * Submersed perennials with numerous uniform 1-nerved leaves: flowers without bracts: carpels separated nearly to the axis.

C. **autumnalis** L. l. c. Stems very slender, 2–10 inches long: leaves linear truncate or retuse at the apex: fruit sessile, round. deeply notched, nearly a line in diameter, the margins thin or at length winged: stigma long, reflexed, caducous. Eastern Oregon to California, the Eastern States, Europe and Asia.

3 MYRIOPHYLLUM L. Gen. n. 10, 66.

Aquatic usually submersed perennial plants, the upper part emersed while flowering, with verticillate, sometimes opposite or alternate leaves, the submersed ones pinnately parted with capillary or filiform segments, and sessile flowers in the axils of the upper leaves (which are frequently reduced to bracts) bibracteolate the uppermost usually staminate, the lower fertile the intermediate often perfect. Flowers monœcious or frequently perfect. Calyx 4-parted in the sterile flowers, 4-toothed in the pistillate and perfect ones. Petals 4, frequently inconspicuous or wanting. Stamens 4 or 8. Ovary 4-celled: stigmas oblong or linear, often compressed, penicillate, or papillose along the inner surface, recurved. Fruit of 4 indehiscent nut-like carpels cohering by their inner angles and enclosed in the adherent tube of the calyx, apiculate with the base of the stigma.

* Stamens 8, petals caducous carpels not ridged on the back: leaves verticillate

M. **spicatum** L. Sp. 992. Stems very long and slender, branching: leaves ternately verticillate. submerged all pinnately parted with capillary segments, emersed leaves bract-like, shorter than the flowers, ovate, entire, the lowermost larger and serrate: bracteoles triangular-ovate, about half the length of the bracts: lobes of the calyx somewhat obtuse: petals broadly ovate: anthers oblong: stigma short, pubescent along the inner side: carpels smooth and even. Deep ponds, Washington to California and the Eastern States.

M. **verticillatum** L. Sp. 992. Stem stout: leaves ternately verticillate, the lower ones pinnately parted with capillary or setaceous segments, floral leaves pectinate-pinnatifid, commonly much longer than the flowers: bracteoles minute: lobes of the calyx nearly lanceolate, acute, minutely serrulate: petals oblong-obovate: anthers oblong, stigmas linear-oblong, at length woolly: carpels smooth and even. Oregon, *Nuttall* (not since reported) and the Eastern States.

* * Stamens 3: petals somewhat persistent: carpels 1–2 ridged on the back.

M. **hippuroides** Nutt. T. & G. Fl. i, 530 Leaves quaternately verticillate, the lower ones pinnately parted, with capillary segments; floral leaves linear, remotely denticulate or serrate; petals obovate, carpels nearly 2-ridged on the back. In ponds, Washington to northern California.

M. pinnatum Walt. Leaves in whorls of 3's and 5's, sometimes scattered, the floral linear, pectinate toothed, or cut serrate, the teeth comparatively few, 5–12 lines long, gradually changing into the submerged which are in crowded verticels, the capillary pinnæ sparse; spikes 3–6 inches long: petals purplish, somewhat persistent, stamens 4, very rarely 6: mature fruit about 1 line long: carpels strongly 2-keeled.

ORDER XXXVIII. ONAGRACEÆ. Dumort. Anal. Fam. xxxvi. 35.

Herbaceous or sometimes shrubby plants with entire or toothed leaves, with flowers in the axils or in terminal spikes or racemes. Sepals united into a tubular calyx, the limb 4-parted rarely more or less; valvate in the bud. Petals usually as many as the lobes of the calyx, and attenuate with them, inserted on the summit of the tube: twisted in the bud, sometimes wanting. Stamens as many or twice as many as the lobes of the calyx, rarely half as many, inserted with the petals, filaments distinct; ovary coherent with the tube of the calyx, 2-4-(or by abortion) 1–2-celled: placenta in the axis, style elongated or filiform; stigma capitate or 4-lobed, fruit capsular with mostly loculicidal dehiscence, or dry and indehiscent, rarely baccate. Seeds indefinite or solitary in each cell, anatropous without albumen; embryo straight.

TRIBE I. JUSSIEÆ. Limb of the calyx divided quite down to the ovary and persistent on a many-seeded capsule. Seeds naked.

1. **Ludwigia.** Petals 4 or none. Stamens 4. Capsules short.

TRIBE II. ONAGREÆ. Limb of the free tube of the calyx, when there is any, deciduous from the ovary or capsule. Capsule loculicidal, few to many seeded. Parts of the flowers in fours.

* Seeds comose at the apex; stamens 8, lower leaves often opposite.

2. **Epilobium.** Calyx 4-parted nearly down to the ovary or with a short and campanulate tube beyond it.

* * Seeds not comose: leaves all alternate.

+ Anthers attached near the middle and versatile. Petals generally yellow or white.

3. **Gayophytum.** Calyx-tube not produced beyond the ovary; this and the membranous capsule only 2-celled.

++ Stamens all of equal length.

= Stigma deeply 4-cleft, its segments linear.

4. **Onagra.** Ovules and seeds horizontal, inserted in 2 or rarely in several rows, prismatic-angled.

5. **Œnothera.** Ovules and seeds ascending in one row; not angled: flower-buds erect: flowers yellow.

6. **Anogra.** Ovules and seeds ascending, not angled, in two rows: flower-buds drooping, flowers pink or white.

= = Stigma entire or rarely 4-toothed: ovaries and capsule sessile or nearly so.

7. **Taraxia.** Stigma capitate: calyx-tube longer than the ovary, usually adherent to the style.

8. **Sphærostigma.** Stigma capitate: calyx-tube campanulate, shorter than the ovary.

= = = Stigma capitate, ovules and capsule long-stalked.

9. **Chylismia.** Calyx-tube somewhat funnel-form, many times shorter than the ovary.

++ ++ Flowers irregular: the alternate stamens longer.

10. **Pachylophus.** Plants normally acaulescent: ovules and seeds few, sessile: seeds with a deep furrow along the raphe.

+ + Anthers attached at or near the base, remaining erect; those opposite the petals much shorter or sterile, rarely wanting; petals never yellow.

11. **Godetia.** Calyx-tube above the ovary obconical, its lobes reflexed. Petals sessile, entire, rarely 2-lobed. Capsule coriaceous. Seeds numerous angled or margined.

12. **Boisduvalia.** Calyx-tube above the ovary obconical, its lobes erect. Petals sessile, 2-lobed. Capsule membranaceous, the cells few-seeded, seeds smooth.

13. **Clarkia.** Calyx-tube above the ovary obconical; its lobes reflexed. Petals with claws either lobed or entire: the stamens opposite them often sterile. Capsule coriaceous.

TRIBE III. GAURINEÆ. Limb or produced tube of the calyx deciduous from the dry and indehiscent 1–4-seeded fruit. Parts of the flowers in 4's or rarely 3's. Leaves alternate.

14. **Gaura.** Stamens 8, all perfect. Anthers attached by the middle, versatile.

15. **Heterogaura.** Fertile stamens 4 with anthers attached at the base, sterile stamens 4 opposite the petals.

TRIBE IV. CIRCÆEÆ. Limb of the calyx deciduous from the indehiscent burr-like 1–2-seeded fruit. Parts of the flowers in 2's throughout. Leaves opposite.

16. **Circæa.** Small perennial herbs with opposite petioled leaves.

LUDWIGIA L. Gen. n. 153.

Calyx-tube not produced beyond the short ovary, the 4 lobes usually persistent. Petals 4 often small or wanting. Stamens 4; filaments short. Capsule short or cylindrical, many-seeded, 4-valved, dehiscent septicidally or by openings at the summit. Seeds minute. Aquatic or marsh perennials; leaves entire (opposite in one species); flowers axillary, mostly solitary and sessile.

L. palustris Ell. i, 211. Stems creeping and rooting in the mud or floating, 4–12 inches long or more: leaves all opposite, ovate or oval, 6–12 lines long tapering to a short petiole acute: flowers solitary, sessile: petals none or short and reddish: capsule short-oblong 2 lines long or less some-

what angled. Western Washington and Oregon to California, in the Eastern States and Europe.

2 EPILOBIUM L. Gen. n. 471.

Perennial or annual herbs, with nearly sessile, denticulate or entire, often fascicled leaves, and rose-colored, purple or white, very rarely yellow, flowers in panicles or racemes. Tube of the calyx not conspicuously prolonged beyond the ovary; the limb deeply 4-cleft; campanulate or funnel-form or 4-parted to the base, the lobes spreading deciduous. Petals 4, spreading or somewhat erect. Stamens 8 the 4 alternate ones shorter; anthers elliptical or roundish, fixed near the middle. Stigma oblong, clavate or with four spreading or revolute lobes; capsule linear, 4-sided, 4-celled, 4-valved. Seeds numerous, ascending, the summit furnished with a coma or tuft of long hairs.

§ 1. CHAMÆNERION. Calyx cleft almost to the ovary. Corolla slightly irregular. Petals widely expanded. Stamens inserted in a single series; the filaments dilated below. Style at first recurved. Stigma with four ultimately divergent lobes. Capsule mostly linear-fusiform, many-seeded. Seeds fusiform, beakless, not papillate in one species. Cespitose perennials from a stout caudex, bearing sessile scaly winter buds with terete stems and ample leaves.

E. spicatum Lam. Fl. France 1077. Stems erect, 2–6 feet high, subsimple, glabrate below: leaves lanceolate, acute, nearly entire, 4–8 inches long, on very short petioles, thin pinnately veined, with the evident lateral veins confluent in submarginal loops: inflorescence elongated; racemes with small bracts; young flower buds soon reflexed, but again spreading or ascending before expansion: petals 5–7 lines long, style exceeding the stamens, hairy at base; capsule 2–3 inches long; seeds less than a line long, with very long dingy coma. Alaska to California, the Eastern States, Europe and Asia.

E. latifolium. L. sp. 347. A span to a foot or more high, frequently branched, mostly glabrate below; leaves 1–2 inches long; usually opposite and connected below on the branches and rarely on the main stem; lanceolate to ovate, acute at both ends, entire or sparingly and minutely denticulate, scarcely petioled, rather coriaceous, the mostly free lateral veins inconspicuous: inflorescence usually short and few-flowered, leafy throughout, the buds not reflexed; petals 8–15 lines long, rather narrow, styles shorter than the stamens, glabrous; seeds a line long or more. Damp places Arctic America to N. E. Oregon and N. E. states, Asia and the Himalayas.

§ 2. LYSIMACHION. Calyx with an evident though usually short tube mostly somewhat hairy within. Corolla regular, the petals deeply notched or obcordate; usually not expanding beyond funnelform. Stamens inserted in two more or less distinct whorls; those opposite the sepals longer and more deeply inserted. Style not declined mostly glabrous.

* Stigma 4-cleft: seeds beakless. Perennials with rather slender caudex and usually terete stems.

+ Capsule linear-fusiform; many seeded; seeds beakless. Rather tall plants with ample conspicuously-veined chiefly opposite leaves and large flowers with short and open calyx tube.

E. luteum Pursh 259. Stems slender a foot or two high, nearly simple; glabrate below except along the elevated lines decurrent from some of the nodes: leaves one to three inches long, ovate or elliptical to broadly lanceolate, acute or acuminate, sinuate-toothed, sessile or when large obliquely tapering to a winged petiole, slightly fleshy: inflorescence more or less glandular-pubescent; the flowers at first nodding, not very numerous, in the axils of the somewhat crowded and frequently reduced upper leaves; petals bright yellow 8–9 lines long, style frequently exserted, its obconical apex mostly deeply 4-parted: capsule long stalked more or less puberulent; seeds obovoid very acute at base, smooth or slightly areolated, less than a line long; coma at length reddish. Oregon to Alaska.

+ + Capsules rather short; subclavate-fusiform; few-seeded: rather low and slender stemmed, more or less cespitose plants, usually somewhat shreddy at base

++ Leaves rather broad; flowers large, rose-purple; style shorter than the petals.

E. rigidum Hausskn. Bot. Zeitschr. xxix, 51. Stems decumbent, 4–8 inches long, glabrous and rather glossy at base, glandular-pubescent above: leaves 8–16 lines long, the upper more or less attenuate, lanceolate to nearly obovate, acute, entire, cuneately narrowed into short winged petioles, glabrous and very glaucous, firm with mostly inconspicuous lateral veins: flowers rather few in the axils of the reduced upper leaves which are often adnate to the base of the peduncles; ovary more or less densely white pubescent; calyx cleft nearly to the base; petals 7–10 lines long; stigma very large, its surface pilose-papillate; seed smooth. Eastern base of the Coast range, Josephine Co, Oregon.

Var. canescens. Trel. Sp. Epilob. 83. Densely velvety-canescent throughout. With the type.

++ ++ Leaves relatively narrow, flowers rather small; cream-colored. style exserted; seeds nearly obconical, closely low-papillate.

E. suffruticosum Nutt. T. & G. Fl. i, 488. Stems woody and intricately much branched at base, a span high, minutely canescent throughout or at length glabrate below: leaves numerous, less than 10 lines long, mainly opposite, broadly lanceolate, acutish, entire, narrowed below but hardly petioled, thick, with inconspicuous veins: flowers rather few, in the axils of the scarcely reduced upper leaves; calyx-tube broadly funnel-form; petals 3–4 lines long; capsule an inch long, short-stalked: seeds a line or more long; coma long and very dingy. Oregon to northwest Montana and the Yellowstone Park.

* * Stigma more or less 4-cleft in the larger flowers, usually subentire in the smaller; capsule prominently ribbed, rather short and few-seeded; seeds beakless, very broad and blunt, usually abruptly contracted above the base, areolate or low-papillate; coma pale, falling easily: mostly slender annuals with terete stems, more or less glandular-pubescent above, and rather firm veinless leaves.

E. paniculatum Nutt. l. c. 490. Stems rather slender, 1–4 feet high, loosely dichotomously branched, mostly white glabrate below: leaves 1–2 inches long, chiefly alternate and fascicled in the axils, lanceolate or linear-lanceolate, often folded along the midrib, acute, rather sparingly denticulate, tapering to a slender winged petiole, gradually passing into the smaller bracts above: flowers rather remote towards the ends of the ascending branches, erect: the bracts often carried up on the peduncle;

calyx-tube very narrowly funnel-form, 1–2 lines long; petals about 4 lines long, violet; capsule fusiform, falcate, ascending about 10 lines long; seeds a line long, low-papillate. Brit. Columbia to California, and the Rocky Mts.

E. jucundum Gray Proc. Am. Acad. xii, 57. Stems erect, 2–4 feet high, diffusely paniculately branched: leaves linear-lanceolate, acute or acuminate, sparingly denticulate: 1–2 inches long, narrowed below to a distinct petiole: flowers somewhat fasciculate at the end of the branches; tube of the calyx linear, dilated at the top, 6 lines long; petals obcordate 6 lines long or more; capsule somewhat clavate. Dry prairies, eastern Washington to northern California.

E. Hammondi. Stems slender and flexuous, 1–3 feet high, paniculately branched above, glabrate and whitish below: leaves linear, 1–2 inches long: flowers larger, borne towards the ends of the branches, erect: calyx tube 6–8 lines long, almost filiform below; petals obcordate, 6 lines long or more, bright purple: capsule lanceolate to somewhat clavate about an inch long, ascending. On dry rocky slopes, Southwestern Oregon, blooming in August and September.

E. minutum Lindl. Hook. Fl. I. 207. Stems slender, a span or two high, simple or mostly with ascending branches throughout, crisp-pubescent below: leaves 6–10 lines long, usually alternate, narrowly to broadly lanceolate or the lowest spatulate, acutish, undulate, cuneately narrowed to a slender winged petiole; flowers rather numerous, erect; calyx tube broadly funnel-form, short; petals 1–2 lines long; capsules about one inch long, narrowed to the base, on short pedicles; seeds less than a line long, reticulated or low papillate. Brit Columbia to California.

* * * Stigma clavate, entire or slightly notched: coma of seeds mostly persistent. Plants of various habit; perennial by rhizomes, stolons, turions, etc. (Exceptions are *E. exaltatum* and *E. Oreganum*, both of which have conspicuously 4-lobed stigmas.)

+ Spreading by filiform remotely scaly subterranean shoots which end in ovoid winter bulblets with fleshy scales: capsule many-seeded: seeds more or less papillate mostly fusiform with conspicuous translucent beak at insertion of coma.

E. palustre L Sp. 348. Quite canescent above, with incurved hairs; leaves 1–2 inches long, narrowly oblong or rarely lanceolate, obtuse or almost truncate, gradually narrowed to a sessile base: fruiting peduncle often long and slender; flowers few, mostly nodding at first; seed fusiform with prominent scarcely narrowed translucent point. Swamps and wet places, Alaska to Oregon and the N. E. states.

+ + Producing at base of stem in late summer and autumn rosettes of foliage; leaves not revolute, more or less toothed: seeds papillate.

++ Habit of *E. palustre*: stems terete or with occasional low decurrent lines: seeds fusiform, prominently beaked.

E. Davuricum Fischer. A span or two high, mostly simple, the very slender stems sparingly incurved-pubescent, otherwise glabrous; roots densely fascicled: leaves less than 8 lines long, somewhat crowded at base, alternate and remote above, linear or oblong, obtuse, remotely denticulate, sessile, 1-nerved: flowers pale, not very numerous, nodding: capsule erect, 20 lines long, on long slender peduncles; seeds less than a line long; coma white. Bogs Alaska to Washington and east to the Selkirk range.

++ ++ Coarser branched plants of the habit of *E. coloratum*: stems with rather prominent ridges decurrent from some of the leaves:

leaves usually ample, commonly toothed, with evident lateral veins; capsule 20–25 lines long; seeds mostly broadly obovoid, short-beaked, sharply papillate in rather distinct longitudinal lines.

= Large flowered for the group, with rather deep violet petals 3–5 lines long, hairs within calyx-tube well developed: leaves mainly opposite; 1–2 inches long.

E. Franciscanum Barbey. Bot. Cal. i, 220 A span to mostly a foot or two high, the larger forms much branched; subcanescent or more or less pilose above; leaves elliptical-lanceolate to ovate-lanceolate: obtuse, with rather numerous and prominent serrations; rounded to the very short and broad petioles: flowers at first crowded scarcely exceeding the somewhat reduced leaves, clustered at the end of branches; seeds broad, very hyaline-papillate. Oregon to California and Nevada.

= = Petals 2–3 lines long, pale to mostly rather deep rose-colored; leaves for the most part attenuate, rather broad often purple in autumn.

E. coloratum Muhl. Glabrate below, the rather numerous paniced branches canescent with incurved hairs, at least along the decurrent lines and more or less glandular towards the end: leaves 2–6 inches long, lanceolate to oblong-lanceolate, acute, deeply and irregularly serrulate, mostly gradually narrowed to conspicuous slender petioles, glabrous except the uppermost, rugose veiny: flowers very numerous more or less nodding; petals 1–2 lines long, rosy: fruiting peduncles slender mostly short: seeds beakless, strongly papillate; coma at length cinnamon-colored, at least at base. Oregon and Eastern States.

E. adenocaulon Hausskn. l.c. 119. Habit of the preceding; inflorescence and capsule very glandular-pubescent, with few if any incurved hairs; leaves 2 inches long or more; frequently erect, elliptical to mostly ovate-lanceolate, obtuse, only slightly serrulate or denticulate, abruptly rounded to short winged petioles, rather pale green and glossy, glabrous except the uppermost which are gradually reduced and seldom as rugose as in *E. coloratum*; flowers very numerous, more or less nodding, two lines long, rosy; seeds obovoid, abruptly short-beaked; coma white. Oregon to New Brunswick, Pennsylvania, Utah and California.

Var. occidentale Trel. l.c. 95 Remotely leafy, especially the mostly strict glandular branches; leaves more triangular-lanceolate; 2 inches long on the main stem, prominently denticulate. Brit. Columbia to Central California.

Var.(?) perplexans Trel. l. c. 96. Slender, subsimple or with few ascending remotely leafy branches; less glandular, the inflorescence sometimes canescent with incurved hairs: leaves scarcely 2 inches long, divergent, lanceolate, rather obtuse, the upper acutely tapering to slender sometimes elongated petioles. Yellowstone Park to Oregon and California.

+ + + Producing globose or ovoid sessile or sub-sessile subterranean winter bulblets with fleshy scales: seeds papillate and more or less beaked.

++ Leaves mostly broad and ample or of medium size and with evident lateral veins; stems with more or less prominent lines decurrent from some of the nodes.

E. delicatum Trel. l. c. 98. Slender stemmed, glabrous except for the crisp-hairy lines above and slightly crisp-hairy or glandular inflorescence: leaves as much as 38 lines long, mostly very divergent, chiefly ovate-lanceolate and obtuse, undulately low-denticulate, rounded to the very short narrow base or cuneate and somewhat petioled, thin and pale: flowers

few, nodding; petals 2–4 lines long, violet; capsules 20–30 lines long, their slender peduncles about half as long: seeds finely papillate; coma dingy. Union county, Oregon (Cusick).

E. glandulosum Lehm. Hook. Fl. i, 206. Tall and rather thick stemmed, the largest specimens branched; commonly somewhat loosely crisp-pubescent above or with very flexuous glandular hairs: leaves crowded near the summit, frequently exceeding the inflorescence; 3–5 inches long, broadly ovate or ovate-lanceolate, the upper acute or subacuminate, prominently serrulate, mostly abruptly rounded to the base, drying dark: flowers erect, near the end of the stem: petals 2–3 lines long, more or less purple; capsules about 30 lines long, short-stalked: seeds coarsely hyaline-papillate or with the papillæ often entirely collapsed, very blunt above; coma dingy. Alaska and Brit. Columbia, perhaps Washington.

E. brevistylum Barbey. Bot. Cal. i, 220. Slender pubescent, leaves scarcely 2 inches long, ovate or elliptical, loosely and uniformly distributed along the stem, the uppermost reduced and surpassed by the nearly glabrous capsule; seeds slightly tapering upwards, coarsely hyaline-papillate. Springs etc, Washington to California.

E. ursinum S. B. Parish. A span to a foot high, slender: both leaves and stems below pilose with rather remote and spreading long white hairs; the inflorescence minutely glandular-pubescent: leaves an inch long or less, rather uniformly and in larger plants remotely distributed, ovate, broadly lanceolate, the upper subacute and serrate, the lower blunter and finely denticulate or nearly entire, very abruptly rounded to the sessile base, flowers few, erect or somewhat nodding; petals white or lavender, 2–3 lines long: capsules ascending 15 lines long on very slender peduncles of more than half their length, soon glabrous; seeds often very rough, short beaked: coma rather scant, white. San Bernardino county, California to Washington.

Var. subfalcatum Trel. l. c. 101. Lower but often branched below, almost without decurrent lines, densely tomentose or pilose to the glandular shorter inflorescence; leaves narrower sometimes falcate, entire or remotely and inconspicuously denticulate, mostly obtuse, more cuneate at base, more tomentose with inconspicuous lateral veins; capsule at first very short stalked. California to Southern Oregon.

E. Halleanum Hausskn. Monog Epilob. 261 Tall and slender, glandular-puberulent throughout or soon glabrous below, leaves remote, mostly ascending 10-15 lines long ovate to oblong-lanceolate, the lower obtuse, decidedly undulate-serrulate, abruptly sessile or some of them clasping, decurrent by the broad base; flowers and capsules ultimately rather remote in the upper axils; petals 2–3 lines long, pale to mostly rather deep violet; capsule almost 2 inches long on slender peduncles of nearly equal length, exceeding the subtending leaves: seeds sometimes smooth, usually very finely papillate, fusiform, blunt at base, with gradually narrowed pale apex and hyaline beak; coma scarcely dingy. Vancouver Island to Oregon.

‡‡ Leaves rather small with less conspicuous lateral veins evidently petioled; stems terete but sometimes pubescent in lines. Much-branched small plants, with the rather spreading leaves therefore mainly attenuate.

E. leptocarpum Hausskn. l.c. 258. A span or less high, glabrous except for some incurved pubescence on the stem: leaves less than 10 lines long broadly lanceolate, sparingly low-toothed, tapering from near the middle to the obtuse or subacute apex and winged petiole; flowers abundant

for the size of the plant; calyx-tube narrow; petals about 2 lines long, rosy capsules 10 lines long, on very slender peduncles of nearly equal length; seeds nearly ellipsoidal, shortly hyaline-beaked; coma at length cinnamon-colored. Oregon (Hall No. 188.)

Var.(?) Macounii Trel. l. c. 105 Less branched, crisp-pubescent in lines, the same pubescence more or less abundant also on the flowers and capsules; leaves more ovate; seeds longer; coma paler. Washington to Athabasca.

+ + + + Producing subterranean scaly branches which ultimately turn upwards and usually develop at once into leafy shoots.

++ Glabrous and glaucous; stems terete slender rather tall except in the variety usually somewhat cespitose, leaves mostly simple and opposite, subsessile with faint lateral veins; flowers erect or suberect; seeds obovoid; scarcely beaked, coarsely papillate.

E. glaberrimum Barbey. Bot. Cal. i, 220. About a foot high, simple or nearly so: leaves erect or ascending, often remote, an inch long, all but the lowest lanceolate, rather obtuse, entire to slightly repand, narrowed to the sometimes subpetioled base: petals purple to nearly white, 2–4 lines long: capsule 3 inches long, linear, falcate; seeds very rough with blunt papillæ, abruptly rounded to the short insertion of the barely dingy coma. In high mountains Washington to California.

Var. latifolium Barbey l. c. Rather firmer stemmed and more branched; sometimes dwarf; leaves more divergent scarcely an inch long; broadly ovate to ovate-lanceolate, mostly subcordately contracted to the very short base. Oregon to California and the mountains of Utah.

++ ++ Puberulent at least in lines; seeds more fusiform, usually somewhat beaked above.

= Seeds papillate.

E. Oreganum Greene Pitt. i, 225. Two to four feet high, stout simple or sparingly branched with ascending branches, glabrate and glaucous below, glandular-puberulent above: leaves ascending 2–3 inches long, lanceolate obtuse, closely denticulate, cuneately subsessile or abruptly rounded to short winged petioles; flowers rather numerous, erect in the axils of the reduced upper leaves; calyx-tube 1–2 lines long, narrowly funnel-form, petals violet 4–6 lines long, pubescent near the apex and on the outside of the four divergent stigmatic lobes; capsule nearly erect 20 lines long, usually subsessile; seeds oblong, fusiform, obliquely pointed at base and very shortly pellucid-beaked; coma white. In running water Spring Hill, Grant's Pass, Oregon.

E. Hornemanni Reichenb. Incon. Cirt. ii, 73. Mostly a span or two high; ascending, simple, somewhat crisp-hairy in the inflorescence and along the decurrent lines or slightly grandular at top, otherwise glabrate: leaves about an inch long, elliptical ovate, mostly very obtuse, nearly entire to remotely serrulate, the lower cuneately narrowed, the upper usually abruptly rounded to the short petioles: flowers rather few, nearly erect: petals 2–4 lines long, lilac to deep violet; capsule an inch long, slender, erect on slender peduncles, about equalling the gradually reduced subtending leaves; seeds rather abruptly short appendaged; coma somewhat dingy. Mountains, Brit. Columbia to California, Colorado, Utah and Europe

= = Seeds smooth or merely areolate.

E. Bongardi Hausskn Oesterr Bot. Zeitschr. xxix 89. A foot or less high, erect, simple with crisp hairy lines, apex at first nodding: leaves 1–2 inches long, crowded above, very broadly lanceolate, the upper acute,

sharply but remotely denticulate. usually crisp-ciliate, gradually narrowed to the conspicuous cuneately winged base; inflorescence sparingly glandular; flowers rather few, somewhat nodding: petals about 4 lines long pale or rosy; capsule rather slender, 20 lines long, on slender peduncles much shorter than the leaves: seeds nearly beakless; coma dingy. Alaska and the adjacent islands, perhaps Washington.

+ + + + + Often more or less cespitose by leafy stolons, otherwise simple or nearly so, sometimes apparently annual.

++ Seeds smooth or at most undulate-areolate except in forms referred to *Oregonense*.

= Leaves rather ample.

E. alpinum L. Sp. 348, in Part. Mostly a span or two high, simple, inflorescence and decurrent lines nearly glabrous; leaves thin and delicate, pale green, 20 lines long, sub-elliptical, rather obtuse, subentire to somewhat sharply serrulate, gradually narrowed to slender petioles: flowers few, suberect. in the upper axils; petals a line or more long, white or rosy-tipped; capsule very slender, erect or ascending, about 2 incles long, their peduncles rather slender and about equalling the subtending leaves or stouter and as long as the capsules: seeds smooth gradually attenuated at apex, with veiny beak. In the high mountain swamps, Brit Columbia to California and Eastern States.

= = Leaves narrow, subentire.

E. Oregonense Hausskn Monogr. Epilob. 270. A span high with few sterile shoots at base, erect even as to the apex, glabrous except for very sparing glandular hairs in the inflorescence; leaves 6–10 lines long crowded below, remote and very small above, narrowly oblong-ovate or the uppermost linear very obtuse, remotely denticulate, somewhat cuneately narrowed at base but sessile: flowers few, strictly erect; petals deep violet, 4 lines long; capsules about 2 inches long slender strict, much surpassing the summit of the stem, their very slender peduncles of nearly equal length, far exceeding the subtending leaves; seeds smooth, blunt. Bogs, Oregon to Brit. Columbia.

Var. (?) **gracillimum** Trel. Sp Epilob. 105. A span to nearly a foot high, cespitose, very slender; quickly erect and hardly bent at top, glabrous except the very minutely and sparingly glandular inflorescence: leaves shorter than the internodes, narrow, entire keeled, on the midrib; flowers few, nearly erect; petals white or pale, 3 lines long; seeds evidently papillate, the beak scarcely hyaline Bogs, Washington to California.

E. anagallidifolium Lam. Dict ii, 376. About a span high, at length rather densely cespitose, otherwise unbranched, stems very slender, strongly nodding at apex, somewhat crisp-hairy at least in lines; leaves 5–10 lines long, all but the lowermost very narrowly ovate or oblong, rather obtuse, entire or remotely denticulate; flowers few, crowded at apex somewhat nodding; petals lilac to violet, 2 lines long; capsule one inch long, slender, surpassing the end of the stem, their rather slender peduncles shorter than the leaves or when only one or two are present equalling the capsules; seeds short-beaked; coma somewhat dingy. Arctic America to California, also in the Old World.

++ ++ Seeds often coarsely papillate, nearly one-half longer than in the preceding group

E. clavatum Trel. l c. 111. A span high, mostly densely cespitose, the slender stems ascending, glabrate to sparingly glandular throughout; leaves 8–10 lines long, broadly ovate, very obtuse, mostly rounded to evident peti-

oles: flowers rather few, suberect, petals rose-colored, 2 lines long, capsules an inch long, subclavate, arcuately divergent the lowest often not reaching the apex of the stem, their slender peduncles equalling the subtending leaves: seeds fusiform, tapering into a pale beak. Oregon to Brit. Columbia, Wyoming and Utah.

3 GAYOPHYTUM. A. Juss. Ann. Sci. Nat. xxv, 18, Pl. 4.

Calyx-tube not produced above the ovary: the 4-parted deciduous limb reflexed. Petals 4, white or rose-colored, very small, obovate or oval with a very short claw. Stamens 8; anthers broad or rounded, attached by the middle, those opposite to the petals on shorter filaments and usually sterile. Ovary 2-celled: style short: stigma capitate or clavate. Capsule membranaceous, clavate, 2-celled, 4-valved. Seeds few to many, in one row in each cell, small, smooth, oblong, naked, ascending. Very slender branching annuals, of Western North America and Chili, with linear entire leaves and axillary flowers. The following are the only North American species known:

G. **lasiospermum** Greene Pitt. ii, 164. Stems 10–12 inches high, loosely dichotomous with filiform branches: the upper leaves and inflorescence more or less canescent with appressed or spreading short hairs: leaves ascending; flowers small, the petals about a line long: shorter stamens with small anthers: stigma globose, about 2 lines in diameter: capsule erect, about equalling the subtending leaves, narrowly linear or slightly clavate, scarcely torulose, on slender pedicels about 2 lines long: seeds mostly numerous, erect, not papillate, finely appressed pubescent. In the high mountains, Washington to Southern California.

G. **diffusum** T. & G Fl. i, 513. Minutely pubescent above especially when young, stems very slender, 6–18 inches high diffusely much branched above; leaves linear-spatulate to linear, the lower obtuse, the upper acute or acuminate; flowers 2 lines in diameter, petals ovate a line or less long; stamens all fertile; stigma small clavate; pod linear-subulate, minutely canescent, attenuate below to a slender pedicel; the cells 4-8-seeded Brit Columbia to California and the Rocky Mountains.

G. **eriospermum** Coville Bot. Death Valley Exp. 103. Stems 12–20 inches high, glabrous, widely branching: leaves narrowly linear, acute, attenuate at base, the largest 2 inches long and 3 lines broad: pedicels 4–8 lines long, erect: ovary appressed-pubescent: calyx-lobes 2 lines long, sparingly appressed-hairy: petals 3–4 lines long, obovate, rose-colored in age: capsule erect, about 5 lines long, torulose, commonly 8–10-seeded: seeds a line long, narrowly obovate, densely pubescent. In the mountains of Southeastern Oregon to middle California.

G. **ramosissmum** T. & G. Fl. i, 513. Glabrous or the inflorescence sometimes puberulent, diffusely much branched 6–18 inches high; leaves an inch long or less: flowers half a line long, mostly near the ends of the branches; capsule oblong, two or three lines long, on pedicels about the same length or shorter, often deflexed; 3–5-seeded. Eastern Oregon to Mariposa county, California.

G. **racemosum** T. & G. l. c. Glabrous or more or less canescent with short appressed hairs; 6–18 inches high, the elongated branches mostly simple; flowers half a line long, axillary the whole length of the branches; capsules linear, sessile or very shortly pedicelled, 8–10 lines long, usually many-seeded. Brit. Columbia to California.

G. pumilum Watson Proc. Am. Acad. Filiform stems 2–6 inches high, somewhat strict, sparingly branched above: flowers less than a line broad; capsule erect, very shortly pedicelled, 6 lines long by half a line broad or more; the numerous seeds oblique in the cells. Marshy places in the high mountains, from Washington to California.

4 ONAGRA Adns. Fam. Pl. ii, 85.

Caulescent annual or biennial herbs with alternate leaves and yellow nocturnal flowers, that are erect before opening. Calyx-tube more or less prolonged above the ovary, deciduous, segments 4, reflexed. Petals 4, equal obcordate to obovate sessile, yellow changing to pink in age. Stamens 8, equal in length. Stigma deeply 4-cleft, its segments linear. Ovules and seeds horizontal, inserted in two rows, rarely in several rows, prismatic-angled.

O. Hookeri. Small Bull. Torr. Club xxiii, 171. *Œnothera Hookeri* T. & G. *Fl. i, 493. Œ. biennis* of authors as to plants of our range. Stems erect, usually stout and mostly simple, 1–5 feet high, canescently pubescent and more or less hirsute or strigose: root often persisting for three or more years: leaves lanceolate to ovate-lanceolate, 2–6 inches long, acute or acuminate, repandly denticulate, the lowest petioled: flowers sessile, in a leafy spike; calyx villous, the tube twice the length of the ovary, rather shorter than the slightly acuminate segments: petals obcordate, 6–12 lines long, stigma linear; somewhat thickened: capsule 9–12 lines long, more or less pubescent or hirsute. Common along rivers, etc. Washington to California and the Rocky Mountains.

6 ANOGRA Spach. Ann. Sci. Nat. (II) iv, 164.

Annual or perennial caulescent herbs with alternate leaves and axillary white, becoming rose-color, diurnal flowers that are nodding in the bud. Calyx-tube prolonged above the ovary, deciduous. Stamens 8, equal. Style filiform; stigma 4-lobed. Capsule coriaceous or somewhat woody, dehiscing loculicidally, 4-valved. Ovules and seeds in 2 rows in each cell ascending, not angled.

A. trichocalyx. Small l. c *Œnothera trichocalyx Nutt.* Stems mostly stout, 6–12 inches long, erect or decumbent at base, white and shining, from a perennial base: leaves linear to oblong-lanceolate or rhomboidal, 2–4 inches long, acute or acuminate, attenuate to a long petiole, repandly denticulate or sinuate-pinnatifid with irregular marginal segments or the lowest entire: calyx very villous, the bud obtuse: tube slender, 6–18 lines long, naked: petals about equalling the calyx-tube, very broad, entire or deeply sinuous: capsule linear, tapering upward, 1–2 inches long: seeds linear not punctate, subangled. Southeastern Oregon to California and the Rocky Mountains.

A. pallida Britton Mem. Torr Club v. *Œnothera albicaulis* of authors as to the plants in our range. Stems rather stout, 6–24 inches high, simple or branched, white and often shreddy, from a perennial running root-stock: leaves linear to oblong-lanceolate, 1–3 inches long, entire or repand-denticulate, or sinuate-pinnatifid towards the base: calyx with the tips of the segments free, the tube rather slender, 9–12 lines long, throat naked; petals equalling or somewhat shorter than the tube, suborbicular, entire or emarginate; capsule linear, tapering upward, 1–2 inches long; seeds lanceo-linear, smooth, subangled. On sandy plains, Brit. Columbia to Oregon and Minnesota.

7 **TARAXIA** Nutt. Raimann in Engl. & Prantl Nat. Pfl. Fam. III, 216.

Acaulescent plant with pinnatifid or entire leaves and yellow or white axillary flowers. Calyx 4-parted, the tube filiform, longer than the ovary, marcescent or tardily deciduous, Petals 4, deciduous. Stamens 8, erect; anthers oval or oblong and fixed near the base or linear and fixed near the middle. Style usually adherent to the calyx-tube: stigma capitate, entire or rarely 4-toothed Capsule sessile. Seeds somewhat ascending, in a double series with a crustaceous testa.

T. graciliflora Raimann. l. c. (*Œnothera graciliflora H. & A.* Small villous annual: leaves linear. 18–30 lines long acuminate or obtuse attenuate or more frequently broad at base, entire or obscurely repand-dentate; ciliate calyx-tube 6–18 lines long; petals 3–5 lines long, yellow changing to greenish in age: capsule compressed-ovate 4–6 lines long coriaceous, tetragonal below and 4-winged above the middle, the wings obliquely truncate and hairy: seeds horizontal, smooth. On barren plains and gravelly bars, Southern Oregon and California.

T. heterantha Small l. c. (*Œnothera heterantha Nutt.* Glabrous perennial: leaves oblong-lanceolate tapering into a slender petiole. acute or acuminate, entire or repand, 2–4 inches long: tube of the calyx much shorter than the leaves, the segments linear-lanceolate; about the length of the broadly obovate retuse petals, anthers oblong, fixed near the base, capsule 9 lines long, obovoid-oblong. tetragonal, attenuate above into the persistent calyx-tube, the sides nearly flat, ribbed, subreticulated: seeds numerous, minutely pitted. On dry plains, Eastern Oregon and Idaho to Utah and Nevada.

T. ovata Small l c. (*Œ. ovata Nutt.* Subpubescent perennial leaves ovate to oblong-lanceolate, ciliate, acute. erosely or repandly denticulate, or serrulate, 2–8 inches long: calyx-tube 1–4 inches long: petals yellow, 3–10 lines long: capsule 6 lines long, strongly torulose: seeds few, in one or two rows, erect, oval a line long. In moist places, Southern Oregon to California.

T. longiflora Nutt. in Herb. (*Œnothera Nuttallii* T. & G. Densely pubescent perennial: leaves lanceolate, 2–6 inches long, petioled, acuminate, deeply sinuate-pinnatifid, the numerous very unequal segments often roundish or obtuse: tube of the calyx 12–18 lines long; petals 5–7 lines long usually white: capsule 6–10 lines long, terete, attenuate above into the persistent calyx-tube: seeds numerous, conspicuously pitted. Along streams, eastern Washington to California and Nevada.

8 **SPHÆROSTIGMA** F. & M. Ind. Sem. Hort. Petrop. ii, 49.

Annual or perennial caulescent herbs with entire or pinnatifid leaves and yellow white or rose-color flowers in bracted or leafy spikes. Tube of the calyx obconic or shortly funnel form, much shorter than the ovary; the limb 4-parted. Petals 4, entire or emarginate. Stamens 8, somewhat unequal, the oblong anthers attached near the middle. Stigma capitate, entire. Capsule linear, sessile, terete or tetragonal, attenuate at the apex, more or less contorted, completely 4-celled. Seeds ascending, in a single row in each cell, ovate to linear-oblong, smooth or nearly so.

* Flowers white or rose color, in a nodding spike: tube of the calyx funnel form: capsule narrowly linear, terete, much contorted: seeds linear acute at each end.

S. alyssoides Walp. Rep. ii, 78. *Œnothera alyssoides H. & A.* Canescently pubescent annual: stems 1–12 inches high, branching from the base: leaves oblanceolate or oblong-lanceolate, 1–3 inches long, attenuate into a slender petiole, entire or repand-denticulate; the bracts much smaller but similar: spikes many-flowered, elongating in age; tube of the calyx 2–3 lines long, equalling the orbicular entire white petals: capsule puberulent, 8–12 lines long, very slender: seeds nearly white, very minutely pitted. On sandy plains Southeastern Oregon to Nevada, Idaho and Utah.

S. Boothii Walp l. c., 77. Very viscidly pubescent annual; branching from the base, 2–4 inches high; leaves ovate, 6–12 lines long, acute or acuminate; denticulate, shortly petioled; tube of the calyx 1-3 lines long; petals rose-color, 2–3 lines long; capsule linear-fusiform, 6–9 lines long, viscid-glandular, much contorted; seeds brownish, angled, very minutely tuberculate. On dry hillsides, Eastern Oregon and Washington to California and Nevada.

* * Flowers yellow becoming greenish or bluish in age: calyx-tube obconic: capsule linear, tetragonal, more or less contorted: stems leafy throughout.

S. spirale Walp. Rep. ii, 77. *Œnothera cheiranthifolia Hornem.* Stems decumbent, spreading, often 2 feet long or more, canescently pubescent: leaves thick, 6–10 lines long, broadly ovate to oblong or lanceolate, the radical and lower cauline often spatulate or oblanceolate and slender petioled, mostly entire: calyx canescent, its tube 1–2 lines long; petals 3–4 lines long, yellow becoming bluish: capsule 4–8 lines long, subhairy, contorted: seed ovate oblong, acute at base, smooth. Along the coast, Southern Oregon and California.

* * * Flowers small, yellow usually turning red, calyx-tube very short; capsule elongated, very narrowly linear slightly curved.

S. contorta Walp. l. c. 78. *Œnothera strigulosa T. & G.* Nearly glabrous; the ovary and calyx usually somewhat appressed-pubescent: stems slender, ascending or erect, usually divaricately branched, 2–12 inches high: leaves linear or lanceolate, 3–9 lines long, attenuate at base, entire or sparingly denticulate, flowers very small: petals 1–2 lines long, usually turning red in age: capsule 8–13 lines long, sessile or attenuate into a very short pedicel, scarcely attenuate above, more or less curved or contorted: seeds smooth. On dry sandy plains Eastern Washington to California, Nevada and Arizona.

Var. pubens Small l. c 189. Pubescence hirsute and spreading especially below, often subglandular above, sometimes very smooth. Vancouver Island to Nevada; Arizona and Southern California.

Var. Greenei Small l. c Strictly erect with ascending somewhat virgate branches: pubescence neither white nor appressed, but spreading and hirsute: pods longer and slender. Oregon to California.

* * * * Low, flowers minute: capsule fusiform, short.

S. Hilgardi Small l. c 188. *Œnothera Hilgardi Greene.* Canescently pubescent; stems 3–6 inches high, divaricately much branched: leaves linear-spatulate, entire including the petiole 1–2 inches long: branches corymbose in flower, densely spicate in fruit, the spikes leafy; petals 1–2 lines long, obovate, entire: capsule 6 lines long, straight, sharply angled, attenuate upward; seeds obovate pale, smooth and shining. In moist places Eastern Washington and Oregon.

S. andinum Walp l. c. 79. *Œnothera andina Nutt.* Canescently pubescent throughout: stems slender, 1–3 inches high, becoming diffusely branched: leaves linear-spatulate 6–12 lines long, attenuate into a slender petiole: spikes mostly dense, many-flowered: flowers yellow, barely a line long: capsule 3–6 lines long, attenuate upward from near the base: seeds linear-oblong, nearly smooth. On alkaline plains, eastern Washington to Nevada, Montana and Utah.

9 CHYLISMA Nutt. Raimann, Engl. & Prantl, Nat. Pfl. Fam. iii, 217.

Caulescent annuals with pinnate or simple leaves and yellow flowers in terminal racemes. Calyx-tube funnel-form or obconic, the limb 4-parted. Petals 4, entire. Stamens 8, unequal; anthers oblong, attached near the middle. Stigma capitate, entire. Capsule linear, subcylindrical or subclavate, obtuse, membranaceous, not sessile, seeds ascending, in a single row in each cell.

C. scapoidea Small l c. 193. *Œnothera scapoidea Nutt.* Puberulent or subglabrous: stems erect, 4–18 inches high, usually branching from near the base: leaves mostly subradical, long-petioled, lyrately pinnatifid, or sometimes undivided, the terminal segment much the longest, ovate to oblong-lanceolate, cuneate to cordate at base, irregularly serrate, the prominent veins often dark colored, the lateral leaflets few to many or none, very irregular in size and shape: racemes at first nodding, the bracts very small or wanting; calyx-tube funnel form with a narrow base, 1–2 lines long, the bud closed and abruptly acute; petals yellow, 1–2 lines long: capsule glabrous, 4–12 lines long, attenuate into a pedicel 2–8 lines long, ascending or divaricate. Idaho and Wyoming to Utah and Southern California.

C. cruciformis. *Œnothera cruciformis K·ll. Œ. scapoidea Var. purpurascens Watson.* Stems erect, 6–18 inches high, stoutish usually branching from near the base: leaves mostly subradical, long-petioled, lyrately pinnate, the terminal leaflets much the largest; lateral few to several or none, very irregular in size and shape, racemes at first nodding, the bracts very small or wanting, calyx-tube funnelform with a narrow base, 2–3 lines long; the bud abruptly acuminate, petals white or pinkish, rarely yellowish, 3–4 lines long: capsule glabrous, 4–12 lines long, somewhat clavate, on pedicels 2–10 lines long. On alkaline plains, Southeastern Oregon to Nevada and Southern California.

10 PACHYLOPHUS Spach. Hist. Veg. iv, 365.

Acaulescent or very short caulescent perennials with entire or pinnatifid leaves and large white or rose-color flowers that open only at night or in cloudy weather. Calyx-tube elongated, somewhat dilated at the throat, the limb 4-parted, erect in the bud. Petals 4, sessile white, changing to red in age. Stamens 8, unequal: anthers oblong attached near the base. Capsule ovate or ovate-oblong, large and rigid, obtusely tetragonal or sharply angled, mostly sessile. Ovules horizontal, sessile few, in one or two rows. Seeds large, with a deep furrow along the raphe.

P. Nuttallia Spach. Hist. Veg. iv, 365. *Œnothera cæspitosa Nutt.* Glabrous or more or less villous with spreading subscabrous hairs: leaves oblong to narrowly lanceolate 2–12 inches long attenuate to a long petiole acute or acuminate, sometimes spatulate, irregularly sinuate-toothed or pinnatifid or repand-denticulate: tube of the calyx 2–7 inches long, 3–6 lines wide at the throat, segments not free in the bud: petals broadly ob-

cordate, 9–20 lines long: capsule oblong 1–2½ inches long by 3–6 lines in diameter, subattenuate at each end, sessile or short-pediceled, strongly ribbed at the sides and often with a double crest along the sutures: seeds in two rows in each cell, oval oblong, not angled, very minutely and densely tubercled upon the back, with a thin flattened process and a longitudinal furrow on the ventral side. Oregon and Idaho to California, Dakota and New Mexico.

11 GODETIA Spach. l. c.

Simple or branched erect annuals with alternate leaves and showy flowers in racemes or spikes. Calyx-tube above the ovary obconic or shortly funnelform, deciduous. Petals 4, broad and sessile, entire or emarginate or very rarely 2-lobed, lilac-purple or rose-color. Stamens 8, unequal, the filaments opposite the petals shorter: anthers all perfect, oblong attached at the base and erect or arcuate. Ovary 4-celled, many-ovuled. Style filiform: stigma-lobes short, linear or roundish. Capsule ovate to linear, 4-sided, somewhat coriaceous, loculicidally dehiscent. Seeds ascending or horizontal, in one or two rows in each cell, obliquely angled, the upper surface with a thin tuberculate margin.

* Capsule ovate to oblong, sessile, stems erect, leafy, usually stout and strict; the flowers in a strict compact spike erect in the bud.

G. purpurea Watson Bot. Cal. i, 229. Mostly very leafy, 1–2 feet high, canescently-puberulent, the ovary hirsutely villous; leaves oblong to oblong-lanceolate, 1–3 inches long, obtuse or acute, entire, sessile with an obtuse or attenuate base; flowers mostly in a leafy terminal cluster; calyx-tube 2–3 lines long, the tips not free; petals 4–6 lines long, deep purple; style shorter than the stamens, the stigma-lobes very short, purple; capsule ovate to linear-oblong, 6–9 lines long, acute, not attenuate at base, hairy, the sides nearly flat, ribbed. From the valley of the Columbia to California.

G. lepida Lindl. Bot. Reg. xxii, t. 1849. Erect, 6–24 inches high, canescently-puberulent, the stem usually white and shining; leaves oblong to oblong-lanceolate, 1–2 inches long, usually obtuse, sessile and scarcely attenuate at base, sparingly denticulate; flowers in a short simple spike; calyx-tube 2–3 lines long, the tips very slightly free; petals 9–12 lines long, rose-color with a darker spot near the apex; stigmas very short, purple; capsule 5–8 lines long, 2 lines broad and attenuate to the apex, hairy, the sides tricostate, at least alternately. Willamette valley to California.

G. decumbens Spach. Monog. Onogr. 68. Stems slender, erect or ascending, 3 inches to 3 feet high; leaves linear to oblong, 6–12 lines long; calyx-tube 2 lines long; petals 3–8 lines long, purple to rose-color; capsule shortly pubescent, 4–6 lines long. Columbia River to California.

G. Arnottii Walp. Rep. ii, 83. *G. lepida var. Arnottii Watson.* Nearly glabrous or subcanescently puberulent; leaves linear to lanceolate, 12–18 lines long, acute, entire or sparingly denticulate; petals 4–8 lines long; capsules glabrous or nearly so. Southern Oregon to California.

G. albescens Lindl. Bot. Reg. 27. Simple or branching from the base, erect, 1–2 feet high, canescently puberulent, leaves linear to oblong-lanceolate an inch long, acutish, sparingly denticulate; flowers small in numerous short lateral spikelets, mostly crowded into a compact spike; calyx-tube 2 lines long; petals 3–5 lines long, purplish-blue; stigmas

greenish to purple; capsule oblong 3–6 lines long, shortly hirsute or pubescent, at least the alternate sides tricostate. Oregon to California.

* * Capsule linear; flowers loosely scattered in a slender spike or raceme, nodding in the bud.

+ Capsules sessile.

G. **quadrivulnera** Spach. l. c. Usually very slender, erect, or ascending 1–2 ft. high, puberulent; leaves linear to linear-lanceolate, 1–2 inches long, sessile or attenuate to a short petiole; calyx-tube obconic, 2–3 lines long, the tips slightly free; petals 3–6 lines long, deep purple or purplish stigma lobes very short, yellow; ovary and capsule hairy, capsule linear 5–10 lines long, mostly short, attenuate at the apex, the sides nearly flat or channelled by the prominence of the sutures. On dry plains, Brit. Columbia to California.

G. **tenella** Watson l. c. Erect, 6–18 in. high, puberulent: leaves linear, 6–24 lines long, acute or obtuse, more or less attenuate, mostly entire: calyx-tube shortly obconic, 1–3 lines long, the tips closed or slightly free; petals 3–5 lines long, deep purple; stigma lobes purple or purplish, the style shorter than the stamens; capsules puberulent, 8–12 lines long, attenuate above but not at base, the sides nearly flat. Washington to California.

G. **viminea** Spach. Monog. Onogr. 60. Usually stout, 1–3 ft. high, branched; leaves linear to linear lanceolate, 1–2 in. long, narrowed at the base, entire; calyx-tube 2–4 lines long, the tips slightly free; petals 9–12 lines long, deep purple or purplish; capsule 9 lines long, 8-costate, smoothish. Washington to California.

+ + Capsule pedicelled not costate; stigmas mostly yellow; calyx tips not free in the bud.

G. **amœna** Lilja in Lindblom Bot. Notes 1839, 53. Usually slender, erect, 1–2 feet high, minutely puberulent; leaves linear to narrowly oblanceolate, or sometimes lanceolate, 1–3 in. long, petioled, entire or nearly so; calyx-tube obconic, 2–4 lines long; petals 8–15 lines long, frequently rather villous, as also the purple anthers, varying from nearly white to rose-color, with more or less of purple; filaments rather stout; stigma-lobes linear, 1–2 lines long, yellow; capsules 12–18 lines long attenuate to a slender beak above and into the pedicel below which is 2–6 lines long. Brit. Columbia to California.

G. **epilobioides** Watson Bot. Cal. i. 231. Erect, 1–3 ft. high tomentosely puberulent; leaves linear to linear-lanceolate, 1–2 inches long, petioled, entire or sparingly denticulate; calyx-tube 1–2 lines long; petals 3–6 lines long, light purple or rose-color; stigma lobes short; capsule 6–14 lines long, acuminate, attenuate to a short pedicel, or rarely nearly sessile. Brit. Columbia to California and Nevada.

G **hispidula** Watson l. c 603. Erect, 6–12 in. high, mostly simple and often but 1-flowered, hispidly puberulent, especially above; leaves very narrowly linear. 1–2 in. long: calyx-tube 2–3 lines long; petals 6–12 lines long, purple; filaments rather slender; style elongated and stigma-lobes linear; capsule 4–9 lines long, attenuate at the apex, abruptly contracted into a pedicel 2–4 lines long Brit. Columbia to California.

12 BOISDUVALIA Spach. Hist Veg. iv, 383.

Erect leafy annuals with alternate simple sessile leaves and small flowers in leafy simple or compound spikes. Calyx-tube funnelform above the ovary, deciduous, the lobes erect. Petals 4, sessile, 2-lobed, purple to white. Stamens 8, those opposite the

petals shorter; filaments very slender, naked at base; anthers all perfect, oblong, attached near the base. Ovary 4-celled several ovuled: style filiform: stigma-lobes short somewhat cuneate. Capsule membranaceous, ovate-oblong to linear, nearly terete, acute sessile dehiscent to the base. Seeds ascending few in one row in each cell, ovate-oblong, somewhat angled, smooth.

B. Torreyi Watson Bot Cal. i, 233. Villous throughout with short stiffish spreading hairs; stems rather slender, 4–18 inches high: leaves linear to lanceolate, usually narrowed at base, entire or somewhat denticulate, 4–9 lines long; the floral leaves similar and scarcely smaller; flowers in a loose simple spike, 1–2 lines long, purplish: capsule linear acuminate, 4–6 lines long, cells 6–8 seeded, the partitions adherent to the valves; seeds ovate half a line long or less. Washington to California.

B. Douglasii Spach. Hist. Veg. 223. *B densiflora Watson.* Canescently pubescent and more or less villous, often stout, 1–3 feet high; leaves lanceolate to linear lanceolate, acuminate, mostly denticulate, 1–3 inches long the floral leaves usually much shorter and broader; flowers usually in a close terminal spike or numerous lateral spikelets; calyx 1–3 lines long, about half the length of the petals; capsule ovate-oblong, smooth or slightly villous, 2–4 lines long, cell 3–6 seeded, the partitions wholly separating from the valves and adherent to the placenta; seeds nearly or quite a line long. In wet places, Brit Columbia to California.

B. glabella Walp. l. c. Glabrous or slightly pubescent: slender, 8–16 inches high; leaves ovate to oblong-lanceolate, acute, serrate, 6–12 lines long, the floral bracts scarcely smaller: flowers in a simple spike, shorter than the leaves, petals deep purple, less than a line long; capsule ovate-oblong, 2–4 lines long, the partitions adherent to the valves, seeds 4–6 in each cell, linear-lanceolate, a line long. In ditches and wet places, Brit. Columbia to Oregon and Nevada.

13 CLARKIA Pursh. Fl i, 260, t, 11.

Annuals with erect brittle stems, alternate leaves and showy flowers in terminal racemes. Calyx-tube obconical above the ovary, deciduous: the 4-cleft limb reflexed. Petals 4, with claws lobed or entire, purple or violet. Stamens 8, those opposite to the petals often sterile or rudimentary; anthers oblong or linear, attached by the base. Ovary 4-celled: style elongated; stigma with 4 broad lobes, sometimes unequal, at length spreading. Capsule linear, attenuate above, coriaceous, erect, somewhat 4-angled, 4-celled and 4-valved to the middle. Seeds numerous, angled or margined.

C. pulchella Pursh. l. c. Stem 6–20 inches high, simple or branched, inflorescence puberulent: leaves linear-lanceolate to linear, 1–3 inches long, nearly glabrous, entire petals 6–9 lines long, 3-lobed, attenuate to a long claw, which has a spreading tooth on each side; perfect stamens with a linear scale on each side at base, the alternate stamens rudimentary and filiform: stigma-lobes equal, dilated: capsule 8–12 lines long, 8-angled, on a spreading pedicel, 2–3 lines long; seeds obliquely cubical, minutely tuberculate. Brit. Columbia to California and the Rocky Mountains.

C. rhomboidea Dougl. Hook. Fl. i, 214. Stem slender, 1–2 feet high, simple or sparingly branched above, puberulent or nearly glabrous: leaves oblong-lanceolate to ovate, the upper narrower, all on slender petioles, entire; petals entire, rhomboidal, with a short broad claw which is

often broadly toothed; anthers all perfect; filaments with hairy scales at the base: stigma-lobes short: capsule 8–12 lines long, 4-angled, nearly glabrous, on pedicels about a line long; seed obliquely cubical, sparingly hispid. Washington to California.

14 GAURA L. Gen. n. 470.

Herbs with mostly sessile alternate leaves and numerous white or rose-color flowers in spikes or racemes. Calyx-tube prolonged beyond the obconic or clavate ovary; the 4-parted limb deciduous. Petals 4 with claws. Stamens 8, nearly equal; filaments furnished with a scale-like appendage on the inside next the base; anthers oval, versatile. Ovary 4 celled: ovules 1–2 in each cell, pendulous: style filiform, hairy below: stigma 4-lobed, surrounded by an obscure ring or indusium. Fruit nut-like, indehiscent or splitting at the apex, obtusely 4-angled and ridged upon the sides.

G. parviflora Dougl. Hook Fl. i, 208. Stems erect, 2–5 ft. high, sparingly branched softly white-pubescent and minutely glandular; leaves ovate-lanceolate, acute or acuminate, repand-denticulate, velvety pubescent on both sides, 1–3 inches long, the uppermost smaller; spikes virgate strict, very many flowered, much elongated in fruit, bracts lanceolate, subulate; petals spatulate, oblong, shorter than the calyx, segments, rose-color; fruit sessile, oblong-clavate, 4-nerved, 4-angled at the apex, about 2-seeded. Washington to California and east to Arkansas.

15 HETEROGAURA Rothrock Proc. Am. Acad. vi, 354.

Annual herbs with alternate leaves and small flowers in terminal racemes. Calyx-tube with a short obconic prolongation above the small ovary; limb 4-cleft, spreading, deciduous. Petals 4, entire, with claws. Stamens 8; filaments nāked; anthers ovate-cordate, attached by the base and not versatile; those opposite to the petals on shorter filaments, lanceolate, acute, sterile. Ovary 4-celled, with a solitary pedulous ovule in each cell: style long: stigma discoid, entire. Fruit nut-like, indehiscent, obovoid, 2–4-celled, 1–2-seeded.

H. Californica Rothr. l c. Smooth or sparingly puberulent, 12–18 inches high, leaves lanceolate, entire, 1–2 inches long, tapering to a slender petiole: petals purple, narrowly spatulate, 2 lines long: anthers very small: fruit 2 lines long, obovate, 4-angled, 1½ lines long, smooth, on a short spreading pedicel. Southern Oregon (Evans Creek, Jos Howell to California.

16 CIRCÆA L. Gen. n. 24.

Low perennial herbs with thin opposite petioled leaves and small white flowers in terminal and lateral racemes, the fruit on slender spreading or deflexed pedicels. Tube of the calyx slightly produced beyond the ovary; the free portion nearly filled with a cup-shaped disk, deciduous; the limb 2-parted. Petals 2, obcordate. Stamens 2, alternate with the petals: filaments filiform: anthers short. Style filiform: stigma somewhat capitate marginate. Capsule obovate, 1–2-celled, at length 2-

valved, with a single erect seed in each cell, hispid with hooked hairs.

C. Pacifica Asch. & Mag. Mostly glabrous, stems usually simple, 6–12 inches high, from a small tuber: leaves ovate, rounded or cordate at base, acute or acuminate, repandly-denticulate, 1–3 inches long; the slender petiole about as long; racemes without bracts; flowers half a line long; calyx white with a very short tube; fruit a line long, rather loosely covered with soft hairs curved above, 1-celled, 1-seeded. In damp woods, Brit. Columbia to California.

C. alpina L. Sp. 9. Glabrous, stems weak, 3–8 inches high, often branching above: leaves cordate, shining, rather coarsely toothed, 1–6 inches long, on slender petioles nearly as long as the blade: pedicels subtended by minute setaceous bracts: flowers reddish, especially before opening: fruit pubescent but scarcely hispid. In damp woods, Alaska to Washington and the Northeastern States and Canada.

ORDER XXXIX. CUCURBITACEÆ B. Juss. Hort. Trian. (1759.)

Tendril-bearing herbs with alternate palmately veined leaves and axillary monœcious or dicœcious, rarely perfect flowers. Calyx 5–6-toothed, the limb sometimes obsolete. Petals 5–6, distinct or more or less united with each other and coherent with the calyx. Stamens 5, sometimes distinct, commonly united in three parcels (two, and two and one separate) so as to appear like three stamens only, rarely 3 and diadelphous, filaments of each set sometimes connate; anthers usually long and sinuous, or variously contorted or folded, 2-celled, adnate, extrorse, commonly more or less connate. Ovary coherent with the tube of the calyx, usually of 3, rarely of 2 or 4, united carpels, sometimes 1-celled by the obliteration of the partitions, more often with each carpel spuriously 2-celled. Fruit fleshy or juicy, rarely membranous. Seeds anatropous, compressed, often enveloped by a juicy or dry and membranous arillus; the testa coriaceous, albumen none.

MARAH Kell. Proc. Cal. Acad. i, 38.

MEGARRHIZA (Torr.) Watson.

Flowers monœcious: the sterile in racemes or panicles; the fertile solitary, from the same axils. Calyx-tube broadly campanulate: teeth obsolete or very small. Corolla rotate, deeply 5–7-lobed, with oblong papillose segments. Sterile flowers with the stamens at the base: filaments short and connate: anthers free or somewhat adherent; the cells somewhat horizontal, flexuous. Pistillate flowers pedicelled: with or without abortive stamens: ovary oblong to globose, usually more or less echinate, 2-celled or more: cells 1–several-ovuled: ovules ascending, horizontal, or pendulous, the attachment mostly parietal: style short: stigma 2–3 lobed or parted. Fruit mostly echinate, more or less fibrous within, becoming dry, at length bursting regu-

larly. (?) Seed large, tinged, ovoid or subglobose, smooth, not margined; hilum linear, acute: cotyledons thick, remaining under ground in germination. Stems elongated and climbing, from large fusiform perennial roots; leaves cordate, palmately 5–7-lobed or angled; tendrils 2–5-cleft; flowers small, white.

M. Oregana *Megarrhiza Oregana Torr. Watson.* Stems 10–30 feet long; scabrous or nearly smooth; leaves cordate or reniform 3-6 inches broad, deeply 5–7 lobed, lobes broad-triangular, abruptly acute, mucronate, sterile flowers 10–20 in slender racemes 4–6 in. long, on slender pedicels; corolla 3–4 lines broad; fertile flowers without abortive stamens; ovary globose, densely echinate, 2–4-celled, the cells 1–2 ovuled, fruit globose to oblong, 1–2 in. in diameter covered with stout fleshy spines, 1–several-seeded, seeds orbicular 6-10 lines in diameter. In alluvial soil, Oregon and Washington to Idaho and Montana.

Order XL. LOASACEÆ. Reichb. Consp. 161.

Herbs with alternate or opposite leaves without stipules and usually showy flowers, the herbage often clothed with bristly hairs. Sepals united into an equally 5-lobed calyx, persistent. Petals 5 sometimes 10 (the inner series mostly dissimilar) inserted in the throat of the calyx. Stamens numerous, rarely few or definite, inserted with the petals, some of the outer filaments often dilated or petaloid and mostly sterile, the others commonly disposed in fascicles opposite the petals and slightly united. Ovary coherent with the tube of the calyx, 1-celled with mostly 3 parietal placentæ; ovules numerous or sometimes few rarely solitary, styles usually united into one. Fruit mostly capsular or succulent, crowned with the limb of the calyx. Seeds anatropous, usually with more or less fleshy albumen.

1 MENTZELIA L. Gen. n. 670.

Annual or biennial herbs with alternate mostly coarsely toothed or pinnatifid leaves and mostly showy flowers. Calyx-tube cylindrical to ovoid or turbinate; the limb 5-lobed, persistent. Petals 5 or 10. Stamens numerous, inserted below the petals on the throat of the calyx and not adnate to them: filaments free or in clusters opposite the petals, filiform, or the outer more or less dilated or sometimes petaloid and barren. Ovary truncate at the summit, 1-celled: style 3-cleft, the lobes often twisted: ovules pendulous or horizontal, few to many in one or two rows on the three linear parietal placentæ. Capsule short-oblong to cylindrical, few to many-seeded, opening by valves or usually irregularly at the truncate apex. Seeds flat or angled.

§ 1. Trachyphytum T. & G. Fl. i, 533. Seeds pendulous, few to rather many, small, in 1–3 rows, irregularly angled or somewhat cubical, not winged, opaque, minutely tuberculate: flowers in terminal cymes, mostly small: calyx-limb 5-parted:

petals 5: filaments all filiform or the 5 outer more or less dilated: capsule linear: leaves sessile, flat, sinuately toothed or pinnatifid: annuals.

M. albicaulis Dougl. Don Mill. iii, 61. Slender, 3–12 inches high or more: leaves linear-lanceolate, pinnatifid with numerous narrow lobes, the upper leaves broader and often lobed or toothed at base only: flowers mostly approximate near the ends of the branches: calyx-lobes 1½–2 lines long, a little shorter than the spatulate or obovate petals: filaments not dilated: capsule linear-clavate, 6–9 lines long: seeds numerous, rather strongly tuberculate, irregularly angled with obtuse margins less than half a line long. On sandy plains, Brit. Columia to California.

M. dispersa Wat. Proc. Am. Acad. xi, 115 & 137. Stems slender annual, 4–12 in. high, leaves narrowly lanceolate, sinuate-toothed or sometimes entire, the uppermost often ovate; flowers small mostly clustered near the ends of the branches: calyx lobes a line long, little shorter than the 5 spatulate or obovate petals; capsule narrowly linear-clavate, 6–9 lines long; seeds often in a single row, angular and somewhat rhombohedral, more or less grooved upon the angles, very nearly smooth, half a line long. Eastern Oregon to California.

M. gracilenta T. & G. Fl. i, 534. Stems pubescent 12–18 inches high: leaves narrowly lanceolate muricate-scabrous, pinnatifid, the lobes short, obtuse: flowers usually clustered at the summit; calyx-lobes 2–5 lines long; petals obovate to oblanceolate, 4–8 lines long, capsule linear clavate 6–12 lines long; seeds in three rows irregularly angled, minutely tuberculate. Idaho to California.

M. congesta T. & G. l. c. Slender, a foot high; leaves linear-lanceolate, pinnatifid with numerous narrow lobes, the upper leaves broader and often lobed or toothed at base only: flowers clustered at the ends of the branches, conspicuously bracted with broad toothed bracts, which are membranaceous at base: calyx-lobes 1½–2 lines long: petals bright orange, 3–6 lines long: filaments all filiform: capsule clavate, half an inch long: seeds irregularly angled, minutely tuberculate, nearly a line long. Interior of Oregon to California and Nevada.

§ 2. BARTONIA T. & G. Fl. i, 535. Seeds numerous in double rows upon the 3 broad placentæ, horizontal, flattened, suborbicular-winged, minutely tuberculate or nearly smooth: flowers often large and showy: calyx-limb 5-cleft nearly to the base: petals 5 or 10: filaments numerous, the outer often more or less dilated or petaloid: capsule broad, oblong: leaves sessile, sinuately toothed or pinnatifid: biennials.

M. lævicaulis T. & G. l. c. 535. Stout 2–3 ft. high, branching: leaves lanceolate, 2–8 inches long: flowers sessile on short branches, very large, light yellow, opening in sunshine: calyx-tube naked, the lobes 12–15 lines long: petals acute at each end, 2–2½ inches long, the filaments and slender style a little shorter: capsule 15 lines long, 3–4 lines in diameter: seeds very minutely tuberculate. On gravelly bars, Brit. Columbia to California.

M. Brandegei Watson Proc. Am. Acad. xx, 367. Stem branching, a foot high: leaves linear, pinnatifid with narrow lobes, 1–3 inches long; the bracts on the short pedicels mostly entire, very narrow: flowers in open corymbs: calyx-lobes 6–8 lines long, the 5 narrowly oblanceolate petals an inch long or more: stamens about 30, a little shorter, none petaloid: capsule narrowly oblong, 7–9 lines long by nearly 3 lines wide: seeds horizontal, flattened, with somewhat angular or rugose sides and narrow scarcely winged margin. Yakima County, Washington.

M. pumila Nutt. T. & G. Fl. i, 535 Stems 8–10 in. high, rough with a minute barbed pubescence, whitish branching towards the summit; leaves lanceolate, sinuate toothed or pinnatifid, the lower ones somewhat petioled, the upper sessile; flowers solitary or three together, terminating the loose flowering branches, slightly pedicilate, with1 or 2 linear-setaceous bracts at the base; petals 10, lanceolate, acute, spreading, longer than the lanceolate-subulate calyx-lobes, the inner ones smaller; stamens very numerous, the outer filaments flat and somewhat dilated; capsule clavate-cylindrical, 3-valved; seeds numerous winged. Colorado, perhaps Idaho.

Order XLI. FICOIDEÆ Juss.

Succulent herbs or shrubs with plain triquetrous, or terete, leaves without stipules. Calyx-tube coherent to the ovary, the lobes usually 5, unequal. Petals very many and linear, or none. Stamens 5–many, with slender filaments, inserted on the calyx-tube. Styles 4–20. Fruit 4–20-celled, dehiscent stellately across the summit or circumscissile or indehiscent. Seeds usually numerous and minute with mealy albumen.

1 MOLLUGO L. Sp. 89.

Low and much branched glabrous annuals, with linear to obovate-spatulate entire opposite and apparently verticillate leaves and axillary flowers. Calyx 5-cleft nearly to the base, lobes herbaceous, membranaceously margined. Petals none. Stamens 3 or 5, rarely twice as many, hypogynous. Styles 3. Capsule free, thin, membranaceous 3–5-celled, loculicidally 3–5-valved; the partitions breaking away from the persistent central placenta. Seeds several in each cell, longitudinally sulcate on the back.

M. verticillata L. l. c. Prostrate slender stems 1–6 inches long; leaves spatulate to linear-oblanceolate, an inch long or less; pedicels umbellately fascicled at the nodes; slender, 2–3 lines long; sepals and oblong-ovoid capsule about a line and a half long; seeds reniform, shining. Brit. Columbia to California and across the continent.

Order XLII. CACTACEÆ. Lindl. Nat. Syst. ed. 2, 53.

Succulent spiny plants with usually angular or 2-edged leaf-like stems without leaves, or these represented by fleshy processes or spines and sessile flowers. Sepals numerous usually indefinite and confounded with the petals, imbricated either coherent with and crowning the ovary or covering its whole surface. Petals numerous, usually indefinite in several series, arising from the orifice of the calyx. Stamens indefinite cohering more or less with the petals and sepals; filaments long filiform; anthers ovate, versatile. Ovary fleshy coherent with the calyx 1-celled with numerous parietal placentæ: ovules indefinite, styles united into a long tube or column; stigmas as many as the placentæ. Fruit succulent, 1-celled, many seeded. Seeds ovate or obovate anatropous without albumen.

1. **Cactus.** Globose or oval plants without proper leaves, covered with spine-bearing tubercles; spines never barbed: flowers sessile, solitary, from between the tubercles.

2. **Opuntia.** Branching or jointed spiny plants with subulate early deciduous leaves: spines always barbed: flowers from the same areola as the spines.

1 CACTUS L. Sp. Pl. 466. in part.
MAMALARIA Haw.

Roundish or somewhat cylindrical plants, destitute of woody axis, often with a somewhat milky juice, covered with conical or mammæform crowded spirally disposed tubercles which bear deciduous spines and tomentum at their extremity. Flowers sessile among the tubercles usually in a transverse zone. Tube of the calyx adherent to the ovary, the lobes 5–6 crowning the young fruit colored; petals 5–6 scarcely distinct from the calyx, longer than the sepals and united with them into a tube. Stamens filiform, in several series. Styles filiform; stigma 5–7-cleft, radiate. Fruit smooth.

C. viviparus Nutt. Fraser's Catalogue. Cespitose, the glomerules subglobose: tubercles cylindric-ovate, bearded, marked above with a proliferous groove; flowers bright red, large, exserted, exterior segments of the calyx ciliate; fruit filiform, greenish. On summits of gravelly hills, Eastern Oregon to British Columbia, east to Missouri.

2 OPUNTIA Mill. Gard. Dict. ed. 6.

Shrubby plants with articulate branches, the joints mostly compressed and dilated, bearing fascicles of prickles or bristles arranged in a quincuncial or spiral order; flowers arising from the clusters of prickles or along the margin of the joints. Sepals and petals numerous, adnate to the ovary, not produced into a tube, the interior petaloid. Stamens numerous, shorter than the petals. Style cylindrical constricted at the base, stigmas numerous, thick, erect. Fruit umbilicate at the apex, tuberculate, often prickly.

O. polyacantha Haw. Suppl. Succ. 82. *O. Missouriensis DC.* Prostrate, forming large spreading masses: joints light-green, orbicular, tuberculate, 4–8 inches long: leaves minute, 2–3 lines long: pulvina 6–8 lines apart, with reddish-brown bristles, all armed: spines 8–15, the 5–10 exterior radiant, setiform, whitish or reddish variegated; the 3–5 interior ones stout, reddish-brown, 1–2 inches long, 2–4 of them deflexed, the other one spreading or suberect and very stout: flowers yellow or sometimes purple; stigmas 5–8; fruit ovate, dry and spiny, with shallow flat umbilicus, 1–2 inches long: seeds irregular, large. Plains and mountains, Eastern Washington to beyond the Rocky Mountains.

Var. platycarpa Coulter Rev. Cact. 436. Joints elongated-obovate to obovate-orbicular, 3–5 inches long: pulvina 6–9 lines apart, with few straw-colored bristles, the lower ones unarmed or upper ones with few spines, or with exterior spines as in the species and mostly 1 stout spreading or deflexed reddish-brown interior one: fruit depressed-globose with a remarkably large and flat umbilicus, 4–9 lines long. Idaho to the Upper Missouri.

Var. borealis Coulter l. c. Joints elongated obovate to orbicular, 2–8 inches long: pulvina 6–9 lines apart, with few straw-colored bristles, and mostly one stout spreading or deflexed reddish-brown interior spine: fruit ovate, with depressed umbilicus, shortly spiny; seeds 2 lines broad, with narrow and acute margin. On sandy plains, Brit. Columbia to Eastern Oregon and Dakota.

Order XLIII. UMBELLIFERÆ Juss. Gen.

Herbs or rarely suffrutescent plants with alternate (rarely opposite) usually pinnatifid or ternately divided leaves, the petioles usually dilated and sheathing at base, and small flowers in simple or compound umbels, usually subtended by an involucre, and often by involucels. Calyx adherent to the ovary, its limb very small, 5-toothed or entire. Petals 5, inserted on the outside of the epigynous disk, usually inflexed at the point, the inflexed portion cohering with the lamina. Stamens 5 alternate with the petals, inflexed in the bud: anthers ovate, introrse. Ovary composed of two united carpels invested with the coherent calyx, 2-celled, with a solitary suspended ovule in each cell: styles 2, their bases dilated and thickened into a fleshy body (called stylopodium) which covers the top of the ovary; stigmas simple. Fruit consisting of two dry carpels which adhere by their faces (called comissures) to a common axis (called carpophore) at length separating from each other and suspended from the summit of the carpophore, each carpel indehiscent, marked with 5 longitudinal primary ribs, one opposite each petal and each stamen, and often with 5 secondary ones: in the substance of the pericarp are usually several longitudinal tubes (called vittæa), filled with a colored aromatic oil, which are commonly lodged in the spaces (intervalves) between the ribs but sometimes opposite them. Seeds anatropous, usually coherent with the carpel rarely loose. Embryo minute at the base of the copious horny albumen.

§ I. Fruit with secondary ribs the most prominent or the only ones: oil-tubes solitary beneath the secondary ribs or wanting: stylopodium conical (except in Daucus).

* Fruit bristly primary ribs filiform, secondary ribs winged, umbels compound; leaves pinnately decompound.

1. **Daucus.** Stylopodium depressed or wanting.

2. **Caucalis.** Stylopodium conical.

3 Coriandrum Calyx-teeth evident: fruit globose, with broad commissure

§ II. Fruit with primary ribs only.

* Fruit strongly flattened dorsally with prominently winged ribs.

+ Caulescent branching plants with solitary oil-tubes (except some species of Angelica) depressed stylopodium, filiform to winged dorsal and intermediate ribs and white flowers.

4. **Angelica.** Carpels with strong ribs, laterals forming a distinct double-winged margin to the fruit, oil-tubes one to several in the intervals, 2–10 on the commissure.

5. **Selinum.** Carpels with prominent winged ribs, the lateral ones usually the broadest; oil-tubes conspicuous, 2–4 on the commissure; seed sulcate beneath the oil-tubes.

+ + Caulescent branching plants, with solitary oil-tubes, conical stylopodium, filiform or stronger dorsal and intermediate ribs and white flowers.

6. **Heracleum.** Carpels with dorsal and intermediate ribs filiform; the broad lateral wings contiguous to those of the other carpel, strongly nerved towards the outer margin.

+ + + Short caulescent or acaulescent with solitary or numerous oil-tubes, no stylopodium, filiform dorsal and intermediate ribs.

++ Lateral wings coherent till maturity.

7. PASTINACA Calyx-teeth obsolete: fruit oval, very much flattened, glabrous.

8. **Coloptera.** Carpel with dorsal and intermediate ribs filiform or winged and approximate: lateral wings broad, very thick and corky: oil-tubes small, 4–8 in the intervals, 8–14 on the commissure

9 **Leptotænia.** Carpel with dorsal and intermediate ribs filiform or obsolete, the lateral wings with thick corky margin that is coherent with the margin of the opposite one till maturity: oil-tubes 3–6 in the intervals, 4–6 on the commisure. (Sometimes obsolete.)

10. **Peucedanum.** Carpel with dorsal and intermediate ribs filiform approximate, lateral wings broad and thin: oil-tubes 1–8 in the intervals, 2–10 on the commissure.

++ ++ Carpels not coherent.

11. **Pseudocymopterus.** Carpel with dorsal and intermediate ribs prominent and acute; lateral wings rather broad and thickish, oil-tubes 1–4 in the intervals, 2–6 on the commissure.

* * Fruit but slightly if at all flattened either way.

+ Fruit with all the ribs conspicuously winged, stylopodium depressed or wanting.

12. **Cymopterus.** Carpel somewhat flattened dorsally, with mostly 5 broad thin equal wings, the lateral wings distinct.

13. **Phellopterus.** Carpel somewhat flattened dorsally with 5 equal broad and corky-thickened wings, the wings distinct.

14. **Thaspium.** Carpels with 3 or 4 or all the ribs strongly winged: stylopodium wanting.

+ + Fruit with all the ribs prominent and equal acute or slightly winged stylopodium, conical oil-tubes numerous.

15. **Ligusticum.** Oil-tubes 2–6 in the intervals, 6–10 on the commissure.

+ + + Fruit with broad and equal corky ribs, stylopodium depressed, oil-tubes solitary.

16. **Cœlopleurum.** Carpel with very thick and prominent corky ribs.

+ + + + Fruit with very thick and corky lateral ribs, filiform dorsal and intermediate ones, stylopodium depressed, oil-tubes solitary.

17. **Orogenia.** Carpel flattened dorsally, lateral wings very corky thickened, oil-tubes very small 3 in the intervals, 2–4 on the commissure.

18. **Crantzia.** Seed terete, carpel with filiform dorsal and intermediate ribs lateral wings very thick and corky next the commissure; oil-tubes 2 on the commissure.

19. **Œnanthe.** Carpel with broad obtuse corky ribs the lateral ones largest, oil-tubes 2 on the commissure; seed semi-terete, sulcate beneath each oil-tube.

* * * Fruit flattened laterally.

+ Fruit prickly or with tuberculate scales, the ribs obsolete.

20. **Eryngium.** Calyx-lobes very prominent, rigid, often spinose, persistent.

21. **Sanicula.** Calyx-lobes somewhat foliaceous fruit sub-globose densely covered with hooked prickles, or tuberculate.

+ + Fruit neither prickly nor scaly.

++ Carpels flattened dorsally.

= Fruit with plane seed-face, numerous oil-tubes, depressed stylopodium and filiform ribs.

22. **Pimpinella.** Calyx-teeth obsolete, carpel with equal slender ribs.

= = Fruit with concave seed face, numerous oil-tubes and filiform ribs.

23. **Musenium.** Calyx-teeth prominent, stylopodium depressed; oil-tubes usually 3 in the intervals, unequal, 2–4 on the commissure.

24. **Eulophus.** Calyx-teeth prominent, stylopodium conical; oil-tubes 1–5 in the intervals, 4–8 on the commissure.

25. **Bupleurum.** Calyx-teeth obsolete: fruit oblong, with rather broad commissure.

++ ++ Carpels terete or slightly flattened laterally.

= Fruit linear-oblong, with concave seed-face and conical stylopodium.

26. **Leibergia.** Fruit flattened laterally, linear, beaked stylopodium wanting.

27. **Osmorhiza.** Calyx-tube obsolete, fruit acute at both ends, oil-tubes obsolete in mature fruit.

28. **Glycosma.** Calyx-teeth obsolete: fruit linear to linear-oblong, not attenuate at base.

= = Fruit with concave seed-face depressed stylopodium, and numerous oil-tubes.

29. **Valæa.** Carpel somewhat flattened laterally with prominent equal filiform ribs.

= = = Fruit with plane seed-face and depressed stylopodium.

a. Oil-tubes numerous, ribs broad and corky.

30. Sium. Calyx-lobes minute carpels with prominent corky nearly equal ribs; seed subangular.

b. Oil-tubes solitary in all the intervals.

31. Apium. Calyx-lobes obsolete; fruit ovate or broader than long: oil-tubes 2 on the commissure.

c. Ribs filiform.

32. Zizia. Calyx-lobes prominent; stylopodium wanting; seed terete sulcate beneath the oil-tubes.

= = = = Fruit with plane seed-face conical stylopodium and solitary oil-tubes.

33. Carum. Calyx-lobes small, carpels with filiform or inconspicuous ribs seeds dorsally flattened.

34. Tæniopleurum. Calyx-lobes prominent carpel with broad salient ribs.

35. Cicuta. Calyx-lobes rather prominent carpels with strong flattish corky ribs, the lateral ones the largest.

= = = = = = Fruit with plane seed-face conical stylopodium and numerous oil-tubes.

36. Berula Calyx-lobes minute; carpel nearly globose with very slender ribs thick corky pericarp and terete seeds.

++ ++ ++ Carpels strongly flattened laterally stylopodium depressed.

37. Hydrocotyle. Caylx-lobes minute or none carpel with 5 primary ribs and filiform intermediate ones.

I. Fruit with secondary ribs the most prominent or the only ones: oil tubes beneath the secondary ribs or wanting.

1 DAUCUS Tourn. L. Gen. n. 333.

Bristly annual or biennial herbs with pinnately decompound leaves foliaceous and cleft involucral bracts, entire or toothed involucels and white flowers in concave umbels. Calyx-lobes obsolete. Fruit oblong flattened dorsally. Carpel with 5 slender bristly primary ribs and 4 winged secondary ones, each bearing a single row of prominent barbed prickles. Stylopodium depressed or wanting. Oil-tube solitary in the intervals, 2 on the commissure. Seed-face concave or almost plane.

D. pusillus Michx. Fl. i, 164. Stems retrorsely papillate-hispid, from an inch to 2 feet high: leaves finely dissected into narrowly linear-segments: umbels unequally few to many-rayed; rays 6–18 lines long; pedicels very unequal, 1–8 lines long. On dry rocky or sterile ground. Brit. Columbia to California and across the continent.

D. CAROTA L. (THE CULTIVATED CARROT.) Stems bristly 1–4 feet high; leaves rather coarsely divided, the ultimate segments lanceolate and cuspidate, umbels with numerous elongated rays and prominent involucels. Escaped from gardens and extensively naturalized.

2 CAUCALIS L. Gen. n. 331.

Mostly hispid annual herbs with pinnately dissected leaves and white flowers. Calyx-lobes prominent Fruit ovate or oblong flattened laterally. Carpel with 5 filiform bristly primary ribs, and 4 prominent winged secondary ones with barbed or hooked prickles. Stylopodium thick-conical. Oil-tubes solitary in the intervals (that is under the secondary ribs), 2 on the commissure. Seed face deeply sulcate.

C. microcarpa Hook. & Arn. Bot. Beechey 348. Stem slender, erect, 3-15 inches high, nearly glabrous: leaves much dissected; slightly hispid: umbels at the ends of the stems and branches, very unequally 3–6 rayed involucre foliaceous the bracts divided: involucels of entire or somewhat divided bractlets: rays slender, 3 inches long or less, pedicels very unequal: fruit oblong, 2–3 lines long armed with rows of hooked prickles, the primary lateral ribs near and pushed around upon the commissural face while the adjoining secondary ones become marginal. Eastern Washington and Oregon to California and Arizona.

3 CORIANDRUM L. Gen. n. 356.

Slender branching glabrous annuals with pinnately compound leaves, no involucre, involucels of several small narrow bractlets, and white flowers. Calyx-teeth prominent. Fruit globose, with broad commissure carpels with inconspicuous secondary ribs Stylopodium conical. Oil-tubes beneath the secondary ribs. and obscure, the commissural pair larger. Seeds dorsally flattened with somewhat concave face.

C. SATIVUM L the common coriander has escaped from gardens and is seen along roadsides in places.

II. Fruit with primary ribs only.

4 ANGELICA L. Gen. n. 347.

Stout perennial branching herbs with ternately or pinnately compound leaves, scanty involucre or none, involucels of small bractlets or none and large terminal umbels of usually white flowers. Calyx-teeth mostly obsolete. Fruit ovate or oblong, with prominent crenulate disk. Carpels with strong ribs, the lateral ones broadly winged, the wings distinct from those of the opposite carpel, thus forming a double-winged margin to the fruit. Stylopodium depressed or sometimes slightly conical. Oil-tubes 1–several in the intervals, 2–10 on the commissure.

* Oil-tubes solitary in all the intervals.

A. genuflexa Nutt. T. & G. Fl. i, 620. Stems stout 2–6 feet high, glabrous except the rough-pubescent inflorescence; leaves once or twice ternate, the divisions often deflexed; leaflets ovate to lanceolate, more or less acuminate, irregularly and sharply serrate: umbel equally many-rayed, with no involucre, and involucels of numerous linear bractlets, rays an inch or more long; fruiting pedicels 4–6 lines long; fruit nearly round, emarginate at base and apex, glabrous; lateral wings broader than the body: oil-tubes 2 on the commissure: seed-face plane. In wet places; Oregon to Alaska, west of the Cascades.

A. Lyallii Watson Proc. Am. Acad. xvii, 374. Stout, 4–5 feet high, glabrous; leaves once or twice ternate then quinate, the uppermost reduced to large inflated petioles; leaflets ovate to lanceolate, acute or acutish, unequally dentate; umbel unequally many-rayed with neither involucre nor involucels: rays ½–4 inches long; fruiting pedicels thick, a line or less long: fruit oblong to obovate, glabrous 2–3 lines long; lateral wings as broad or broader than the body, oil-tubes 2 on the commissure: seed-face broadly concave. In the mountains, Oregon to Brit. Columbia, Montana and Idaho.

A. arguta Nutt. l. c. Stout 2–4 feet high, glabrous or the inflorescence sometimes minutely puberulent: leaves ternate then pinnate or bipinnate; leaflets mostly small, ovate to lanceolate, rather acute, serrate: umbel rather equally many-rayed with neither involucre nor involucels: rays 1–3 inches long; pedicels 3–5 lines long, fruit oblong-elliptical, glabrous 3–4 lines long, dorsal and intermediate ribs thick and slightly elevated; lateral wings very corky, thick and broad as the much flattened body or broader, oil-tubes 2 on the commissure (sometimes 4 in 2 distinct pairs): seed sulcate beneath the oil-tubes with plane face. Along high mountain streams, Oregon and Washington.

A. Hendersoni C. & R. Bot. Gaz. xiii, 80. Very stout densely tomentose throughout, especially the inflorescence and whitened lower surface of the leaves: leaves quinate then pinnate; leaflets thick, broadly ovate, 2-4 inches long by 2–3 broad, obtuse, serrate: umbel equally many rayed with no involucre and involucels of numerous linear-acuminate bractlets: rays 1–2 inches long: pedicels a line or less long: fruit oblong more or less pubescent, 3 lines long: dorsal and intermediate ribs prominent; lateral wings thick and corky, as broad as the body: oil-tubes 2 on the commissure, seed deeply sulcate beneath the oil-tubes, with plane face. Bluffs moistened by the sea spray Washington and Oregon

* * Oil-tubes in pairs in some of the intervals.

A. Canbyi C. & R. Rev. Umb. 40. Rather stout, 2–3 feet high, glabrous except the puberulent inflorescence: leaves bipinnate: leaflets lanceolate to ovate-lanceolate 1–2 inches long acute or acuminate, laciniately toothed: umbel rather equally 10–20-rayed, with neither involucre nor involucels; rays 1–2 inches long: pedicels slender 3–4 lines long: flowers pinkish: stylopodium conical: fruit oblong, glabrous at maturity; dorsal and intermediate ribs thin and very prominent somewhat winged; lateral wings rather thin half as broad as the body; oil-tubes solitary in the dorsal intervals in pairs in the lateral ones, 4 on the commissure; seed-face plane. Eastern Washington to Southern Oregon.

5 SELINUM L. Gen. n. 327.

Tall stout branching perennials with pinnately decompound leaves, few-leaved involucre, involucels of numerous bractlets and white flowers. Calyx-lobes obsolete. Fruit oblong to obovate with more or less prominent disk. Carpels with prominent winged ribs, the laterals usually broader. Oil-tubes conspicuous, 2–4 on the commissure. Seed sulcate beneath the oil-tubes, with plane face.

S. capitellatum Watson, Bot. King, 126. Very stout, 1–5 feet high, smooth except the tomentose inflorescence; leaves large with much dilated petioles bipinnate, the few leaflets oblong to linear-lanceolate, an inch or two long, coarsely laciniately toothed or lobed: umbel equally 6–12 rayed, with globose umbellets of sessile pubescent flowers having involucels of a

few deciduous bractlets: rays 1–2 inches long: fruit sessile and dilated; receptacle, hirsute, cuneate-obovate, 3 lines long: lateral wings broader than the dorsal and intermediate ones. Along stream banks eastern Oregon to Nevada and California.

S. Kingii Watson, Bot. King, 126. Smooth, 1–2 feet high: lower leaves bipinnate the upper nearly simply pinnate with dilated petioles; leaflets ovate or linear lanceolate, 1–3 inches long, coarsely and unequally serrate; umbel 5–10 rayed, with no involucels; pedicels 2–3 lines long, fruit broadly ovate, hispid, 2–3 lines long; lateral wings broader than the narrow dorsal and intermediate ones. Aquatic in mountain swamps Eastern Washington to Nevada and California.

S. Dawsoni C. & R. Bot. Gaz., xiii, 144. A foot or so high glabrous: leaves ternate then pinnate, the small ovate acute segments laciniately toothed to entire: umbel with involucels of linear-oblong scarious bractlets longer than the pedicels and abruptly ending in a longer attenuation: pedicels 1–2 lines long, fruit oblong, smooth about 2 lines long, with prominent wings, the lateral ones but little broader. At Pelly Banks Yukon river, lat. 61 deg., perhaps Northern Washington.

S. Benthami Watson. Bibl. Ind. 432. Glabrous throughout: leaves ternate then pinnate the oblong to linear-oblong acute segments 6–9 lines long, laciniately toothed or lobed to entire; umbels on stout peduncles, 10–15 rayed, with an involucre of a few linear setaceous bracts, and involucels of several elongated linear entire bractlets equalling the flowers or longer; rays about an inch long; pedicels 2–3 lines long: fruit ovate, 2 lines long, often with a single prominent calyx-tooth. Arctic shores and mountains to Queen Charlotte Islands, perhaps Northern Washington.

S. Hookeri Watson C. & R. Rev. Umb. 45. *Conioselinum Fisheri* of Anthers in part. Stout, 2–3 feet high, glabrous except the somewhat puberulent inflorescence: leaves large with much dilated petioles bipinnatifid, the narrowly ovate to linear-oblong acute segments an inch or less long, laciniately toothed or lobed to entire: umbel 10–25 rayed, with involucre of few deciduous linear-setaceous bracts, and involucels of narrowly linear more or less elongated bractlets; rays about an inch long; pedicels 2–3 lines long: fruit oblong, glabrous, 2–3 lines long, with prominent but scarcely winged dorsal and intermediate ribs and rather broadly winged thickish lateral ribs. Ocean bluff mouth of the Columbia to Alaska.

6 HERACLEUM L. Gen. n. 345.

Tall stout perennial herbs with large ternately compound leaves, deciduous involucres, involucels of numerous bractlets and large many-rayed umbels of white flowers with obcordate petals. Calyx-lobes small or obsolete. Fruit broadly ovate, very much flattened, somewhat pubescent. Carpel with dorsal and intermediate ribs filiform; the broad lateral wings contiguous to those of the other carpel, strongly nerved towards the outer margin. Stylopodium thick conical. Oil-tubes about half as long as the carpel 2–4 on the commissure. Seed very much flattened dorsally.

H. lanatum Michx Fl. i, 166. Very stout, 4–8 feet high, pubescent or woolly above: petioles much dilated; leaflets petiolulate round-cordate 4–10 inches broad irregularly cut-toothed: rays 2–6 inches long: fruit 4–6 lines long, somewhat pubescent. Wet grounds, Alaska to California and across the continent.

7 PASTINACA Tourn. L. Gen. n. 362.

Calyx-lobes obsolete. Fruit oval, very much flattened, glabrous. Carpel with broad lateral wings continuous to those of the opposite carpel, and strongly nerved towards the outer margin. Stylopodium depressed but prominent. Oil-tubes small, solitary in the intervals, 2–4 on the commissure. Seed very much flattened dorsally. Tall stout biennial herbs with pinnately compound leaves and yellow flowers.

P. SATIVA L the common parsnip is introduced almost everywhere. The leaflets are ovate to oblong and cut-toothed.

8 COLOPTERA C. & R. Rev. Umbelif. 49.

Dwarf sandy ground plants with small leaves, no involucre involucels of foliaceous more or less united bractlets and yellow flowers. Calyx-lobes obsolete or evident. Fruit ovate, glabrous. Carpel with dorsal and intermediate ribs filiform or winged and approximate; lateral wings broad very thick and corky, coherent till maturity with those of the other carpel forming a broad corky margin to the fruit usually thicker than the fruit proper. Oil-tubes very small, 4–8 in the intervals, 8–14 on the commissure. Seed very flat with plane or slightly concave face.

C. Parryi C. & R. l. c 50. Acaulescent, 2-6 inches high: leaves small, ovate in outline, bipinnate with very small oblong segments: involucels of slightly united bractlets: fruit with prominent corky and undulate dorsal and intermediate wings. N. W. Wyoming, to be looked for in Idaho.

9 LEPTOTÆNIA Nutt. T. & G. Fl. i, 629.

Stout glabrous short-caulescent perennial herbs with thick often very large fusiform roots, usually pinnately decompound leaves, involucre of few bracts or none, involucels of numerous small bractlets and yellow or purple flowers. Calyx-lobes obsolete or evident. Fruit oblong-elliptical, glabrous. Carpel with dorsal and intermediate ribs filiform or obscure and approximate; lateral wings broad very thick and corky, coherent until maturity with those of the other carpel, commissural face with a prominent central longitudinal ridge left after separation from the carpophore. Oil-tubes 3–6 in the intervals 4–6 on the commissure, mostly small, sometimes obsolete. Seed very flat, with plane or slightly concave face.

* Oil-tubes obsolete or very obscure.

L. dissecta Nutt. l. c 630. *Ferula dissoluta Watson Bot Cal. i, 271.* Stems stout, 1–3 feet high, leafy at base: leaves broad, a foot or so long, ternate and thrice pinnate: segments ovate or oblong 6–12 lines long pinnatifidly laciniate-lobed and toothed, puberulent on the veins and margins; umbel 8–20 rayed, with an involucre of few linear bracts, involucels of several linear bractlets; rays 2–5 inches long: flowers yellow or purplish; fruit sessile or nearly so 5–9 lines long, about 3 lines broad: seed-face plane. Brit. Columbia to California.

L. **multifida** Nutt. l. c. *Ferula multifida Gray.* Stems 1–2 feet high, somewhat spreading, leaves ternate and pinnate: umbels mostly without involucre, pedicels of the fruit 3–12 lines long: fruit 4–6 lines long: seed-face concave. Brit. Columbia to California, Utah and Montana.

* * Fruit with oil-tubes and pedicels.

L. **Watsoni** C. & R. l. c. 52. Low, a foot high or less, rather stout, somewhat branching: leaves few and small, at or near the base, ternate-pinnately decompound, the ultimate segments very small, ovate and cuspidate: umbel with 5–10 variously elongated divaricate rays, no involucre and involucels of few setaceous bractlets: rays 2–4 inches long: fruiting pedicels about 6 lines long and divaricate; fruit 6 lines long: oil-tubes 3 in the intervals: seed face concave. In the Wenatchee region, Washington.

L. **minor** Rose in Herb. Stems about a foot high, glabrous: leaves very much dissected, the alternate segments linear or filiform: umbel 8–20-rayed, with no involucre, and involucels of several linear accuminate bractlets; rays 3–4 inches long; flowers purple: fruit 6–9 lines long as long as the pedicels 4–6 lines broad; wings very corky margined: oil-tube prominent, 3 in the intervals of the distinct dorsal and intermediate ribs, 4 on the commissure. On stony hillsides in the John Day country, Oregon.

L. **purpurea** C. & R. l. c. *Ferula purpurea Watson* Stout many-stemmed from a large thick root; stems 2–4 feet high, whole plant glaucous with a white bloom: leaves ample very finely dissected, ultimate segments linear or filiform umbel many rayed with no involucre and involucels of several bractlets rays 3–4 inches long; flowers purple: fruit 9–12 lines long as long as the pedicels; 5–6 lines broad with very prominent corky margins to the wings: oil-tubes prominent. 3 in the intervals of the distinct dorsal and intermediate ribs, 4 on the commissure. On rocky hillsides along the Columbia river, near the mouth of the Klickitat.

L. **Californica** Nutt. l. c. 630. *Ferula Californica Gray.* Rather stout, 1–3 feet high, with 1 or 2 stem leaves: leaves ternate and pinnate or twice ternate; leaflets cuneate-obovate 1–2 inches long, usually 3-lobed, coarsely toothed above: umbel 15–20 rayed, with involucre of 1–2 narrow bracts or none and no involucels; rays 2–4 inches long, pedicels 2–4 lines long; fruit 5–7 lines long, 3–4 lines broad, with a thinner margin than any other species; dorsal and intermediate ribs distinct: oil-tubes 3–4 in the intervals 6 on the commissure. On dry hillsides, Southern Oregon to California.

10 PEUCEDANUM Koch Umb. f. 28 and 29, L. Gen. n. 339.

Short caulescent or acaulescent perennial or biennial herbs with fusiform or tuberous roots, ternate or pinnate to dissected leaves, no involucre, involucels usually present, and yellow, white or pinkish flowers. Calyx-lobes obsolete or evident. Fruit oblong to suborbicular. Carpel with dorsal and intermediate ribs filiform and approximate; lateral wings broad and thin, coherent till maturity with those of the other carpel, forming a broad, membranous wing to the fruit; commissural face without a prominent longitudinal ridge after separation from the carpophore. Oil-tubes 1–8 in the intervals, 2–10 on the commissure. Seed flat with plane or slightly concave face.

§ I. Mostly low, from globose tubers: leaves small more or less dissected, with short segments: wings of the fruit narrow: oil-tubes

mostly solitary in the intervals, or with accessory ones in some species.

* Always acaulescent, mostly glabrous.

+ Flowers white.

P. Hendersoni C. & R. Bot. Gaz. xiii, 210. Scapes 4–6 inches long, decumbent from a shallow constricted tuber 6–12 lines in diameter; leaves ternate then bipinnate, ultimate segments short and obtuse: umbel equally 2–5-rayed, with involucels of linear acuminate scarious bractlets; rays 6 lines long; pedicels 1–2 lines long; fruit ovate very glabrous 2½ lines long by 2 lines broad, with thickish narrow wings more or less involute and a rather prominent ridge on the commissural face: oil-tubes solitary in the intervals, 2 on the commissure: seed face plane. On high hill-tops, John Day Valley, Eastern Oregon.

P. Canbyi C. & R. l c 78. Scapes erect, 3–8 inches high, with a short underground stem from a thick more or less elongated root which ends in a globose tuber 6–15 lines in diameter: leaves ternate pinnate or bipinnate, ultimate segments small with 3–5 linear-oblong lobes: umbel equally 5–10-rayed, with involucel of narrowly linear scarious-margined bractlets: rays 1–2 inches long: pedicels 4–6 lines long; fruit oblong-ovate, glabrous, 4 lines long, with wings about half as broad as the body: oil-tubes solitary in the intervals, 2 or 4 on the commissure. High ridges, Eastern Oregon and Washington.

P. Geyeri Watson Proc. Am. Acad. xiv, 293. Low, glabrous; root moniliform with 2 or 3 small globose tubers: leaves ternate-quinate, with linear leaflets 4–9 lines long: umbel small with unequal rays: involucel of several linear acuminate bractlets; mature fruit unknown. Collected by Geyer Spalding and Lyall, not since reported.

P. farinosum Geyer Hook. Lond. Journ. Bot. vi, 235. Somewhat caulescent: stems slender from a rather deep-seated small round tuber 4–6 lines in diameter with numerous clusters of fine rootlets on its surface: leaves 2–3-ternate, with segments more or less lobed, ultimate divisions all linear: umbel 1–8 rayed, with involucels of few small linear bractlets: rays 1–2 inches long, fruit almost sessile, oblong-elliptical, glabrous, 3–4 lines long, 2 lines broad, with wings half as broad as the body: oil-tubes small, 2–4 in the intervals, 4–6 on the commissure: seed-face plane. From Brit. Columbia to California and Idaho.

P. Gormani *P. Watsoni C. & R in Part.* Stems 2–3 inches high from a shallow globular tuber an inch or less in diameter with fascicles of rootlets on its surface: leaves bipinnate, the ultimate divisions oblong or linear, umbel unequally 1–5 rayed with involucels of a few setaceous bractlets or none: fruit sessile or nearly so; ovate, rough-puberulent 3 lines long with wing more than half as wide as the body and conspicuous dorsal and intermediate ribs: oil-tubes one in each rib, 2–6 on the commissure, seed-face plane. High hills opposite The Dalles.

P. evittatum C. & R. Eight to eighteen inches high from a deep-seated small tuber, glabrous: leaves once or twice ternate then more or less pinnate into linear, callous-tipped segments 6–12 lines long: umbel somewhat unequal 8–18-rayed with involucels of numerous purplish lanceolate acuminate gamophyllus bractlets; rays 1–2 inches long, pedicels short: fruit oblong glabrous 4–6 lines long 2½ lines broad, with very thin wings more than half as broad as the body: oil-tubes none. Ellensburg, Washington. (*G. R. Vasey, 1889*)

+ + Flowers yellow.

P. Watsoni C. & R. Bot. Gaz. xiii, 209 in Part. Low, 2–3 inches

high with a short subterranean stem from a deep-seated fusiform root: leaves bipinnate, the ultimate divisions short and linear-oblong; umbel unequally 1-5-rayed, with involucels of more or less united, often toothed bractlets: fruit sessile or nearly so, ovate rough puberulent, 3 lines long, with narrow wings, oil-tubes obscure, seed face plane. Simcoe Mountains, Washington.

P. Cous Watson l. c. xxi, 453. Glabrous or slightly puberulent, with roughish scape 2-6 inches high from a nearly globose tuber 6-12 lines in diameter: leaves pinnate: leaflets 3-7 parted or cleft or even entire; ultimate divisions linear-oblong: umbel unequally 3-10-rayed, with involucels of short oblong-ovate scarious-margined bractlets, rays from nearly wanting to 2 inches long; pedicels short: fruit oblong, more or less puberulent, 2-4 lines long, 1-2 lines broad, with wings about half as broad as the body, and prominent dorsal and intermediate ribs; oil-tubes large, filling the intervals: 4-6 on the commissure: seed-face plane with central longitudinal ridge. On high gravelly ridges, John Day Valley, Oregon.

P. ambiguum Nutt. T. & G. Fl. i, 626. From low acaulescent to a foot high and caulescent; glabrous: root tuberous, usually moniliform: petioles much dilated at base: leaves 1-2-pinnate with more or less elongated linear leaflets, the upper often more dissected: umbel unequally 8-18-rayed with mostly no involucels, rays 1-4 inches long; pedicels 2-3 lines long: fruit narrowly winged: oil-tubes 2 on the commissure. Oregon to Brit. Columbia, Idaho and Montana.

Var. leptocarpum C. & R. Rev. Umb. 59. Fruit sessile or nearly so making a close somewhat divaricate cluster: rays few and very unequal. Oregon.

P. circumdatum Watson l. c. xxii, 478. Stem solitary from a deep-seated constricted tuber, glabrous or puberulent a foot or less high: leaves ternate-quinate, the ultimate divisions linear 1-4 lines long: umbel unequally 6-12-rayed, with involucels of conspicuous broadly oblanceolate bractlets becoming scarious; rays ½-3½ inches long; pedicels very short: fruit oblong elliptical, glabrous, 3-4 lines long 1½ lines broad, with narrow wings and very prominent dorsal and intermediate ribs: oil-tubes 4 on the commissure: seed-face concave with a prominent central ridge. Oregon and Washington to Dakota.

§ II. Stout, glabrous only in P. Grayi, from large roots: leaves mostly large and very finely dissected, the ultimate segments filiform or narrowly linear: fruit wings more than half as broad as the body: oil-tubes 1-3 in the intervals, (solitary in P. Grayi and P. macrocarpum).

* Flowers yellow: fruit glabrous: short caulescent.

P. Grayi C. & R. Bot Gaz. xiii, 209. *P. millefolium Watson.* Glabrous, peduncles 2-20 inches long numerous from a thick perennial root: leaves ternate-pinnately decompound, the ultimate segments linear, elongated or short cuspidate, very numerous: umbel rather equally 6-16-rayed, with involucels of distinct linear-subulate bractlets; rays 1-3 inches long; pedicels 5-8 lines long: fruit oblong 4-8 lines long, 2-5 lines broad, with filiform dorsal and intermediate ribs: oil-tubes usually solitary in the intervals, 2-4 on the commissure. Common on dry rocky banks Oregon and Washington to Utah.

* * Flowers white.

P. eurycarpum C. & R. Rev. Umb. 61. Somewhat caulescent 6-12 inches high more or less pubescent from a long biennial caudex terminating below in a fusiform tuber: leaves bipinnate, segments pinnately incised, ultimate divisions ovate or shortly linear: umbel somewhat

equally 6–8-rayed, with involucels of conspicuous and somewhat foliaceous lanceolate or linear gamophyllus bractlets: rays 1–3 inches long: pedicels 2–5 lines long, calyx-lobes evident: fruit narrowly oblong, glabrous 4–12 lines long 2–3 lines broad, with wings about half as wide as the body, and filiform dorsal and intermediate ribs: oil-tubes solitary in the intervals, 2 or 4 on the commissure: seed face with a slight central longitudinal ridge. On dry rocky ridges and plains Brit. Columbia to California.

P. macrocarpum Nutt. l. c. 627. Caulescent, branching a foot or two high, more or less pubescent: leaves ternate-pinnately decompound, with small linear cuspidate segments; umbel 3–12-rayed with involucels of lanceolate acuminate often united bractlets rays from ½–4 inches long: fruit broadly elliptical glabrous 5–9 lines long: 3–4 lines broad with wings as broad as the body, on pedicels 1–5 lines long: oil-tubes large, solitary in the intervals, 2 on the commissure. Brit. Columbia to California.

§ III. Low and rather slender, from elongated comparatively slender roots leaves rather small, more or less pinnately compound. With short segments fruit-wings never broader than the body: oil-tubes 3–6 in the intervals.

* Flowers white, fruit-wings more than half as wide as the body.

P. Nevadense Watson Proc. Am. Acad. xi, 143. Glaucous-puberulent, shortly caulescent peduncle 3–15 inches high: leaves pinnately decompound with small segments: umbel equally 5–10-rayed, with involucels of scarious-margined linear lanceolate bractlets: rays often 1–2 inches long; pedicels 2–5 lines long: fruit rounded to ovate, somewhat pubescent, 3–5 lines long, 2–4 lines broad, with wings almost as broad as the body and evident dorsal and intermediate ribs: oil-tubes 3 or 4 in the intervals, 4 or 6 on the commissure. From Northern Cal. to S. E Oregon, Utah and Nevada.

* * Flowers yellow, fruit wings narrower.

P. Oreganum C. & R. Rev. Umb. 64. Acaulescent and cespitose from a multicipital caudex, with very slender peduncles 1–2 inches high bearing a very small single umbel or sometimes two nearly sessile umbellets and one to few matured puberulent fruits about 2 lines long ultimate leaf segments very small, linear-oblong not cuspidate. Alpine rocks Blue and Eagle Creek Mountains, Oregon. (Cusick).

P. villosum Nutt. Watson Bot. King 131. Acaulescent more or less densely pubescent 3–8 inches high: leaves finely dissected, with very numerous narrow crowded segments: umbel somewhat equally 4–5 rayed, with involucels of ovate to linear usually very tomentose bractlets; rays about an inch long; pedicels 1–3 lines long: fruit oval, somewhat pubescent with wings half as broad as the body, and prominent dorsal and intermediate ribs: oil-tubes 3 or 4 in the intervals 4 on the commissure, seed-face plane. Northern California and Nevada to the Yukon river.

P. Donnellii C. & R. Bot. Gaz., xiii, 143. Shortly caulescent or acaulescent 6–12 inches high, glabrous from a fusiform root; leaves ternate then pinnately decompound leaves with segments cleft into short oblong or linear lobes: umbel somewhat unequally 6–12-rayed, with involucels of linear acuminate bractlets: rays 1–4 inches long; pedicels 2–8 lines long: fruit ovate to broadly oblong, glabrous, 3–4 lines long, 2–3 lines broad, with wings less than half as broad as the body and prominent dorsal and intermediate ribs: oil-tubes small, 4–6 in the intervals, 4–6 on the commissure. In wet places, John Day Valley, Oregon.

P. Sandbergii C. & R. l. c. 79. Caulescent, branching at base, an inch or two to a foot high, from an elongated comparatively slender root

rough pubescent petioles wholly inflated, with a very conspicuous white scarious margin; leaves ternately or pinnately dissected, the ultimate segments very short, linear: umbel very unequally 6-15-rayed, with involucels of distinct linear-lanceolate bractlets; rays 1-4 inches long; pedicels a line or two long; flowers bright yellow: fruit ovate puberulent 2-2½ lines long with very narrow wings, and filiform dorsal and intermediate ribs oil-tubes 4-5 in the intervals 6 on the commissure: seed-face plane. Bare mountain tops, Northern Idaho and Montana to Brit. Columbia.

P. microcarpum Howell P. C. Pl. Coll. 1887. Caulescent, branching from the base 6-16 inches high, glabrous: leaves pinnately-decompound the ultimate segments oblong- to linear-lanceolate: minutely cuspidate: umbel somewhat equally 10-18-rayed with involucels of several linear-lanceolate bractlets 1-3 lines long: pedicels 2 lines long, flowers dark yellow: fruit oblong 3 lines long 2 lines broad with narrow wings: oil-tubes 4 on the commissure. On dry cliffs, Umpqua Valley.

§ IV. Shortly caulescent, slender from elongated comparatively slender roots; glabrous; leaves small, lanceolate or oblong in outline, pinnate or bipinnate with ovate toothed segments.

* Fruit wings half as broad as the body.

P. Hallii Watson Proc. Am. Acad. xi, 141. Peduncles elongated 6-15 inches high: leaves pinnate oblong in outline, the ovate segments ½-inch long, deeply toothed or pinnatifid: umbel equally 3-6-rayed, with small involucels; rays about an inch long; pedicels 3-4 lines long: flowers yellow: fruit broadly elliptical 3 lines long, 2 lines broad with filiform dorsal and intermediate ribs, oil-tubes 3 in the intervals 4-6 on the commissure. Northern Oregon and Washington.

* * Fruit wings much broader than the body.

P. Martindalei C. & R. Bot. Gaz. xiii, 142. Caulescent and branching, with elongated peduncles 4-12 inches high: leaves pinnate, or bipinnate with toothed or pinnatifid segment: fruit 4-7 lines long, 3-4 lines broad, with wings as broad or broader than the body, and prominent dorsal and intermediate ribs; oil-tubes solitary in the intervals, 2 on the commissure, seed-face somewhat concave with central longitudinal ridge. On bluffs of the Columbia river, near the Cascades.

Var. angustatum C. & R. l. c. 143. Usually more caulescent and sometimes taller with more dissected leaves, and wings of the fruit but half a line wide making a fruit 2 lines wide. On high mountains, Brit. Columbia to California.

§ V. Caulescent; from elongated comparatively slender roots: leaves decompound with narrow linear more or less elongated segments and usually wholly dilated petioles: bractlets of the involucels scarious-margined more or less conspicuous.

* Wings of the fruit nearly as broad as the body, thin: oil-tubes large and solitary in the intervals: dorsal and intermediate ribs prominent.

P. utriculatum Nutt. T. & G. Fl. i, 628. Caulescent to nearly acaulescent, 4-12 inches high from a more or less tuberous root, puberulent or glabrous: petioles very broadly dilated; leaves ternately or pinnately decompound, with ultimate segments narrowly linear, 6 lines long or less: umbel unequally 5-20-rayed with involucels of much dilated mostly obovate often toothed petiolulate bractlets; rays about 2 inches long, pedicels 2-5 lines long; flowers yellow; fruit broadly elliptical, glabrous, 2-5 lines long, 1-3 lines broad: oil-tubes 4-6 on the commissure: seed-face some-

what concave. On open places, Brit. Columbia to California, west of the Cascade Mountains.

* * Wings of the fruit narrow and thickish oil-tubes obsolete or very indistinct and numerous in the intervals: dorsal and intermediate ribs obsolete or nearly so.

P. bicolor Watson Bot King, 129. Caulescent or scarcely so, 4–18 inches high, glabrous or slightly puberulent: petioles wholly dilated; leaves ternate-pinnately decompound, the ultimate segments very numerous and linear: umbel very unequally 2–12-rayed, with involucels of 1–8 linear-subulate bractlets; rays 1–5 inches long; pedicels short; fruit oblong glabrous, 5–6 lines long, 1–2½ lines broad. Eastern Oregon to Nevada and Utah.

§ VI. Mostly tall and often stout, from long fleshy roots: leaves with usually broad or elongated segments: bractlets of the involucel small or none.

* Leaves with narrowly linear more or less elongated leaflets.

+ Low: flowers white.

P. Cusickii Watson Proc. Am. Acad. xxi, 453. Caulescent, 2–5 inches high, from a thick elongated root: leaves 1–2-ternate, the segments with 3–5 linear acute lobes, 3–12 lines long: umbel with 1–3 short fertile rays and involucels of narrow acuminate bractlets which are distinct or more or less united pedicels very short: fruit oblong-elliptical, 4–5 lines long the thin wings as broad as the body or narrower: oil-tubes 1–3 in the intervals, 4 or 6 on the commissure: seed-face concave. On the highest summits of Eagle Creek Mountains, Union county, Oregon.

+ + Taller: flowers yellow.

P. simplex Nutt. Watson Bot. King. 129. Caulescent, 6–18 inches high, puberulent: leaves ternate or biternate; leaflets from almost filiform to linear-lanceolate, 2–4 inches long: umbel unequally 3–15-rayed, with involucels of lanceolate or setaceous bractlets; rays ½–3 inches long: pedicels 1–3 lines long: fruit broadly oblong to nearly orbicular, sometimes emarginate at each end, 3–6 lines long, 2–5 lines broad, with wings broader than the body and prominent dorsal and intermediate ribs: oil-tubes large and solitary in the intervals, 2 on the commissure: seed-face slightly concave. Eastern Washington to California, Idaho and Montana.

P. triternatum Nutt. T. & G. Fl. i, 626. Caulescent 1–3 feet high, from a deep-seated elongated fusiform root: leaves biternate or triternate: leaflets from narrowly linear to linear-lanceolate, 2–4 inches long: umbel unequally 5–18-rayed, with involucels of lanceolate or setaceous bractlets; rays ½–3 inches long; pedicels a line or more long: fruit narrowly oblong, glabrous 3–6 lines long 1½–2 lines broad with narrow wings, and somewhat prominent dorsal and intermediate ribs: oil-tubes very large and broad, solitary in the intervals, 2 on the commissure. Brit Columbia to California, very variable.

Var. macrocarpum C. & R. Rev. Umb. 70. A more robust form with broader leaflets, longer rays and fruit 6–8 lines long. About Hood River, Oregon.

Var. brevifolium C. & R. l. c. Stout 6–18 inches high, rough-puberulent with more compact leaves, stout inflated petioles, and shorter and broader often toothed leaflets. On the high hills opposite The Dalles.

Var. alatum C. & R. l. c. Leaves with very narrowly linear and elongated segments fruit 5–6 lines long with broader wings. Eastern Oregon to California.

P. lævigatum Nutt l. c. 627. Caulescent or acaulescent, 6–15 inches high, glabrous, from shallow seated long roots: leaves triternate; leaflets linear 3–12 lines long by half a line wide: umbel unequally 10–14-rayed, with involucels obsolete or rarely 1–3 small triangular bractlets: pedicels 4–5 lines long: fruit 4–5 lines long 1½–2 lines broad, with narrow wings and prominent dorsal and intermediate ribs: oil-tubes 2 on the commissure: seed-face more or less concave with central longitudinal ridge. On bluffs of the Columbia River, near Celilo.

* * Leaves with lanceolate or orbicular segments.

P. leiocarpum Nutt l. c 626. Acaulescent, glabrous, 1–2 feet high, from a very long fleshy root: leaves biternate or triternate or ternate-quinate, sometimes simply ternate; leaflets thickish, from ovate to narrowly lanceolate 1–2 inches long, petiolulate, entire, or toothed at the apex: umbel very unequally 6–15-rayed without involucels; peduncles and rays dilated at summit: rays 1–8 inches long: pedicels variable 1–9 lines long: flowers yellow: fruit narrowly oblong 5–7 lines long 1½–2½ lines broad narrowly winged: oil-tubes large and solitary in the intervals, 4 on the commissure: seed-face somewhat concave. Brit. Columbia to California and Idaho.

P. Nuttallii Watson Bot. King. 128. Acaulescent, glabrous, 6–12 inches high: leaves once or twice ternate with ovate to orbicular leaflets with cuneate or cordate base; fruit ovate to oblong, 4 lines long, 3 lines broad, very narrowly winged: oil-tubes small, 3 in the intervals, 4 or 6 on the commissure: seed-face almost plane. Eastern Oregon to N. Nevada and Idaho.

P. Brandegei C. & R. Bot. Gaz. xiii, 210. Short caulescent, glabrous, 6–12 inches high from a thick elongated root; leaves ternately decompound the ultimate segments lanceolate, 6–12 lines long, cuspidate: umbel 6–12-rayed, with involucels of few linear or setaceous bractlets: rays 3–6 lines long; pedicels not more than a line long, both reflexed at maturity: flowers yellow: calyx-teeth evident: fruit (immature) oblong, about 4 lines long, 2 lines broad, with wings about half as broad as the body, and prominent dorsal and intermediate ribs: oil-tubes 2–4 in the intervals 4 or 6 on the commissure. Near Walla Walla, Washington. (*Brandegee.*)

* * * Very stout and tall with large decompound leaves and linear oblong segments.

P. Suksdorfii Watson Proc. Am. Acad. xx, 369. Caulescent, 2–4 feet high: leaf-segments 1–2 inches long, entire or 2–3-cleft at the top: umbel somewhat equally 6–12-rayed with involucels of linear acuminate bractlets; rays 1–5 inches long; pedicels 3–9 lines long: flowers yellow: fruit narrowly oblong, 9–11 lines long 3–6 lines wide with wings narrower than the body, and very prominent dorsal and intermediate ribs: oil-tubes solitary in the intervals, very large, 2 on the commissure: seed-face somewhat concave. Dry rocky mountain sides, Klickitat county, Washington.

§ VII. Low shortly caulescent or acaulescent, from a thick elongated root, glabrous: leaves ternate or pinnate with broad oblong or round coarsely cuspidate-toothed leaflets, flowers yellow: fruit-wings very broad, often several times broader than the body: oil-tubes 3–4 or solitary in the intervals.

P. Howellii Watson l. c. Short caulescent, peduncles 12–15 inches high: leaves biternate to biquinate: leaflets cuneate-orbicular to round-cordate, acutely dentate, often 3-lobed, 6–12 lines long: umbel with elongated and divaricate fertile rays with involucels of acuminate lanceolate

bractlets; pedicels 4 lines long: fruit glabrous, broadly elliptical or nearly orbicular, emarginate, with wings broader than the body, 4 lines long, oil-tubes 3 or 4 in the intervals 4–10 on the commissure. On dry hillsides, near Waldo, Josephine county, Oregon.

11 PSEUDOCYMOPTERUS C. & R. Rev. Umb. 74.

Mostly low glabrous perennials from a thick elongated root, with bipinnate leaves, no involucre and involucels of narrow bractlets mostly longer than the flowers. Calyx-lobes evident. Fruit ovate or oblong. Carpel with dorsal and intermediate ribs very prominent and acute: lateral wings rather broad and thickish, distinct from those of the other carpel. Oil-tubes 1–4 in the intervals, 2–6 on the commissure.

P. anisatus C. & R. l. c. 75. Acaulescent, cespitose from a much branched caudex which is more or less covered with the remains of old leaves: leaves on long petioles, narrow, somewhat rigid, pinnate and the leaflets pinnately-parted into linear pungently acute segments: peduncles 6–12 inches long exceeding the leaves: umbel unequally 5–12-rayed, with involucels of linear-subulate bractlets exceeding the white or yellow flowers: rays ½–3 inches long: pedicels 1–3 lines long: fruit about 2 lines long, the carpel irregularly 2–5-winged; oil-tubes 1–3 in the intervals, 2 or 4 on the commissure: seed-face plane. Oregon to Wyoming, Utah and Colorado.

* * Fruit not flattened either way or but slightly so.

\+ Fruit with all the ribs conspicuously winged; stylopodium depressed or wanting.

12 CYMOPTERUS Raf. Journ. Phys. 1819, 100.

Mostly low perennials from thick elongated roots with more or less pinnately compound leaves, mostly no involucre, prominent involucels and white, yellow or purple flowers. Calyx-lobes more or less prominent. Fruit usually globose, somewhat flattened laterally if at all. Carpel somewhat flattened dorsally with mostly 5 broad thin equal wings, lateral wings distinct from those of the other carpel. Stylopodium depressed. Oil-tubes 1–several in the intervals, 2–8 on the commissure.

C. terebinthinus T. & G. Fl. i, 624. Shortly caulescent, decumbent, 6–18 inches long, leafy at base: leaves rather rigid, thrice pinnate; leaflets a line long or less, linear or linear-oblong, entire or toothed, mucronate: umbel with 4–15 fertile rays, mostly no involucre, and involucels of short linear or lanceolate bractlets; rays ½–2 inches long; pedicels 1–5 lines long: flowers yellow: fruit 3–4 lines long, the 5 carpel-wings broad and thin: oil-tubes 2–5 in the intervals, 5–10 on the commissure. Brit. Columbia to California, Wyoming and Colorado.

C glaucus Nutt. Journ. Philad. Acad. vii, 28. Leaves and peduncles clustered at the summit of a short caudex, more or less scabrous-puberulent: leaves tripinnate the ultimate segments crowded, linear-oblong, with revolute margins: peduncles at first short, elongated in fruit and exceeding the leaves: umbels 5–15-rayed, with an involucre of setaceous bracts or none and involucels of linear acute bractlets; rays 4–12 lines long; pedicels 2–3 lines long; flowers white: fruit 2–3½ lines long, the 2–5

carpel-wings rather narrow: oil-tubes 3–5 in the broad intervals 6–8 on the commissure: seed-face deeply sulcate or involute. Nevada to Idaho and Montana.

13 PHELLOPTERUS Benth. B. & H. Gen. Plant. i, 905.

A low tomentose seashore herb with once or twice ternate or ternate-pinnate thick leaves ovate to roundish more or less confluent leaflets that are densely white-tomentose beneath, involucre and involucels of subulate bracts and glomerate white flowers. Calyx-lobes small. Fruit globose, glabrous. Carpel somewhat flattened dorsally, with 5 equal broad and corky-thickened wings; lateral wings distinct from those of the other carpel. Stylopodium depressed. Oil-tubes 2–3 in the intervals, 4–6 on the commissure. Seed-face slightly concave.

P. littoralis Schmidt. Fl. Sachel. in Mem. Acad Petrop. 7, xii, 138. Subacaulescent: petioles elongated; leaflets callous-serrate to dentate, with impressed veinlets above, 1–2 inches long: umbel shorter than the leaves, 10–12-rayed; rays 6–12 lines long; umbellets capitate: fruit 4–5 lines in diameter the wings 1½ lines broad. On shifting sands of the seashore, Vancouver Island to Southern Oregon.

14 THASPIUM Nutt. Gen. i, 196.

Perennial herbs with ternately divided leaves with broad serrate or toothed leaflets, mostly no involucre, involucels of small bractlets mostly yellow flowers and all the fruits pedicelled. Calyx-lobes conspicuous. Fruit ovoid to oblong, slightly flattened dorsally if at all, mostly glabrous. Carpel with 3 or 4 or all the ribs strongly winged. Stylopodium wanting; styles long. Oil-tubes solitary in the intervals, 2 on the commissure: Seed sulcate beneath the oil-tubes, almost terete or somewhat dorsally flattened with plane face.

T. aureum Nutt. l. c. Glabrous: radical leaves mostly cordate, serrate: stem leaves simply ternate: leaflets ovate to lanceolate, rounded or tapering at base, serrate: umbel 8–12-rayed; rays 6–12 lines long; pedicels about a line long, flowers deep yellow: fruit globose-ovoid, about 2 lines long. all the ribs equally winged. Thickets and woodlands through the Eastern States.

Var. trifoliatum C. & R. Bot. Gaz. xii, 136. Leaves or leaflets crenately-toothed. Ohio and Illinois to Oregon and Brit. Columbia.

Var. involucratum C. & R. l. c. Radical leaves twice or thrice ternate; leaflets as in the species: umbel with conspicuous involucre of serrate bracts and involucels of numerous toothed bractlets often as long as the pedicels which are 2–3 lines long. Kootenai county, Idaho (*Leiberg.*)

* * Fruit with all the ribs prominent and equal; stylopodium conical: oil-tubes numerous.

15 LIGUSTICUM Linn. Gen. n. 346.

Smooth perennials from large aromatic roots; with large ternate-pinnately compound leaves, mostly no involucre, involucels of narrow bractlets and white flowers in large many-rayed um-

bels. Calyx-lobes obsolete. Fruit oblong or ovate, flattened laterally if at all, glabrous. Oil-tubes 2–6 in the intervals 6–10 on the commissure. Seed with round or angled back and plane to deeply concave face.

* Leaves ternately decompound the broad leaflets simply toothed or serrate: seed-face plane.

L. Scoticum L. Sp. 250. Stems simple, 1–2 feet high, somewhat leafy, with glabrous inflorescence: leaves biternate; leaflets ovate, 1–2 inches long, coarsely toothed: umbel 8–15-rayed, with involucels of several linear bractlets; rays at length 1–3 inches long: fruit narrowly oblong, 4–5 lines long, with prominent somewhat winged ribs: oil-tubes small 2 or 3 in the intervals, 6 on the commissure: seed flattened dorsally with rounded back Alaska to Brit. Columbia, perhaps Washington, also on the N. Eastern coast.

* * Leaves ternate-pinnately compound with leaflets laciniately toothed or pinnatifid.

L. scopulorum Gray Proc. Am. Acad. vii, 347. Stout, 2–3 feet high, more or less leafy, with puberulent inflorescence: lower leaves often very large, twice or thrice ternate, then once or twice pinnate; segments ovate, laciniately pinnatifid; upper leaves often ternate-pinnate or simply pinnately compound: umbel of numerous rays with involucels of several narrowly linear elongated bractlets: rays at length 2–3 inches long; pedicels 6 lines long: fruit oblong, about 3 lines long, with somewhat prominent conical stylopodium, and prominent somewhat winged ribs: oil-tubes 3–5 in the intervals, 6–8 on the commissure: seed somewhat dorsally flattened, with angled or sulcate back and face with a broad shallow cavity and central longitudinal ridge. In the coast mountains of Southern Oregon, Sierra county, California, and the mountains of Colorado.

L. tenuifolium Watson Proc. Am. Acad xiv, 293 Stem slender, 1–2 feet high, naked above the base or with a single leaf, bearing 1–3 glabrous umbels: leaves small, ternate then pinnately decompound, finely dissected with laciniately divided leaflets the ultimate segments linear and short: umbel few-rayed, with involucels of 1 or 2 narrowly linear bractlets; rays about an inch long; pedicels 2–3 lines long: fruit oblong 1½–2 lines long, with narrow ribs: oil-tubes 3–5 in the intervals, 6–8 on the commissure. Union county, Oregon, to Colorado.

L. apiifolium Gray, Proc. Am. Acad. viii, 345. Stems 2–4 feet high, few-leaved or almost naked; inflorescence puberulent: leaves mostly radical, ternate or biternate then once or twice pinnate; the segments ovate, laciniately pinnatifid: umbel of numerous rays, with involucels of several narrowly linear elongated bractlets; rays at length about 2 inches long; pedicels 2–4 lines long: fruit oval 1½–2 lines long, with short conical stylopodium and narrow acute ribs: oil-tubes 3–5 in the intervals, 4–6 on the commissure: seed with round back and more or less deeply concave face, and a prominent central longitudinal ridge. In the mountains of Oregon and Washington.

L. Grayi C. & R. Rev. Umb. 88 Stems 1–2 feet high, with leaves nearly radical, and glabrous inflorescence: leaves ternate then pinnate, the segments ovate, laciniately pinnatifid: umbel of numerous rays with involucels of several narrowly linear elongated bractlets: rays 1–2 inches long; pedicels 2–4 lines long: fruit narrowly oblong, 2–2½ lines long, with short conical stylopodia and narrow prominent almost winged ribs: oil-tubes 3–5 in the intervals, 8 on the commissure: seed strongly flattened dorsally with angled back and face but slightly concave, with no central rid

Common from Washington to California.

L. verticillatum C. & R. Cont. Nat. Herb. iii, 320, t. 12. *Angelica verticillata Hook.* I have neither specimens nor description of this species, and the plate cited is not sufficient to draw one from: it is found on "shady grassy borders of pine woods of the high plains of the Nez Perces," Idaho.

16 CŒLOPLEURUM Ledeb. Fl. Ross. ii, 361.

Stout glabrous sea-coast perennials with 2–3-ternate leaves on very large inflated petioles, few-leaved involucre, involucel of numerous small bractlets and greenish-white flowers in many-rayed umbels. Calyx-lobes obsolete. Fruit globose to oblong, slightly flattened laterally if at all, glabrous. Carpel with very thick and prominent corky ribs. Oil-tubes small, one in the interval and 1 or 2 under each rib, 2–4 on the commissure, all adhering to the seed which is loose in the pericarp.

C. Gmelini Ledeb. l. c. Stems stout, 1–3 feet high: leaflets ovate, acute irregularly cut-serrate 2–3 inches long, 1–1½ inches broad: rays 1–1½ inches long: pedicels 3–4 lines long: fruit globose to oblong 2–3½ lines long, with ribs all nearly equal and seed-face plane. Alaska to the coast of Washington, also on the Northern Atlantic coast.

C. maritimum C. & R. Bot. Gaz. xiii, 145. Stems 2–3 feet high: leaflets broad, often round, usually with cordate base, very obtuse, dentate or crenate-denate, 2½–3 inches long, 2½ inches broad: rays 2–3 inches long; pedicels 6–7 lines long: fruit oblong 3–3½ lines long, with lateral ribs broader than the others, and seed-face plane. Wet ocean bluffs near the mouth of the Columbia and southward.

17 OROGENIA Watson Bot. King. 120, t. 15.

Dwarf glabrous nearly acaulescent plants from tuberous or fusiform roots with ternate leaves and linear segments, no involucre, involucels of few linear bractlets, and white flowers in subcompound umbels with very unequal rays. Calyx-lobes minute. Fruit oblong, very slightly flattened laterally, glabrous. Carpel much flattened dorsally with filiform dorsal and intermediate ribs: laterals excessively corky-thickened, involute (that is, extended towards the other carpel leaving between the commissural faces a cavity which is divided longitudinally by a thick corky projection from the middle of each face). Oil-tubes very small, 3 in the intervals, 2–4 on the commissure.

O. linearifolia Watson l. c. Stems slender, 1–2 inches high, from a deep-seated tuber: leaves 2 or 3, once or twice ternate, upon slender petioles; leaflets entire 1–2 inches long, 1–3 lines wide, obtuse: umbels 2–4-rayed, with nearly sessile flowers: fruit 1½–2 lines long; lateral ribs and commissural projection strongly developed. Oregon and Washington to Utah.

O. fusiformis Watson Proc. Am. Acad. xxii, 474. Rather stout 3–6 inches high, from a long fusiform root: leaves 2–3-ternate, with terminal leaflets often 3-parted; leaflets an inch or less long: umbels 6–10 rayed: fruit about 3 lines long, 1½ lines broad, lateral ribs and commissural pro-

jection smaller. California and Nevada.

Var. Leibergi C. & R. Rev. Umb. 92. Tall and slender, a foot or more high, with petioles correspondingly elongated. Sand hills in the Bitterroot Mts., Idaho.

18 CRANTZIA Nutt. Gen. i, 178.

Small glabrous perennial herbs, creeping and rooting in the mud, with leaves reduced to hollow cylindrical or awl-shaped petioles, jointed by transverse partitions, minute involucral bracts, and simple few-flowered umbels of white flowers. Calyx-lobes small. Fruit globose, slightly flattened laterally, glabrous. Carpel with filiform dorsal and intermediate ribs; laterals very thick and corky next the commissure. Oil-tubes 2 on the commissure. Seed terete.

C. linlata Nutt. l. c. Leaves very obtuse, 1–3 inches long, 1–2 lines broad: fruit a line long, the thick lateral wings forming a corky margin. In salt marshes, Vancouver Island to Oregon and the Atlantic Coast.

19 ŒNANTHE L. Gen. n. 352.

Mostly aquatic glabrous herbs, with succulent stems, pinnate or decompound leaves, and usually involucrate umbels of white flowers. Calyx-lobes rather prominent. Fruit globose, slightly flattened laterally if at all, glabrous. Carpel with broad obtuse corky ribs; laterals the largest. Stylopodium very short-conical. Oil-tubes 2 on the commissure. Seed sulcate beneath each oil-tube.

Œ. sarmentosa Presl. D C. Prod. iv, 138 Stems 2–5 feet high, leaves ternate and bipinnate; leaflets ovate, acuminate, toothed often lobed at base, 6–12 lines long: umbels many-rayed, with involucre of few linear bracts or none, and involucels of similar more numerous bractlets: rays an inch long or less; pedicels short: fruit about 2 lines long, with commissural face and ribs very corky. In marshes, Alaska to California.

* * * Fruit flattened laterally.

\+ Prickly, or with tuberculate scales.

20 ERYNGIUM Tourn. L. Gen. n. 324.

Glabrous perennials with mostly rigid, coriaceous, spinosely toothed or divided leaves and white or blue flowers, in dense sessile bracteate heads. the outer bracts form the involucre, the inner ones, bractless, intermixed with the flowers represent the involucels. Calyx-lobes very prominent, rigid and persistent. Fruit ovoid, crowded with hyaline scales or tubercles. Carpel with ribs obsolete. Stylopodium wanting: styles short or long, often rigid. Oil-tubes mostly 3 on the back and 2 on the commissure. Seed-face plane.

E. Vaseyi C. & R. Bot. Gaz. xiii, 142. Stems from a few inches to a foot high, several from a common root and branching above: leaves oblanceolate, unequally spinulose-serrate, attenuate below: involucre of narrow thick and rigid spinose and spiny-toothed bracts, much longer than

the heads; bractlets the same: fruit with lanceolate acuminate-cuspidate calyx-lobes longer than the short styles. Wet grounds, Southern Oregon to California.

E. **articulatum** Hook. Fl. i, 259. Erect, a foot or so high, more or less branching throughout: radical and lower stem leaves reduced to very long jointed petioles, with or without small lanceolate blades; upper stem leaves sessile: involucre of linear cuspidate-tipped and spiny-toothed bracts much longer than the heads; bractlets tricuspidate, the middle one much the largest, scarcely longer than the flowers: fruit with lanceolate cuspidate-acuminate calyx-lobes hardly longer than the styles. Swamps and wet meadows, Brit. Columbia to California.

E. **Harknessii** Curran Bull. Cal. Acad. iii, 153. Erect, slender, 2–4 feet high, dichotomously branched above: radical and lower leaves consisting only of the jointed fistulous petiole, often very long: stem leaves lanceolate entire, sparingly ciliate-toothed, on jointed petioles of equal length, laciniate-fringed near the base; upper reduced to sessile laciniate bracts: heads oblong, 6-9 lines in diameter, blue involucre of 8–10 narrow bracts, exceeding the head, calyx-lobes subulate, equalling the styles. In wet places, Washington to California and Idaho.

21 SANICULA Tourn. L. Gen. n. 326.

Smooth herbs with almost naked or few-leaved stems palmate or pinnate leaves with more or less pinnatifid or incised lobes, and greenish yellow or purple flowers in irregularly compound few-rayed umbels. Calyx-lobes somewhat foliaceous, persistent. Fruit sub-globose, densely covered with hooked prickles or tuberculate. Carpel without ribs. Stylopodium depressed. Oil-tubes mostly large, 3 on the back and 2 on the commissure, or 3–19 irregularly distributed.

* Oil-tubes irregular in number and in distribution.

+ Mature fruit pedicelled: leaves palmately divided.

S. **arctopoides** Hook. & Arn. Bot. Beechey, 141. Stems very short, from thickened rootstocks, bearing a tuft of leaves and several divergent scape-like branches 2–8 inches long, each bearing an umbel of 1–3 elongated rays: leaves deeply palmately 3-lobed, the cuneate divisions once or twice laciniately cleft or dissected with lanceolate acute spreading segments: involucre of 1–2 similar leaf-like bracts; umbellets large 3–6 lines in diameter, with conspicuous involucels of 8–12 narrowly oblanceolate mostly entire bractlets: flowers yellow: fruit short pedicellate 1½ lines long naked at base with strong prickles above; seed-face almost plane. On plains and hillsides, Sacramento Valley, California, also Vancouver Island, Brit. Columbia, to be looked for in our range.

S. **Howellii** C. & R. Bot. Gaz. xiii, 81 Stems coarse, a foot or less high, often bearing tufts of stout elongated peduncles and leaves; leaves broad and palmately 3–5-lobed, the upper inclined to be pinnately lobed, the divisions rather sharply cut and toothed, the teeth mucronate-tipped: umbel unequally few-rayed, with involucre of few leaf-like bracts and involucels of very prominent bractlets sometimes much exceeding the large globose head of fruit; flowers yellow: fruit short pedicellate, prickly all over 1½–2 lines long, seed-face concave. Sandy seashore, Columbia river to Southern Oregon.

S. **Menziesii** Hook. & Arn. l. c. 142. Stem solitary, erect, from a long, thickish perpendicular root, 1–5 feet high, branching: leaves round-

cordate 2–4 inches broad, very deeply 3–5-lobed, the broad segments sharply toothed or somewhat cleft, the teeth bristle-tipped; upper leaves more narrowly lobed and laciniately toothed: umbel with 3–4 slender rays, involucre of 2–3 small leaf-like bracts, and involucels of 6–8 small entire bractlets; flowers yellow, the sterile ones nearly sessile: fruit becoming distinctly pedicellate and divergent, obovate 1–2 lines long, covered with strong prickles: seed-face plane. Brit. Columbia to California.

+ + Mature fruit sessile.

++ Leaves pinnately divided.

S. laciniata Hook & Arn. l. c. 147 Stems more or less branching, 6–18 inches high; from a thickened root-stock: leaves mostly palmately 3–5-parted, the divisions 1–2 pinnatifid, segments laciniately toothed, the teeth spinosely pointed: umbel 3–5 rayed, with involucre of leaf-like bracts, and involucels of lanceolate spinosely pointed bractlets; flowers yellow, the sterile ones on long pedicels: fruit somewhat naked below, more prickly above 1½ lines long: seed-face deeply sulcate somewhat involute. California to the Willamette Valley, Oregon.

S. Nevadensis Watson Proc. Am. Acad. xi, 139. Stem slender sometimes very short, simple or branching near the base, a foot or less high: leaves ternate, the divisions oblong-ovate, 3–5 lobed; the segments lobed or toothed: umbel with about 5 rays, which are sometimes branched and become 6–18 lines long in fruit; involucre of pinnatifid leaf-like bracts; involucels of small oblong acute bractlets: flowers yellow, the sterile ones pediceled: fruit prickly all over 1½ lines long: seed-face plane. Dry open woods, Brit. Columbia to California and Nevada.

++ ++ Leaves more or less pinnately divided.

S. bipinnatifida Dougl. Hook. Fl. i, 258. Stems a foot or more high from a thickened rootstock: with usually a pair of opposite leaves at base and 1–3 leaves above; leaves pinnately 3–7 parted, the divisions incisely toothed or lobed, decurrent on the toothed rhachis, teeth acute or slightly pointed; umbel with 3–4 elongated rays: involucre of leaf-like bracts, and involucels of small narrow merely acute bractlets; flowers purple, in dense heads, the sterile ones on long pedicels: fruit prickly all over. Seed-face broadly concave with a prominent central longitudinal ridge. Common in open places Brit. Columbia to California.

S. bipinnata Hook. & Arn. l. c. 347. A foot or more high from a slender fusiform root: leaves twice or thrice pinnate, with divisions not at all decurrent, cuneate-oblong to ovate, incisely and mucronately toothed: umbel 3–4 rayed, with involucre of leaf-like bracts and involucels of a few small bractlets more or less united: flowers yellow: fruit tuberculate at base, prickly above: seed-face deeply sulcate, more or less involute, with a central longitudinal ridge. California to the southern boundary of Oregon.

* * Fruit neither prickly nor scaly.

22 PIMPINELLA L. Gen. n. 366.

Glabrous perennials with ternately or pinnately compound leaves, involucre and involucels scanty or none, and white or yellow flowers. Calyx-lobes obsolete: fruit oblong to ovate, glabrous, carpel with equal slender ribs: stylopodium depressed or cushion-like. Oil-tubes 2–6 in the intervals, 4–8 on the commissure: seed somewhat dorsally flattened.

P. apiodora Gray Proc. Am. Acad. vii, 345. Smooth, rather stout,

2-3 feet high: leaves mostly radical, 2–3-ternate, the cuneate-ovate leaflets laciniately pinnatifid and toothed, an inch long: umbel long-peduncled, 6–15-rayed; rays 1–2 inches long, hispidly puberulent: flowers white or pinkish: fruit broadly ovate: oil-tubes numerous in the intervals, 8 or more on the commissure. From San Francisco to Eastern Nevada.

Var. nudicaulis Gray l. c. viii, 385. Small; stem scapiform, almost leafless, scarcely a foot high. Oregon *Hall 1871*, not since found.

23 MUSENIUM, Nutt. T. & G. Fl. i, 642.

Dwarf resinous dry ground perennials, from thick elongated roots, with pinnate decompound leaves, no involucre and involucels of a few narrow bracts. Calyx-lobes prominent. Fruit ovate or ovate oblong, carpel with equal filiform ribs, and thin pericarp: stylopodium depressed. Oil-tubes usually 3 in the intervals, the middle one the largest, 2–4 on the commissure. Seed-face broadly concave.

M. divaricatum Nutt. l. c. Decumbent, glabrous: stem short, dichotomously branching from the base: leaves bipinnatifid, with winged rhachis; segments 3–5-toothed: peduncles 2–5 inches long: umbel 10–25 rayed; rays 3–9 lines long, pedicels short: fruit smooth or nearly so, about 2 lines long; oil-tubes 3 in the interval-, with accessory ones beneath the ribs, 4 on the commissure: Seed terete, with rather deeply concave face. From the plains of the upper Missouri to Oregon and Brit. Columbia.

24 EULOPHUS Nutt. DC. Prodr. iv, 248.

Glabrous perennials from deep-seated fascicled tubers, 1–5 feet high, with pinnately or ternately compound leaves, narrowly linear to oblong-linear mostly entire leaflets, the terminal one elongated, involucre and involucels of several lanceolate acuminate usually scabrous bractlets and long-peduncled umbels of white or pinkish flowers. Calyx-lobes prominent. Fruit ovate to linear-oblong glabrous. Carpel with equal filiform ribs, and thin pericarp. Stylopodium conical, with long and recurved styles. Oil-tubes 1–5 in the intervals, 4–8 on the commissure and a small group in the parenchyma of the commissural sulcus. Seed-face broadly concave, with a central longitudinal ridge.

E. Bolanderi C. & R. Rev Umb. 112. Stems slender, 1–2 feet high; leaf divisions more or less pinnately compound: ultimate divisions narrowly linear, 6–18 lines long, the terminal ones sometimes much longer, ¼–1 line wide: uppermost leaves simple: umbel 10–25-rayed, with prominent involucre and involucels of scarious ovate-lanceolate abruptly long acuminate bractlets, longer than the pedicels, rays 5–10 lines long; pedicels 1–2 lines long: fruit oblong: oil-tubes small 2–5 in the intervals, 6 on the commissure. Southeastern Oregon to California.

25 BUPLEURUM. L. Gen. n. 328.

Calyx-lobes obsolete. Fruit oblong with rather broad commissure. Carpel with equal very slender or prominent ribs. Stylopodium prominent and flat. Oil-tubes wanting or continuous about the seed-cavity. Ours perennial from a branching caudex, with simple entire clasping or perfoliate stem-leaves and

yellow flowers.

B. Americanum C. & R. Rev. Umb. 115. Radical leaves linear-lanceolate, cauline ones very variable, oblong to linear, more or less clasping: rays unequal, 6–24 lines long, with involucre of 3–5 unequal bracts and involucels of 5–8 rather small ovate bractlets: pedicels short: carpel with prominent ribs, oil-tubes continuous about the seed-cavity and one in each rib. Seed-face plane. Alaska to Yellowstone Park, perhaps Washington.

26 LEIBERGIA C. & R. Contr. Nat. Herb. iii, 675, t. xxvii.

Slender glabrous acaulescent plants from a small globose root, ternately divided leaves and irregular umbels of white flowers. Calyx-teeth obsolete. Fruit flattened laterally, linear, beaked, glabrous: stylopodium wanting. Carpels only slightly flattened dorsally, with 5 filiform ribs, the 2 lateral a little more prominent and turned inward. Oil-tubes small, solitary in the intervals, 2 on the commissure. Seed-face slightly concave but when dry becoming more or less involute.

L. orogenioides C. & R. l. c. Stem slender 6–20 inches high; leaves nearly as long as the flowering peduncle: leaflets linear, 1½–4 inches long, entire or with a few teeth or linear lobes: rays of the umbel 3–10, very slender, often spreading, 1–6 inches long; umbellets with few flowers and fruits: involucre none; involucels of few small bracts that are somewhat united at base: fruit 4 lines long, flattened laterally but terete at base, terete and somewhat beaked at apex. Along small streams, Coeur d'Alene Mountains Idaho, Spokane Co., Washington.

27 OSMORHIZA Jour. Phys. lxxxix.

Perennials from thick aromatic roots, with ternately decompound leaves, ovate variously toothed leaflets, involucre and involucels few-leaved or wanting and white flowers in few-rayed and few-fruited umbels. Calyx-lobes obsolete. Fruit linear to linear-oblong, caudate, attenuate at base, acute above, very bristly on the ribs. Carpel slightly flattened dorsally or not at all, nearly pentagonal in section, with equal ribs and thin pericarp. Oil-tubes obsolete in mature fruit.

O. nuda Torr. Pac. R. R. Rep. iv, 93. Stems rather slender, 1–3 feet high, divaricately branched, somewhat pubescent or glabrous: leaves twice ternate; leaflets 6–24 lines long, toothed and cleft: umbel long peduncled, 3–6-rayed, mostly naked; rays slender, spreading 2–4 inches long: pedicels 2–12 lines long: fruit with not very prominent ribs: stylopodium and style very short, seed-face concave. Very common in wooded districts. Alaska to California and the Rocky mountains.

28 GLYCOSMA Nutt. T. & G. Fl. i, 639.

Mostly tall perennials from thick aromatic roots with ternately decompound leaves, ovate variously toothed leaflets, mostly without involucre or involucels, and white flowers in few-rayed umbels. Calyx-teeth obsolete. Fruit linear to linear-oblong, not attenuate at base, acute above, glabrous or somewhat

bristly on the ribs. Carpels slightly flattened dorsally or not at all, with 5 acutely carinate equal ribs. Stylopodium mostly depressed. Oil-tubes obsolete in mature fruit. Seed-face concave.

G. occidentalis Nutt. l. c. Rather stout, puberulent or pubescent: leaves 2-3-ternate; leaflets 1-4 inches long, acute, coarsely serrate, rarely incised: umbel 5-12-rayed, naked or with 1 or 2 involucral bracts; rays 1-5 inches long, mostly erect: pedicels 1-3 lines long: fruit 7-12 lines long obtuse at base, glabrous, with prominent acute ribs: stylopodium half to a line long; seed-face concave. In the higher mountains, Brit. Columbia to California, Montana and the Wahsatch.

G. ambiguum Gray Proc. Am. Acad. viii, 386. Glabrous or hairy near the nodes: leaves 2-3 ternate: leaflets 1-2 inches long, acute, shortly toothed or cleft: umbel 4-8-rayed, naked; rays about 2 inches long, somewhat spreading; pedicels 1-3 lines long: fruit 6-7 lines long acutish at base, sometimes bristly, with prominent ribs: styles half a line long: seed-face concave. Western Washington and Oregon to California.

29 VELÆA DC. Prodr. iv, 230.

DEWEYA T. & G.

Perennial herbs from thick elongated roots with mostly radical pinnate or ternate leaves, conspicuous involucels and yellow flowers. Calyx-lobes obsolete or prominent. Fruit oblong to orbicular, glabrous or pubescent. Carpel somewhat flattened laterally, with prominent and equal filiform ribs (the intermediates somewhat distant from the laterals) and a thin pericarp. Oil-tubes conspicuous, 3–6 in the intervals, 4–10 on the commissure. Seed terete, the face strongly involute, enclosing a central cavity.

V. glauca C. & R. Contrib. Nat. Herb. iii, 321. Shortly caulescent slender, 8–18 inches high, erect or somewhat spreading, glabrous and somewhat glaucous: radical leaves small, bi- or tri-ternate; stem leaves often simply ternate; leaflets small, 4–8 lines long, mostly cordate or truncate at base, often 3-lobed or 3-parted, irregularly toothed: umbel 7–15-rayed, with no involucre and involucels of small linear bracts: rays 1–3 inches long; pedicels a line long or less: fruit orbicular, a line in diameter; carpophore parted below the middle, flowers yellow. On dry hillsides in open woods, Southwestern Oregon.

V. Kelloggii C. & R. Rev. Umb. 121. *Deweya Kelloggii Gray.* Acaulescent or nearly so, mostly puberulent; 2–3 feet high: leaves triternate; leaflets ovate, half to less than an inch long, mostly 3-lobed: umbel 8–16-rayed, mostly with no involucre, and involucels of small linear bractlets; rays 2–3 inches long: fruit 1–2 lines long, almost as broad, somewhat notched at base, with filiform ribs: oil-tubes 3 in the dorsal intervals, 5–6 in the lateral ones, 8–18 on the commissure. Southern Oregon to Southern California.

V. Howellii C. & R. l. c. 122. Glabrous throughout, short-caulescent; 2–4 inches high: leaves 1–3, thickish about 18 lines long, with ovate outline, pinnatifid, the oblong segments irregularly cuspidate-toothed and lobed, with revolute margins; umbel 3–6-rayed, with no involucre and involucels exceedingly prominent, being exactly like the leaves and forming the principal part of the foliage of the plant; rays 6–8 lines long; pedi-

cels about a line long, calyx-lobes prominent: fruit (immature) oblong, glabrous: oil-tubes several in the intervals. In the Siskiyou mountains at high elevations, southwest of Ashland, Oregon.

30 SIUM L. Gen. n. 348.

Smooth perennials, growing in wāter or wet places, with pinnate leaves, serrate or pinnatifid leaflets. involucre and involucels of numerous narrow bracts, and numerous white flowers. Calyx-lobes minute. Fruit ovate to oblong, glabrous. Carpels with prominent corky nearly equal ribs. Stylopodium depressed. Style short. Oil-tubes 1–3 in the intervals, 2-6 on the commissure. Seed subangular with plane face.

S. cicutæfolium Gmelin. Syst. ii, 482. Stout, 2–6 feet high: leaflets 3–8 pairs, linear to lanceolate, sharply serrate; mostly acuminate, 2–5 inches long, submerged leaves when present finely dissected: umbel many-rayed; rays 12–18 lines long; pedicels 1–3 lines long: oil-tubes 2–6 on the commissure. Apparently throughout North America.

31 ZIZIA Koch Umbel. 129.

Smooth perennial herbs with mostly simple or ternate leaves, no involucre, involucels of small bractlets and yellow flowers: the central fruit of each umbellet sessile, calyx-teeth prominent. Fruit oblong, glabrous. Stylopodium wanting. Styles long. Oil-tubes large and solitary in the broad intervals, 20 on the commissure and a small one in each rib. Seed terete, sulcate.

Z. cordata Koch l. c. Radical leaves mostly long-peticled, cordate or even rounder, crenately toothed, very rarely lobed or divided; stem leaves simply ternate or quinate, the leaflets ovate to lanceolate, serrate incised, or even parted: fruit ovate. Throughout Canada and the Atlantic States and Oregon.

32 CARUM Linn.

Smooth erect slender herbs with tuberous or fusiform fascicled roots, pinnate leaves with few linear leaflets, involucre and involucels of few to many bracts and white flowers. Calyx-lobes small. Fruit ovate or oblong, glabrous, carpel with filiform or inconspicuous ribs. Oil-tubes 2–6 on the commissure. Seed dorsally flattened, more or less sulcate beneath the oil-tubes.

C. Gairdneri Gray Proc. Am. Acad. vii, 344. Stems 1–4 feet high, from fascicled-tuberous or fusiform roots: leaves few usually simply pinnate, with 3–7 linear leaflets 2–6 inches long; upper leaves usually simple: umbels 6–15-rayed with involucre of several bracts or none and involucels of linear acuminate bractlets: rays about 18 lines long: fruit ovate, small, with long styles: seed terete. From Brit. Columbia and Montana to Utah and California.

C. Oregana Watson Proc. Am. Acad. xx, 368. "Closely resembling the preceding, but the lower leaves more divided, with shorter linear lobes; fruit oblong, larger with long styles: seed flattened dorsally, sulcate beneath the oil-tubes and slightly concave on the face, with central longitudinal ridge." Brit. Columbia to California and Nevada.

33 TÆNIOPLEURUM C. & R. Bot. Gaz. Nov. 1889.

Smooth erect herbs, from a fascicle of thickened fibers, with ternate-pinnate leaves, toothed leaflets, involucre and involucels of numerous conspicuous bracts and white flowers. Calyx-lobes prominent. Fruit oblong, glabrous flattened latterly. Carpel with broad, salient ribs. Stylopodium prominent and conical. Oil-tubes solitary in the intervals, very large, two on the commissure. Seeds dorsally flattened, sulcate beneath the oil-tubes, becoming loose in the pericarp, and invested by a layer of secreting cells.

T. Howellii C & R. l. c. Stems rather stout, 3-4 feet high, leaves few, ternate then once or twice pinnate; leaflets lanceolate to ovate, strongly toothed or lobed; umbels many-rayed, with involucre of long narrowly oblanceolate bracts and involucels of prominent lanceolate scarious-margined bractlets; ray 1-3 inches long; pedicels 3-5 lines long. Wet places Grants Pass, Oregon.

34 CICUTA L. Gen. n. 354.

Tall branching glabrous perennial herbs with pinnately or ternately compound leaves, involucre small or wanting, involucels of several small bractlets and many-rayed umbels of small flowers. Calyx-lobes rather prominent. Fruit oblong to nearly orbicular, glabrous. Stylopodium conical. Carpels with strong flattish corky ribs, the laterals the largest. Seed nearly terete, or somewhat dorsally flattened, with plane face. Oil-tubes solitary in the intervals, 2 on the commissure.

C. occidentalis Greene Pitt. ii, 7. Stem stout, 3-6 feet high, green, scarcely glaucous, paniculate from toward the base: leaves bipinnate; leaflets 2-3 inches long, narrowly lanceolate, coarsely serrate: umbel many-rayed; involucre usually wanting; involucels of few narrow lanceolate bractlets: rays 1-4 inches long; pedicels 2-4 lines long: fruit broadly ovate to oval, the lateral ribs much larger than the others: oil-tubes broad and conspicuous, the commissural pair contiguous. In marshes and wet places. Alaska to California and the Rocky Mountains.

C. purpurata Greene l. c. 8. Stems 3-4 feet high, purple glaucous, conspicuously striate, paniculate from the middle: leaves bipinnate; leaflets ovate-lanceolate, 1-2 inches long closely and often deeply serrate, the teeth a little falcate; umbels many, long peduncled: involucre and involucels wanting or deciduous: flowers dull and inconspicuous: fruit orbicular, ribs of the carpels broad and low: oil-tubes small. Springy and boggy places near Cle Elum, Washington.

C. vagans Greene l. c. Stem branching from the very base, the branches diffuse or reclining, 3-5 feet long, abundantly floriferous: herbage purplish or glaucous: radical leaves 2 feet long bi- or tri-pinnate; leaflets 2 inches long, lanceolate, somewhat cuneate below and entire, but from below the middle bearing rather remote short but salient serrate teeth: flowers dull, fruit orbicular; the ribs very broad and low; oil-tube small, cross-section of seed nearly reniform. Borders of Lake Pend d'Oreille, Idaho.

35 HYDROCOTYLE Tourn.

Low perennial herbs growing in water or wet places with slen-

der creeping stems, orbicular-peltate or reniform leaves and small white flowers in simple or proliferous umbels. Calyx-teeth minute or obsolete. Fruit more or less orbicular. Carpels with 5 primary ribs, the dorsal marginal, broad or filiform; intermediate filiform, usually curved; laterals filiform or broad, distinct from those of the other carpel or confluent: a prominent oil-bearing layer beneath the epidermis occasionally containing small oil-tubes.

H. ranunculoides L. f. Suppl. 177. Stems rather slender 6–12 inches long: leaves thickish, round-reniform, 6–18 lines in diameter, 3–7-cleft, with crenate lobes: peduncles 1–3 inches long, reflexed in fruit: umbel capitate, 5–10-flowered: fruit with rather obscure ribs, strongly flattened laterally: stylopodium depressed. In ponds, Oregon to California and across the continent.

Order XLIV. ARALIACEÆ Vent. Tabl. iii, 2.

Shrubs, trees or perennial herbs with compound or simple leaves without stipules, the petioles thickened and dilated at base, and umbellate paniculate, or racemose infloresence. Calyx adherent to the ovary, the limb usually very small, entire or toothed. Petals 5–10, valvate in the bud, very rarely none. Stamens as many as petals and alternate with them: filaments short: anthers introrse. Ovary crowned with an epigynous disk, 2–15-celled, with a solitary suspended ovule in each cell: styles erect and connivent or spreading: stigma simple. Fruit drupaceous or baccate, sometimes nearly dry, but the carpels not separating. Seed solitary in each cell, anatropous. Embryo short, at the base of copious fleshy albumen.

1. **Aralia.** Petals imbricate in the bud, drupes 5-celled: pedicels not jointed.

2. **Echinopanax.** Petals valvate in the bud, drupes 2–3-celled, pedicels not jointed.

1 ARALIA Vaillant.

Perennial herbs or shrubs with alternate digitate or compound leaves and small flowers in racemed umbels. Calyx 5-toothed or entire. Petals 5, ovate, slightly imbricate. Stamens 5. Disk depressed or rarely conical. Ovary 2–5-celled; styles few or connate at base, at length divaricate; stigmas terminal. Fruit laterally compressed, becoming 3–5-angled, fleshy externally, endocarp chartaceous.

A. Californica Watson. Herbaceous, unarmed and nearly glabrous, 8–10 feet high from a large thick root: leaves bipinnate, or the upper pinnate with 1 or 2 pairs of leaflets, which are cordate-ovate, 4–8 inches long or more, shortly acuminate, simply or doubly serrate with short acute teeth, uppermost leaves ovate-lanceolate: umbels in loose terminal and axilary compound or simple racemose panicles, which are a foot or two long and more or less glandular-tomentose; rays numerous, 4–6 lines long: involucres of several linear bractlets; flowers 1½–2 lines long; disk and

stylopodium obsolete; styles united to the middle. Shaded mountain ravines California.

Var. acuminata Watson in Herb. Leaflets long acuminate, pedicels 10–14 lines long. Mountain streams Southern Oregon.

2 ECHINOPANAX Decaisne & Planch. in Rev. Hortic, 1854, 105.

Densely prickly shrubs with large palmately lobed leaves and greenish-white flowers in dense paniculate umbels. Calyx-teeth obsolete. Petals 5, valvate in the bud. Stamens 5, alternate with the petals: filaments filiform; anthers ovate to oblong. Ovary 2–3-celled: styles 2, filiform: stigma terminal. Fruit laterally compressed, drupaceous; endocarp indurated.

E. horridum Decaisne & Planch. l. c. Very prickly throughout: stems erect from a decumbent base, 4–12 feet high, leafy at the top: leaves roundish-cordate, prickly both sides, palmately lobed, aculeate-dentate, more or less pubescent beneath, 6–24 inches long: inflorescence terminal, densely tomentose: rays subtended by a scarious laciniately cut bract: petals ovate, with a broad base: styles united to the middle. In mountain swamps, Oregon to the arctic regions.

ORDER XLV. CORNACEÆ Link. Handb. ii, 2.

Trees, shrubs or rarely herbs with opposite mostly entire pinnately veined leaves without stipules and cymose or capitate inflorescence, with or without an involucre. Calyx adherent to the ovary, the limb 4–5-toothed or lobed, valvate in the bud. Petals distinct, as many as the calyx-lobes and alternate with them, inserted on the margin of the epigynous disk, valvate in the bud: stamens 4–5, inserted with the petals and alternate with them: anthers introrse, mostly cordate. Ovary one-celled with a single pendulous ovule. Style single. Fruit drupelets covered with the remains of the calyx. Seed anatropous. Embryo nearly as long as the fleshy albumen.

1 CORNUS Tourn. (DOGWOOD)

Trees, shrubs or herbs with opposite entire leaves and small perfect flowers in dichotomous cymes or involucrate heads. Limb of the calyx 4-toothed, minute. Petals oblong, spreading. Filaments filiform. Style subclavate; stigma obtuse or capitate. Drupelets not connate.

* Flowers greenish or purple, in a close head, surrounded by a conspicuous involucre of white petal-like bracts: fruit bright red.

+ Low and herbaceous, from slender, creeping root-stocks.

C. Canadensis L. Sp. i, 118. Stems simple, 4–8 inches high; leaves scarcely petioled, mostly in an apparent whorl of 4 or 6 near the summit, oval to obovate pointed at both ends, somewhat appressed-pubescent on both sides 2–3 inches long, near the middle of the stem; a pair of smaller leaves and scale-like bracts below; peduncles 1–3 inches long: involucral

bracts 4, white or cream-color, ovate, 3–8 lines long: fruit globular: stone smooth, not flattened, a little higher than broad. In the higher mountains and along the coast, across the continent as far north as forests grow, south to California and New Jersey.

C. Suecica L. l. c. Stems sometimes branching above, 5–20 inches high: leaves sessile, all opposite, becoming smaller downwards, ovate or oval, acute, nerves all arising at or near the base, appressed-pubescent on both sides, uppermost leaves 1–3 inches long: peduncle 1–3 inches long: involucral bracts 4, white or cream-color, ovate 3–6 lines long: flowers dark purple: fruit globular: stone flattened, mostly with a shallow furrow on each face, acute, as broad as high. Alaska and across the continent: perhaps N. Washington.

\+ \+ Shrubs or trees.

C. Nuttallii Audubon Birds 467, T. & G. Fl. i, 652. A tree 20–75 feet high: leaves mostly obovate, on petioles 3–12 lines long, usually wooly-pubescent beneath, with intermixed appressed hairs: involucral bracts 4–6 or more, narrowly oblong to obovate or even round, obtuse, 1½–2 inches long: heads of flowers 6–12 lines in diameter: fruit crowded among the abortive ovaries, crowned with the broad persistent calyx: stone 4–5 lines high, 3–4 lines broad. Brit. Columbia to California west of the Cascade Mountains.

* * Flowers yellowish, in sessile umbels, appearing before the leaves, involucrate with 4 small deciduous bracts.

C. sessilis Torr Durand Pl. Pratt. 89. Shrub 10–15 feet high with greenish bark: leaves short-petioled, approximate, ovate, short acuminate, nearly smooth above, pale beneath, with appressed and silky pubescence: umbels terminal but becoming lateral by the development of the shoot: involucral bracts 3–4 lines long, about as long as the slender silky pedicels: fruit oblong, 6–7 lines long, 3–5 lines wide: stone oblong somewhat pointed and longitudinally rigid, 4–5 lines long, 2–2½ lines broad. Northern California, perhaps reaches our limits.

* * * Flowers white or cream-colored, cymose, not involucrate: fruit white, lead-colored or blue: leaves opposite.

C. pubescens Nutt Sylv. iii, 54. Shrub 6–20 feet high with smooth red or purplish slender branches branchlets and inflorescence more or less hirsute: petioles 3–12 lines long; leaves from narrowly to broadly ovate or oval, acute or somewhat accuminate mostly acute at base; appressed-pubescent or glabrous above, whitish silky-pubescent beneath flowers in more or less compact cymes; calyx-teeth minute: fruit white; stone somewhat compressed, mostly oblique, with a more or less prominently furrowed edge about 2 lines long by 2½ lines broad, the sides apt to have more or less prominent ridges In alluvial places, Brit. Columbia to California west of the Cascade Mountains.

C. Baileyi C. & E. Bot. Gaz. xv. 89. Erect shrub with reddish-brown mostly smooth branches: branchlets and inflorescence pubescent to woolly: petiole 6–12 lines long; leaves from lanceolate to ovate, acute or short-acuminate, acute or obtuse at base, appressed-pubescent to glabrous above, white beneath and with woolly hairs variously intermingled with appressed ones: flowers in small rather compact cymes: calyx-teeth from small to prominent; fruit white or bluish: stone decidedly compressed, flat-topped rarely oblique, with a very prominently furrowed edge, much broader than high. About the Great Lakes and westward to the Cascades of the Columbia.

C. stolonifera Michx. Fl. i, 92. Shrub 3–9 feet high, erect or ros-

trate, stoloniferous, with branches usually bright red-purple and smooth: branchlets and inflorescence appressed pubescent, petioles 3–18 lines long; leaves from lanceolate to broadly ovate or oblong, short- or long-acuminate or only acute, mostly obtuse at base, minutely appressed pubescent above, more or less white and appressed pubescent beneath with straight rigid hairs: flowers mostly in small cymes: calyx-teeth minute: fruit white or lead-color; stones very variable from ovate and pointed scarcely flattened, higher than broad, to more or less flattened, broader than high, these extremes completely connected by intermediate shapes and dimensions, all with more or less furrowed edge. From New Brunswick to the District of Columbia and westward to the Cascade Mountains and British Columbia. South to New Mexico and Arizona.

C. glabrata Benth. Bot. Suppl. 18. Shrub 4–12 feet high, with erect and mostly bushy gray smooth branches bearing usually crowded small leaves: branchlets and inflorescence glabrous or nearly so: petioles short and slender; leaves lanceolate to nearly ovate or oblong, acute at each end, glabrous or sparsely and minutely appressed-pubescent on both sides, the lower surface but little paler than the upper: flowers in numerous small open cymes; calyx-teeth prominent: fruit white or light blue: stone but little compressed, not furrowed; broader than high. Along streams, southwest Oregon to California.

ORDER XLVI. GARRYACEÆ Lindl. Bot. Reg. xx, t. 1686.

Shrubs or small trees with opposite persistent entire leaves and dicœcious flowers in aments or catkins. Calyx adnate to the ovary, the limb 4-toothed, valvate in the bud. Petals none. Stamens 4, inserted on the epigynous disk. Ovary 1-celled, with two pendulous ovules. Fruit baccate, crowned with the remains of the calyx. Seeds anatropous. Embryo nearly as long as the fleshy albumen.

1 GARRYA Dougl. Lindl. l. c.

Evergreen shrubs with greenish bark, opposite entire coriaceous leaves and dicœcious flowers in axillary pendulous aments, solitary or in threes between the decussately connate bracts. Calyx of the sterile flowers 4-parted with linear valvate segments. Stamens 4, filaments distinct, disk and rudimentary ovary none. Calyx of the fertile flowers with a shortly 2-lobed or obsolete limb, disk and rudimentary stamens none. Ovary 1-celled with 2 pendulous ovules. Styles 2, stigmatic on the inner side, persistent. Berry ovoid, 1–2 seeded.

G. Fremontii Torr. Pac. R. Rep. iv, 136. Shrub 4–12 feet high, becoming glabrous: petioles 3–9 lines long; leaves ovate to oblong or elliptical, mostly acute at each end, usually somewhat mucronate, entire, smooth or nearly so on both sides: fertile aments 2½–5 inches long: bracts prominent, connate above the middle, acute, somewhat silky: fruit globose, becoming glabrous, short-pedicellate, 2–3 lines in diameter. Oregon to California.

G. elliptica Dougl. Lindl. l. c. A stout shrub or small tree 5–16 feet high: petioles 3–6 lines long; leaves elliptical, rounded at base, round or

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acute and mucronate at apex, undulate on the margin, smooth above, densely tomentose beneath, 2–5 inches long; sterile aments 3–15 inches long, the bracts truncate or acute, silky; fertile aments stouter 1½–4 inches long, with acute or acuminate bracts: fruit globose densely silky-tomentose, sessile 3–5 lines in diameter. Along the coast of Oregon and California.

6. **buxifolia** Gray Proc. Am. Acad. vii, 349. Small shrub 2–5 feet high: leaves oblong-elliptical 12–18 lines long, 4–8 lines broad acute at each end, glabrous above, densely white-silky beneath; petioles 1–3 lines long, fertile aments 1–3 inches long, the short bracts acute, more or less silky: fruit glabrous, globose, subsessile 2½–3 lines in diameter. On dry hillsides, southwestern Oregon to Mendocino county, California.

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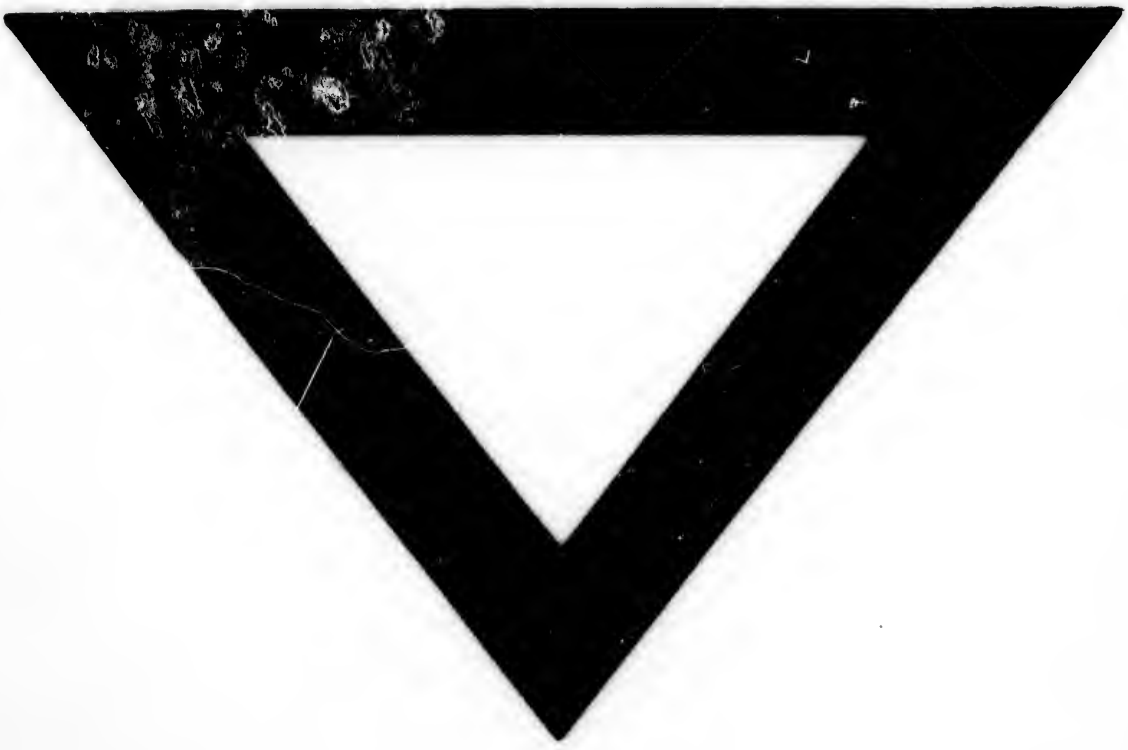
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