THE FLORA OF THE

PALOUSE REGION

Containing descriptions of all the Spermatophytes and Pteridophytes known to grow wild in the area within thirty-five kilometers of

PULLMAN, WASHINGTON

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Dear Dr. Britton:

I have been reading the catalog of the Library, and I am very much interested in the article on the Cyclamen plant. I have never seen one, but I should like to have a chance to see one.

I am looking forward to your return from London. I hope to see you then.

Yours truly,

[Signature]

P.S. I enclose a copy of the catalogue you asked for.
INTRODUCTION.

The following pages aim to give descriptions of all the seed-plants and fern-plants growing wild within the area circumscribed by a circle whose radius is 35 kilometers (21 miles) with Pullman as a center. This area embraces about 24 townships in Washington and 11 in Idaho. Geographically the limits are approximately marked by Steptoe Butte and Garfield on the north, Troy on the east, Lewiston on the southeast and Almota on the west.

The region consists mainly of rolling hills, 30-150 meters high, with an average altitude from the sea-level of 800 meters. These hills are destitute of trees and shrubs, and are typical of a large area in Eastern Washington and Western Idaho. They are generally designated the Palouse Hills, the name said to have been given by the early Jesuit missionaries (French pelouse, greensward).

Besides these low rolling hills occur others of considerably higher elevation. Steptoe Butte, already mentioned, is a perfectly conical peak of about 1200 meters altitude. It is wholly destitute of trees.

Kamiack Butte is a bold hill, shaped like a sugar-loaf, lying 15 kilometers north of Pullman. Its altitude is about 1100 meters. The summit and north slopes are heavily timbered with coniferous trees, but the south slope is nearly bare.

The Thatuna Hills are the highest of a considerable number of timbered mountains that occupy about one-fifth of the area of the circle in the eastern and north-eastern portions. The culminating peak, Cedar Mountain, is about 2000 meters high, and lies 30 kilometers east of Pullman.

The drainage of the region is mainly north-westward. In the extreme eastern part it is south-eastward. Four streams traverse the region for nearly its full width. The North Fork of the Palouse flows westward through the northern part of the area; the South Fork flows north-westward through the center of the circle, joining the North Fork near the north-eastern limit; Union Flat creek parallels the preceding stream, about 10 kilometers farther southward; and Snake River for 60 kilometers has hewn an enormous canyon, 700 meters deep, through the south-western part. The other three streams form narrow valleys, 50-200 meters lower than the surrounding hills, or in some places narrow canyons. All these streams as well as smaller ones are margined with a growth of willows, poplars, thorns and other shrubs, and occasionally with a few pines.

The lowest point in the area is where Snake River crosses the western limit, the altitude being about 200 meters. The highest point is the summit of Cedar Mountain, altitude about 2000 meters.

Geologically the Palouse Hills are formed of the worn surface of an immense sheet of basalt or lava-rock. This basalt, as revealed in the canyon of Snake River is at least 700 meters thick and consists of several, probably
The soil of these hills is a black clay-loam extremely fine and wholly destitute of gritty substance. Its greatest thickness over the basalt is perhaps 50 meters. Owing to its fine clayey nature, it is extremely retentive of moisture, which fact alone enables it to support as dense a plant covering as it does. Springs are of frequent occurrence, but the greater part of the subsoil is perfectly dry two or three meters beneath the surface.

The Thatuna Hills, Kamiack Butte, Steptoe Butte, and other lower knobs are composed of granite or quartzite and geologically are much older than the basalt which envelopes their bases. They have been well designated "islands of granite in a sea of basalt." Owing to its origin, the soil is much coarser than that of basaltic origin, and is less densely covered with herbaceous vegetation. The flora is strikingly different from that of the Palouse Hills.

Snake River canyon is simply an immense gorge hewn through the basalt but not to the bottom, as the present bed of the river is still like its bluffs. The soil of these bluffs presents various stages of decomposition from the coarse talus at the foot of the cliffs to some nearly as fine as the characteristic Palouse soil. The canyon at its bottom is scarcely wider than the river, except at the bends where bars of moderate area have been formed, the soil being partially river-sand of granitic origin and partially wash from the bluffs. At its top the canyon is two to three kilometers wide. Owing mainly to the much higher average temperature of the canyon, many plants of the semi-arid regions along the Columbia occur here together with others which apparently have followed down the river from the south. The flora therefore contains many plants not found elsewhere in the area.

The total flora of the region herein described consists of 14 Pteridophytes, 9 Gymnosperms, 114 Monocotyledons and 526 Dicotyledons. It is very doubtful if further exploration will increase these numbers by as much as five per cent. With four exceptions, no plant has been admitted into the Flora unless authentic specimens were in the College Herbarium. Of these four, there is doubt concerning only one as to whether it actually occurs within the limits or not.

In preparing this brochure the authors have made free use of every available work that was found at all helpful.

In nomenclature the aim has been to follow the so-called Kew and Berlin Rules.

Washington Agricultural College and School of Science, Pullman.
May 14th, 1901.
ANALYTICAL KEYS TO THE FAMILIES.

Plants vascular, reproducing by spores. Branch PTERIDOPHYTA
Plants vascular, reproducing by seeds. Branch SPERMATOPHYTA

Branch PTERIDOPHYTA.

Leaves few, large; stems solid, mostly underground.
Sporangia borne within the tissue of the leaf.
Sporangia in a prominent and distinct fertile lobe of the leaf: spores of one kind. OPHIOGLOSSACEAE 1
Sporangia in the enlarged bases of the leaves: spores of two kinds. ISOETACEAE 2
Sporangia formed of modified hairs or outgrowths from the surface of the leaf.
Sporangia in groups on the back of foliage leaves: spores of one kind. POLYPodiACEAE 2
Sporangia in the enlarged bases of the leaves: spores of two kinds. MARSIliACEAE 5

Leaves minute, whorled; stems hollow, jointed. EquisetACEAE 6
Leaves small, scattered, numerous; stems solid. SELAGINelliACEAE 7

Branch SPERMATOPHYTA.

Ovules and seeds not in a closed cavity, usually on the face of an open scale-leaf: stigmas none. Class GYMNOSPERMAE III
Ovules and seeds contained in a closed cavity surrounded by one or more closed and modified leaves forming an ovary: stigmas present. Class ANGIOSPERMAE III

Cotyledon one: stem with no distinction into bark, wood and pith (endogenous): leaves usually parallel-veined: parts of the flower nearly always in threes. Subclass MONOCOTYLEDONES III
Cotyledons two: stem (with rare exceptions) of bark, wood and pith (exogenous): leaves usually net-veined: parts of the flower in fours, fives and sixes, never in threes. Subclass DicotYLEDONES IV

Class IV. GYMNOSPERMAE.

Fruit a cone. PINACEAE 8
Fruit drupe-like. TAXACEAE 11

Class V. ANGIOSPERMAE.—Subclass 1. MONOCOTYLEDONES.

Carpels one or more, distinct: parts of flowers mostly unequal in number. Flowers not in the axils of dry chaffy scales (glumes): aquatic or marsh plants.
Perianth of bristles or chaffy scales: endosperm mealy or fleshy. TYPHACEAE 12
Perianth corolla-like or herbaceous or none: endosperm none or very little
Perianth-segments, when present, herbaceous. NAIAdacAE 12
Perianth of two series of segments, the outer (sepals) green, the inner (petals) mostly white. LAlismACEAE 13
Flowers in the axils of dry chaffy scales (glumes), arranged in spikes or spikelets.

Fruit a grain: stems mostly hollow. GRAMINEAE 14
Fruit an akene: stem solid. CYPERACEAE 33

Carpels united into a compound ovary: parts of the usually complete flowers mostly in threes or fours.

Flowers regular: seeds with endosperm, not numerous or minute: ovary superior or inferior.

Ovary superior.

Perianth-segments distinct, green or brown, not petal-like: herbs with grass-like leaves and small flowers.

JUNCACEAE 38

Perianth-segments distinct or partly united, at least the inner petal-like.

LILIACEAE 40

Ovary inferior, wholly or in part.

IRIDACEAE 47

Flowers irregular: seeds without endosperm, very numerous and minute:

ORCHIDACEAE 48

Subclass ii. DICOTYLEDONES.

I—PETALS DISTINCT TO THE BASE OR WANTING.

A—PETALS NONE.

I—FLOWERS, AT LEAST THE STAMINATE, IN AMENTS.

Fruit a 1-seeded nutlet: flowers monoecious. BETULACEAE 54
Fruit a many-seeded capsule: flowers dioecious. SALICACEAE 51

2—FLOWERS NOT IN AMENTS.

a—Ovules many in each cell of the ovary.

ARISTOLOCHIACEAE 59

Ovary 1, inferior.

FICOIDEAE 67

Ovary 1, superior.

Placenta central.

LYTHRACEAE 120

Stamens on the throat or tube of the calyx.

CARYOPHYLLACEAE 69

Stamens on the receptacle or base of the calyx.

b—Ovules 1 or 2, rarely 3 or 4, in each cell of the ovary.

RANUNCULACEAE 74

Ovaries 2 or more, separate, simple.

1—Ranunculaceae 162

Placenta 1, parietal

SYNTHYRIS in SCROPHULARIACEAE

Stamens more than 2

RANUNCULACEAE 74

Stamens 2.

Poteriuni in ROSACEAE

Ovaries 2 or more, separate, simple.

ROSACEAE 93

LORANTHACEAE 58

Pistils more than 1, distinct or nearly so.

Not parasitic above ground: anthers on filaments.

SANTALACEAE 58

Parasitic on branches of trees: anthers sessile.

Ovary superior, enclosed by the calyx-tube.

POLERIUM in ROSACEAE 93

Ovary superior, not enclosed by the calyx-tube.
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Stipules (ocreae) sheathing the stem at the nodes. POLYGONACEAE 59
Stipules not sheathing the stem, or none. CALLITRICHACEAE 112
Herbs, aquatic. EUPHORBIACEAE 110
Herbs not aquatic.

Ovary 3-celled: juice milky. AMARANTACEAE 66
Ovary 1-celled: juice not milky.

Flowers with scarious bracts.

Flowers without scarious bracts. CHENOPODIACEAE 64

Shrubs or trees.

Cells of ovary each 2-ovuled. SAPINDACEAE 113
Cells of ovary each 1-ovuled.

Ovary 3-celled. RHAMNACEAE 114
Ovary 2-celled. URTICACEAE 56

B—PETALS PRESENT.

1—STAMENS MORE THAN 10 AND MORE THAN TWICE THE SEPALS.

Calyx free and separate from the pistil.
Pistils numerous, separate, concealed in a hollow receptacle. ROSACEAE 93
Pistils more than 1, separate, not enclosed in the receptacle.

Stamens on the calyx, distinct. ROSACEAE 93
Stamens united with the base of the petals, monadelphous. MALVACEAE 115

RANUNCULACEAE 74

Pistils several, their ovaries cohering in a ring around an axis. MALVACEAE 115

Pistil 1 as to the ovary, the styles or stigmas 1-several.

Leaves minutely punctate with pellucid dots.

Leaves not punctate with pellucid dots.

Ovary simple, 1-celled, 2-ovuled. ROSACEAE 93
Ovary simple, 1-celled, with 1 parietal many-ovuled placenta. RANUNCULACEAE 74

PORTULACACEAE 67

Ovary compound, several-celled.

Aquatic or marsh herbs: leaves peltate.

Terrestrial herbs or shrubs: leaves not peltate. NYMPHAEAECAE 74

MALVACEAE 115

Calyx more or less coherent with the surface of the compound ovary.

Ovary 10-ovuled. ROSACEAE 93
Ovary 2-5-ovuled.

Leaves alternate, with stipules.

Leaves opposite, without stipules. SAXIFRAGACEAE 88

Ovary 1-celled, with parietal placenta.

Fleshy plants, leafless or with minute leaves: petals many. CACTACEAE 119

Rough-leaved plants: petals 5-10. LOASACEAE 118

Ovary 1-celled, with basal placenta. PORTULACACEAE 67
2—Stamens as many as the petals and opposite them.

Ovary 1-celled: anthers opening by uplifted valves. Berberidaceae 79
Ovary 1-celled: anthers not opening by uplifted valves.

Style and stigma 1: ovules more than 1. Primulaceae 135
Style 1; stigmas 3: ovules several. Portulacaceae 67

Ovary 2–4-celled. Rhamnaceae 114

3—Stamens not more than twice as many as the petals, when of the same number alternate with them.

a—Ovary wholly superior.

Ovaries 2 or more, separate.

Stamens united with each other and with the stigma.

Stamens unconnected, hypogynous. Asclepiadaceae 138
Herbs, not fleshy. Ranunculaceae 74
Herbs, with thick fleshy leaves. Crassulaceae 88
Stamens unconnected, perigynous.

Stamens twice as many as pistils. Crassulaceae 88
Stamens neither the same nor twice as many as pistils.

Leaves without stipules. Saxifragaceae 88
Leaves with stipules. Rosaceae 93

Ovaries 2–5, somewhat united at base, separate above.

Shrubs or trees. Sapindaceae 113
Terrestrial herbs. Saxifragaceae 88

Ovaries or lobes of ovary 3–5, with a common style.

Ovary 1.

Ovary simple, with 1 parietal placenta. Leguminosae 101

Compound, as shown by the number of cells, placentae, styles or stigmas.

Ovary 1-celled.

Corolla irregular: stamens 6; petals 4. Fumariaceae 80
Corolla irregular: petals and stamens 5.

Violaceae 117

Corolla regular or nearly so.

Ovule 1: shrubs or trees. Anacardiaceae 112
Ovule 1: herbs. Cruciferae 81

Ovules more than 1, in the center or bottom of the cell. Caryophyllaceae 69

Ovules several or many, on two or more parietal placentae.

Leaves punctate with pellucid dots. Hypericaceae 116

Saxifragaceae 88

Ovary 2–several-celled.

Stamens neither just as many nor twice as many as the petals.

Cruciferae 81

Stamens just as many or twice as many as the petals.

Cells of ovary 1–2-ovuled.

Herbs.

Cells of ovary as many as sepals. Geraniaceae 109

Cells of ovary twice as many as sepals. Linaceae 110

Shrubs or trees.

Leaves palmately-veined. Sapindaceae 113
Leaves pinnately-veined. Celastraceae 113

Cells of ovary several-many-ovuled. Umbelliferae 125
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Leaves opposite, with stipules. ELATINACEAE 117
Leaves when opposite without stipules.

Stamens free from the calyx.

Style 1. ERICACEAE 132
Styles 2-5. CARYOPHYLLACEAE 69
Stamens on the calyx.

Styles 2-3. SAXIFRAGACEAE 88
Style 1. LYTHRACEAE 120

b—Ovary at least half-inferior.

Ovules and seeds more than 1 in each cell.

Ovary 1-celled, many-ovuled from the base. PORTULACACEAE 69
Ovary 1-celled, with 2-3 parietal placentae. SAXIFRAGACEAE 88
Ovary 2-several-celled.

Stamens on a flat disk which covers the ovary.

Stamens on the calyx.

Style 1. ONAGRAEAE 121
Styles 2-3, distinct. SAXIFRAGACEAE 88

Ovules and seeds only one in each cell.

Stamens 10 or 5. Crataegus in ROSACEAE 93
Stamens 2 or 8: style 1. Gaura in ONAGRAEAE 121
Stamens 5: flowers usually in umbels, rarely in heads.

II—PETALS MORE OR LESS UNITED INTO ONE PIECE.

1—STAMENS MORE NUMEROUS THAN THE COROLLA-LOBES.

Ovary 1-celled with 1 parietal placenta. LEGUMINOSAE 101
Ovary 1-celled with 2 parietal placentae. FUMARIACEAE 80
Ovary 3-many-celled.

Stamens free or nearly free from the corolla. ERICACEAE 132
Stamens on the base or tube of the corolla. MALVACEAE 115

2—STAMENS (FERTILE ONES) AS MANY AS THE COROLLA-LOBES AND OPPOSITE THEM. PRIMULACEAE 135

3—STAMENS AS MANY AS THE COROLLA-LOBES AND ALTERNATE WITH THEM OR FEWER.

a—Ovary superior.

Corolla irregular: fertile stamens 4 or 2.

Ovules solitary in the 1-4 cells.

Ovary 4-lobed, the style rising from between the lobes.

Ovary not lobed, the style from its apex. LABIATAE 150
Ovaries numerous or at least 2 in each cell.

Ovary and pod 1-celled. OROBRANCHIACEAE 165
Ovary and pod 2-celled.

Corolla somewhat irregular: fertile stamens 5. Verbascum in SCROPHULARIACEAE 157

Corolla regular.

Stamens as many as the corolla-lobes.

Ovaries 2, separate.

Filaments distinct. APOCYNACEAE 158
Filaments monadelphous. ASCLEPIADACEAE 158
Ovary 1, deeply 4-lobed around the style.

Leaves alternate. BORRAGINACEAE 145
Leaves opposite. Mentha in LABIATAE 154
Ovary 1, not deeply lobed.
Ovary 1-celled.
Leaves entire, opposite.  
Leaves mostly not entire, if entire alternate.  

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GENTIANACEAE 136  
HYDROPHYLLACEAE 143

Ovary 2–10-celled.
Stamens free from the corolla, or nearly so.
Stamens on the corolla-tube.
Stamens 4.
Stamens 5, or rarely more.
Fruit a few-seeded pod.
Fruit a many-seeded pod or berry.

ERICACEAE 132  
PLANTAGINACEAE 166  
Polemoniaceae 140  
CONVOLVULACEAE 139  
Solanaceae 154

Stamens fewer than the corolla-lobes.
Corolla not scarious.
Corolla scarious.
Style 2-lobed.
Style single.

LYCOPUS in LABIATAE 153  
Veronica in SCROPHULARIACEAE 163

b—Ovary inferior.
Stamens united by their anthers into a ring or tube.
Flowers in an involucrate head.
Flowers separate, not involucrate.
Stamens separate, free from the corolla or nearly so.
Stamens separate, on the corolla.
Stamens 1–3, fewer than the corolla-lobes.
Stamens 4–5.

COMPOSITAE 174  
LOBELIACEAE 173  
CAPRIFOLIACEAE 168

DIPSACEAE 174

Valerianaceae 170

Dipsa

Stamens 4–5.

Ovary 1-celled: flowers in a dense involucrate head.

Dipsaceae 174

Ovary 2–3-celled.
Leaves opposite or whorled, when opposite with stipules.
Leaves opposite, without stipules.

Scrophulariaceae 163

Campanulaceae 171

Labiatae 153

Rubiaceae 167

Plantaginaceae 166

Solana

Stellaria

Bellis

Capsella

Silene

Viola

Veronica

Lobelia

Lycopus

Primula

Dipsacus

\[ \text{Stamens united by their anthers into a ring or tube.} \]

\[ \text{Flowers in an involucrate head.} \]

\[ \text{Flowers separate, not involucrate.} \]

\[ \text{Stamens separate, free from the corolla or nearly so.} \]

\[ \text{Stamens separate, on the corolla.} \]

\[ \text{Stamens 1–3, fewer than the corolla-lobes.} \]

\[ \text{Stamens 4–5.} \]

\[ \text{Ovary 1-celled: flowers in a dense involucrate head.} \]

\[ \text{Ovary 2–3-celled.} \]

\[ \text{Leaves opposite or whorled, when opposite with stipules.} \]

\[ \text{Leaves opposite, without stipules.} \]
BRANCH PTERIDOPHYTA.

Plant containing woody tissue and vessels in the stem and producing spores asexually, which, on germination, develop very small flat mostly green structures called prothallia, on which are borne the sexual reproductive organs from which the asexual plant is developed. The sexual plant is rarely collected, and the classification is based mainly on the characters of the asexual plant.

Class 1. FILICINEAE.

Plant highly organized, vascular, with green, usually large leaves: spores borne within the tissue of, or in modified hairs on, modified or unmodified foliage leaves: stem solid, underground (in ours).

Order 1. OPHIOGLOSSEAE.

Plant consisting of an underground stem bearing one or more leaves which rise above ground and are divided usually into two parts, a fertile portion and a sterile portion, the latter being the foliage part of the leaf; frequently the fertile portion lacking in some of the leaves: sporangia borne within the tissue of the fertile portion, ring-less, opening by a transverse slit.

Family 1. OPHIOGLOSSACEAE.

Characters of the Order.

1. BOTRYCHIUM.

Rootstock very short, with clustered fleshy roots: sterile part of the leaf ternately or pinnately divided or compound; veins free: fertile segment 1-3-pinnate, each pinnule bearing a double row of sessile sporangia; spores numerous, sulphur-yellow.

B. coulteri Underwood. Stout, fleshy, 12-18 cm. high: stem very short and stout, swollen with the contained bud of the succeeding season; leaves one or two, their petioles stout, 2-5 cm. long; sterile blades 10-15 cm. wide, scarcely as long, ternate, the primary divisions tripinnate or quadripinnatifid; ultimate segments obliquely ovate, 1-1.5 cm. long, thick, entire or nearly so, the veins few, obscure: sporophyll erect, the petiole stout, the
fruiting portion quadripinnate below, gradually simpler above; sporangia numerous, crowded, bright yellow. The typical plant grows in geyser formations but specimens from near Moscow are referred to this species by its author.

**Order 2. ISOETEAE.**

Plant aquatic, usually submersed, or sometimes growing on moist soil, consisting of a short, 2-3 lobed, fleshy stem with a dense tuft of fibrous roots and a compact cluster of rush or grass-like leaves: sporangia in small lobes, enclosed in the bases of the leaves; spores of two kinds, large (macrospores) and small (microspores).

**Family 2. ISOETACEAE.**

Characters of the Order.

2. **ISOETES.**

Stem a fleshy corm rooting just above the base, surrounded above by the swollen bases of the awl-shaped linear leaves: sporangia large, enclosed in the bases of the leaves; those of the outer leaves with macrospores, those of the inner with microspores; the sides of the sporangia more or less covered with a fold of the inner side of the leaf base (the velum).

* I. howellii Engelm. Leaves 18-50, rather slender, 10-35 cm. long, erect or nearly so, semi-lunate or helmet-shaped in cross section, striate, with abundant stomata above: macrosporangia dark brown, the macrospores bright white, rough with low more or less confluent tubercles; microsporangia olivaceous, elliptic or oblong, much pitted, 6-8 mm. long, partly covered by the narrow wings of the velum, the microspores unsymmetrical, spinulose on the ridges.

Borders of ponds near Moscow. The species has been redescribed as Isoetes underwoodii Henderson.

**Order 3. FILICES.**

Plant leafy, vascular: sporangia borne as modified hairs or outgrowths from the surface of the leaf, arranged in groups (sori) over the lower or sometimes the upper surface of the leaf; sori with or without a protective covering (the indusium); sporangia opening by means of a more or less complete elastic ring of specialized cells (the annulus); spores of one kind only: vernation circinate.

**Family 3. POLYPODIACEAE.**

Sporangia stalked, surrounded by a more or less complete vertical annulus and bursting transversely; sori on the backs or margins of the leaves, with or without indusia.
Sori dorsal or marginal, provided with special indusia.

Sori roundish; indusia less than twice as long as broad.
Veins of pinnules pinnately branched.

Veins of pinnules dichotomously branched.
Sori linear or oblong; indusium more than twice as long as broad.
Sori with marginal indusia formed of the more or less altered edge of the leaf.
Sporangia on a continuous vein-like receptacle which connects the ends of the veins.
Sporangia at or near the ends of unconnected veins.
Sori without indusia, roundish.

3. WOODSIA.

Small or medium sized ferns, growing in rocky places: leaves 1-2 pinnate or pinnatifid; sori round, borne on the backs of pinnately forked free veins; indusium attached all around the receptacle underneath the sporangia, early bursting at the top into irregular pieces or lobes, and, when mature, usually concealed by the sorus.

**W. oregana** D. C. Eaton. Rootstock short; petioles glabrous, not jointed, brownish below; blades slightly roughened, 5-28 cm. long, elliptic-lanceolate, the sterile shorter than the fertile; pinnae triangular-oblong, obtuse, pinnatifid; lower pinnae reduced in size and somewhat remote from the others; rachis straw-colored; segments oblong or ovate, dentate or crenate, teeth often reflexed and covering the sori. Common in crevices in rocks, usually in shady places, Pullman.

4. CYSTOPTERIS.

Delicate rock-ferns: leaves 2-4 pinnate; leaf-stalks slender: sori round, borne on the backs of dichotomously branched free veins (in ours); indusium attached partly under the sorus on the side toward the midvein, early opening and withering away.

**C. fragilis** Bernh. Rootstock short; petioles 10-20 cm. long; blades thin, oblong-lanceolate, only slightly tapering below, 10-25 cm. long, 3-7 cm. wide, 2-3 pinnatifid or pinnate; pinnae lanceolate-ovate, irregularly pinnatifid with bluntly or sharply-toothed segments along the margin or winged rachis; texture membranous. Not very common; shady woods, Thatuna Hills.

5. PTERIS.

Large, mostly coarse ferns, with variously divided, or, in tropical species, simple leaves, and marginal linear continuous sori which occupy a slender thread-like receptacle connecting the tips of free veins; indusium membranous, formed of the reflexed margin of the leaf: leaf-stalks continuous with the rootstock.

**P. aquilina** L. Rootstock stout, black, subterranean, horizontally-creeping; petioles 30-90 cm. high, erect, pale-green or straw-color; leaf-blades 60-120 cm. long, 30-90 cm. wide, glabrous or nearly so, ternate, the three
Flora of the Palouse Region

branches each bipinnate; pinnules oblong, acutish, mostly entire, the uppermost coalescent, the lower more or less lobed.

var. lanuginosa Hook. Leaves tomentose beneath.

Only the variety occurs in our limits. Common in coniferous woods, otherwise infrequent.

6. CHEILANTHES.

Mostly pubescent or tomentose rock-loving and small ferns with much divided leaves: sori terminal on the veins, at first small, finally more or less running together; sporangia often much concealed in the scales or hairs which in many species cover the segments.

The species occurring within our limits have the ultimate segments of the pinnae very small and circular in form and the indusia formed by the incurving of the whole of the leaf margin.

Leaf-blades glabrous above, bipinnate; ultimate segments mostly entire. C. gracillima.

Leaf-blades pubescent above, tripinnate or tripinatinfid; ultimate segments mostly crenate. C. lanuginosa.

C. gracillima D. C. Eaton. Petioles densely tufted, shining brown, 4–8 cm. high, bearing a few scattered lanceolate scales; blades 2–8 cm. long, oblong lanceolate, bipinnate; pinnae numerous, crowded, pinnately divided into 5–9 oval mostly entire pinnules, glabrate above, pubescent beneath with rusty matted wool. Common in rock crevices on Kamiack Butte.

C. lanuginosa Nutt. Petioles densely tufted, 4–6 cm. high, brownish, when young covered with long hair-like scales, at length glabrate; blades 4–8 cm. long, oblong-ovate, the lowest usually remote; ultimate segments orbicular or oblong, entire or crenate, crowded; upper surface with a few long hairs, the lower densely matted with whitish or pale-brown long hairs. Bluffs of Snake River near Almota.

7. ASPLENIUM.

Large or small ferns with simple, lobed, 2–3 pinnate or pinnatifid leaves, and linear or oblong sori oblique to the midrib or rachis: leaves uniform or the fertile sometimes different from the sterile; veins free (in ours): indusia straight or curved, opening towards the midrib when single.

A. filix-femina Bernh. var. cyclosorum Rupr. Rootstock creeping, short, densely covered by the bases of the petioles; petioles tufted, 20–30 cm. long, straw-color or brownish; blades delicate, glabrous, broadly oblong-lanceolate or oblong-ovate, acuminate at the apex, 30–90 cm. long, bipinnate; pinnae oblong-lanceolate, 5–20 cm. long, pinnules oblong, obtuse, obscurely 9–13 lobed, the lobes serrate; terminal pinnules confluent: sori short, straight or curved. Common in moist woods, Thatuna Hills.
8. PHEGOPTERIS.

Medium sized or small ferns: leaves 2-3-pinnate or ternate; leaf-stalk not articulated with the rootstock; fertile and sterile leaves similar (in ours); sori small, round, borne on the backs of veins below their ends; indusium none.

**P. dryopteris** Fee. Rootstock slender, horizontally creeping; petioles 15–20 cm. tall, pale straw-color, shiny, bearing a few brownish scales toward the base; blades broadly triangular in outline, 10-20 cm. wide, ternate, the lateral primary divisions bipinnate, the terminal usually tripinnate; all naked at the base; pinnae oblong, 2-5 cm. long, glabrous, pinnately cleft or divided into 15-25 obtuse lobes; sori near the margin, on the ends of free veins. Common in rich woods, Thatuna Hills.

**Order 4. HYDROPTERIDEAE.**

Plant perennial, herbaceous, rooting in the mud, with slender creeping rootstock and 4-foliolate or filiform leaves: sporangia borne within closed receptacles (the sporocarps) which arise from the rootstock near the leafstalks or are consolidated with them; spores of two kinds, macrospores and microspores, both contained in the same sporocarp.

**Family 4. MARSILIACEAE.**

Characters of the Order.

9. **MARSILIA.**

Marsh or aquatic plants: leaves slender-petioled, quadrifoliolate, commonly floating on the surface of shallow water: sporocarps ovoid or bean-shaped, peduncled and rising from the petiole or from the rootstock at the base of the petiole, composed of two vertical valves having several transverse compartments (sori) in each valve; also provided inside with a ring which at the opening of the valves swells and tears the sori from their positions: sori composed of both macrosporangia and microsporangia.

**M. vestita** Hook & Grev. Rootstock slender, creeping; leaves more or less pubescent with white hairs; petioles slender, 4-12 cm. long; leaflets deltoid-obovate, 4-12 mm. long, mostly entire: sporocarps solitary on the stalks, 4-8 mm. long, 3-5 mm. wide, with a short raphe, a short blunt lower tooth, and an acute upper one, densely pubescent with white appressed hair-like scales; sori 6-11 in each valve. Common on the banks of streams in spring and early summer, frequently aquatic, the leaves floating on the surface.

**Class 2. EQUISETINEAE.**

Plant rush-like with hollow jointed stems rising from subterranean rootstocks: sterile leaves reduced to minute scales, whorled, forming sheaths at the joints; fertile leaves forming a short spike terminating the stem: epidermis rough.
Order 5. EQUISETEAE.

Branches when present whorled: sporangia one-celled, clustered under the scales of the terminal cone-like spikes; spikes of but one kind: spores furnished with narrow ribbon-like appendages (elaters) attached at the middle, coiling around them when moist and spreading in the form of a cross when dry and mature: epidermis impregnated with silica, rough.

Family 5. EQUISETACEAE.

Characters of the Order.

10. EQUISETUM.

Perennial plants with extensively creeping rootstocks; stems simple or with whorled branches, furrowed lengthwise, hollow: sporangia adhering on the under side of the shield-shaped scales of the spike, one-celled, opening down the inner side; spores of one kind, with elaters.

Stems annual, of two kinds; the pale brown fertile ones appearing in spring before the herbaceous sterile ones. E. ARVENSE.

Stems perennial, all alike, evergreen; spikes tipped with a rigid point.

Ridges of the stem somewhat roughened with tubercles. E. ROBUSTUM. E. LAEVIGATUM.

E. arvense L. Aerial stems annual, of two kinds; the fertile pale brown and short-lived, appearing in early spring before the sterile; fertile stems 10–20 cm. tall, simple, terete, bearing about four loose scarious distant sheaths, these whitish with about 12 brownish acuminate teeth; sterile stems pale green, 10–40 cm. tall, marked with 6–19 furrows, with numerous whorls of mostly simple, solid branches, these 4-angled or rarely 3-angled; cavity of the main stem small: spike 2–3 cm. long. Common in moist places.

E. robustum A. Braun. Aerial stems evergreen, all alike, 40–120 cm. tall, 5–20 mm. thick, marked with 20–36 furrows; ridges roughened usually with a single series of transverse siliceous tubercles: sheath short, commonly marked with a black girdle at the base and another at the base of the early falling teeth: spike nearly sessile in the uppermost sheath, 2–3 cm. long, tipped with a rigid point.

Common in moist places. The stems are usually simple but under certain conditions branches may be produced. The species is variable and probably not distinct from E. hiemale L.

E. laevigatum A. Braun. Aerial stems evergreen, pale, mostly simple, 40–90 cm. tall, marked with 14–30 furrows, the ridges nearly smooth: each sheath marked with a black girdle at the base of the deciduous white-margined teeth, and sometimes with another at its base; wall of the stem thin, the cavity large: spikes 2–3 cm. long, borne on a stalk that usually exceeds the uppermost sheath.

Common in low ground, on railway embankments, etc. When the primary stems are cut off near the base a large number of smaller stems are produced, resulting in a form very similar to E. variegatum Schleih.
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Class 3. LYCOPODINEAE.

Plant moss-like: stems branched, solid, with numerous small leaves; sporangia solitary in the axils of the leaves or on their upper surfaces.

Order 6. SELAGINELLEAE.

Terrestrial, annual or perennial moss-like plants with branching stems and scale-like leaves, which are many-ranked and uniform, or four-ranked and of two kinds spreading in two planes; sporangia one-celled, in the axils of leaves which are so arranged as to form more or less quadrangular spikes; spores of two kinds; some sporangia (macrosporangia) containing four macrospores, others (microsporangia) containing numerous microspores.

Family 6. SELAGINELLACEAE.

Characters of the Order.

II. SELAGINELLA.

Sporangia in the axils of leaves forming terminal cone-like spikes; sporangia minute, subglobose, opening transversely; macrospores globose, four in each macrosporangium; microspores small, numerous.

S. rupestris Spreng. Stems densely tufted, 5-10 cm. long, prostrate or ascending, much branched; leaves closely imbricate, narrowly lanceolate, ciliate margined, channeled on the back, tipped with a slender white awn: spikes quadrangular 1-1.5 cm. long; bracts like the leaves but the awns shorter and the margin more ciliate.

Abundant on the basaltic bluffs of Snake River. Our form has shorter branches and more densely crowded leaves than is typical and has been named S. densa Rydberg.
BRANCH SPERMATOPHYTA.

Highly organized plants, mostly producing flowers and always producing seeds, each of which contains a young plant (the embryo) usually composed of a stem-like structure (the caulicle or hypocotyl), one or more rudimentary leaves (the cotyledons) and a terminal bud (the plumule or epicotyl): macrosporangia (ovules) usually borne on the side or face of an open or closed modified leaf (the carpel): microsporangia (anther-sacs) on the end or side of a modified leaf (the filament) and bearing numerous microspores (pollen grains).

CLASS 4. GYMNOSPERMAE.

Ovules (macrosporangia) naked, not enclosed in an ovary, usually on the face of an open scale but sometimes on the axis, in which case the scale is rudimentary or wanting: stigmas none: cotyledons mostly several in a whorl, occasionally only two: perianth none.

ORDER 7. CONIFERAE.

Stem branching freely: leaves entire, relatively small, linear or reduced to scales: ovules naked.

FAMILY 7. PINACEAE.

Resinous trees or shrubs, mostly with evergreen narrow entire or scale-like leaves: pollen-sacs and ovules borne in separate spikes (aments): ovules solitary or several together on the surface of a scale, which is in the axil of a bract in most genera: fruit a cone with numerous several or few, woody papery or fleshy scales: seeds wingless or winged.

Scales of the cone numerous: leaf-buds scaly.

Cone-scales woody: leaves needle-shaped, 2-5 in a sheath.

Cone-scales thin: leaves filiform, scattered or clustered, not in sheaths.

Leaves clustered on very short branchlets, deciduous.

Leaves scattered, persistent.

Branchlets smooth; leaf-scars not prominent: bracts longer than the cone-scales.

Cones erect; scales deciduous: leaves sessile.

Cones pendulous; scales persistent: leaves petioled.

Branchlets rough from the prominent persistent leaf-bases: bracts smaller than the scales.

Scales of the cones few (3-12): leaf-buds naked.

12. Pinus.

13. Larix.


15. Pseudotsuga


17. Thuja,
12. **PINUS.**

Evergreen trees with two kinds of leaves; the primary ones scale-like with deciduous tips; the secondary ones forming the ordinary foliage, needle-like, arising from the axils of the former in clusters of 2-5; ovule-bearing aments solitary or clustered, each composed of numerous minute bracts, each with an ovule-bearing scale in its axil; ament, upon maturing, becoming a cone; the scales elongating and becoming woody; seeds two on the base of each scale.

Cone scales with prominent thickenings.

Leaves two in a fascicle.  
P. contorta.  

Leaves three in a fascicle.  
P. ponderosa.  

Cone scales without prominent thickenings: leaves five in a fascicle.  
P. monticola.

**P. contorta** Dougl. Small tree, 10 to 20 m. tall, the dark bark usually deeply checked; leaves 4-8 cm. long, dark green; cones small, ovoid, 4-5 cm. long; scales thickened at the apex and armed with a stout point.

Rare in the Thatuna Hills. A very variable species, by some authors segregated into two or more.

**P. ponderosa** Dougl. Large tree, 30-80 m. tall, 1-4 m. in diameter, the reddish bark thick and deeply furrowed; leaves in fascicles of three, 15-25 cm. long, minutely serrulate; staminate aments cylindrical, somewhat flexuous, 4-6 cm. long, crowded at the base of young shoots: pistillate aments 1-5, greenish or purplish, borne near the apex of the shoots of the season: cones brown, ovoid, 7-10 cm. long, 5-5 cm. thick, frequently in clusters of 3 to 5; scales much thickened near the apex and bearing a stout sharp point. Throughout our limits where the soil is gravelly.

**P. monticola** Dougl. Tree 50-100 m. high, 1-2 m. in diameter; bark gray, rather smooth, longitudinally cracked; leaves pale green, in fascicles of five, 4-7 cm. long; cones narrowly cylindrical, 15-30 cm. long, about 4 cm. thick. Infrequent, Thatuna Hills.

13. **LARIX.**

Tall trees with horizontal or ascending branches and small narrowly linear deciduous leaves, without sheaths, in clusters on short lateral scaly bud-like branchlets: aments short, lateral; staminate from leafless buds; ovule-bearing buds commonly leafy at the base and the aments red: mature cones ovoid or cylindrical, small, erect; scales thin, spirally arranged, obtuse, persistent; ovules two on the base of each scale, ripening into two reflexed somewhat winged seeds.

**L. occidentalis** Nutt. A large tree, 30-70 m. high, 1-2 m. in diameter; bark thick, reddish, longitudinally fissured; branches short, horizontal, the branchlets glabrous; buds spherical; leaves narrowly linear, 2-4 cm. long, in alternate fascicles of 12-18, deciduous; cones ova-cylindrical, reddish when young, brown when mature, 2-3 cm. long; scales broadly oblong, truncate, ciliate-fringed when young; bracts scarious, dilated at the base,
the narrow terminal part exceeding the scale. Common in the Thatuna Hills.

14. ABIES.

Evergreen trees with linear flat scattered sessile leaves, spreading so as to appear two-ranked but in reality spirally arranged, commonly quite persistent in drying: staminate aments axillary: ovule-bearing aments lateral, erect; ovules two on the base of each scale, reflexed; the scale shorter than or exceeding the thin papery bract: cones erect, subcylindrical or ovoid, their orbicular or broader scales deciduous from the persistent axis.

**A. grandis** Lindl. Large tree, sometimes 100 m. tall and 2 m. in diameter, with thin, dark gray, rather smooth bark: branches horizontal or the lower drooping; leaves linear, obtuse or notched, shining green above, marked beneath by two white lines, 18-30 mm. long, usually arranged in two ranks, giving the foliage a flattened appearance: cones cylindric-oblong, 7-10 cm. long, dark green, more or less covered with drops of resin; scales broader than long, entire: bracts small. Moist places, Thatuna Hills.

15. PSEUDOTSUGA.

Very large trees, at first pyramidal and spruce-like, often at last more spreading; leaves flat, somewhat two-ranked by a twist at the base: aments from the axils of the leaves of the preceding year: staminate aments in an oblong or cylindrical column, surrounded or partly enclosed by numerous, conspicuous, round bud-scales: ovule-bearing aments with the scales much shorter than the broadly linear acutely two-lobed bracts: cones maturing the first year; scales persistent.

**P. douglasii** Carr. Very large tree, 50-100 m. high, 1-4 m. in diameter: bark thick, reddish within, deeply cracked longitudinally: branches usually short and horizontal; leaves linear, obtusif, 20-30 mm. long, narrowed at the base, dark green above, paler beneath: staminate aments light brown, oblong-cylindric, 1 cm. long, half enclosed in the large bracts: pistillate aments green or purplish: cones pendent, cylindric-ovate, 6-10 cm. long, the tridentate bracts conspicuously exceeding the scale. Common on Kamiack Butte and the Thatuna Hills.

16. PICEA.

Evergreen conical trees, with linear short four-sided leaves, spreading in all directions, falling away from the twig in drying, leaving it covered with small projections: leaf-buds scaly; staminate aments axillary, nearly sessile: ovule-bearing aments terminal, ovoid or oblong; ovules two on the base of each scale, reflexed, ripening into two more or less winged seeds: cones ovoid or oblong, obtuse, pendulous; their scales numerous, spirally arranged, thin, obtuse, persistent.
P. engelmanni Parry. Handsome pyramidal tree, 30-40 m. tall, the bark gray and scaly; branchlets pubescent: leaves dark-green, quadrangular in cross section, very sharply pointed, 1.5-2 cm. long: cones cylindric-ovate, 3-6 cm. long, the scales ovate, truncate, rounded or retuse, crenulate. Thatuna Hills, along streams; not common.

17. THUYA.

Evergreen trees or shrubs: leaves small or minute, scale-like, appressed, opposite, four-ranked: aments monoecious, both kinds terminal; the staminate globe; the ovule-bearing ovoid or oblong, small, their scales opposite, each bearing 2, rarely 2-5, erect ovules: cones ovoid or oblong, mostly spreading or recurved, their scales 6-10, coriaceous, opposite, dry, spreading when mature.

T. gigantea Nutt. Handsome pyramidal tree, 30-50 or even 80 m. high, 1-5 m. in diameter, the trunk rapidly tapering from the large base: branches usually somewhat drooping: bark pale grayish, thin, fibrous, longitudinally fissured; wood soft, the heart wood reddish, odorous: leaves oblong-ovate, bright green, rapidly tapering to an acuminate cuspidate apex: staminate aments minute, dark purple: pistillate aments usually crowded near the tips of the branchlets: cones ovoid, 1-1.5 cm. long, light colored, consisting of about 6 pairs of scales, these elliptical, mucronate on the back, near the apex. In moist places, Thatuna Hills and Kamiack Butte.

Family 8. TAXACEAE.

Dioecious trees or shrubs, not resin-bearing (in ours): leaves evergreen or deciduous, linear (in ours): pollen-sacs and ovules borne in separate clusters or solitary: fruit drupe-like (in ours).

18. TAXUS.

Evergreen trees or shrubs with spirally arranged, short-petioled linear flat leaves, spreading so as to appear two-ranked: aments very small, axillary and solitary, sessile or nearly so: staminate aments consisting of a few scaly bracts and 5-8 stamens: ovules solitary, axillary, erect, subtended by a fleshy ring-shaped disk: fruit consisting of the fleshy disk which becomes cup-shaped, red and nearly encloses the bony seed.

T. brevifolia Nutt. Small tree 4-10 m. high, sometimes much larger, the bark loose and reddish; branches slender, horizontal or drooping: leaves horizontal, 1-2 cm. long, linear, acuminate, cuspidate, with revolute margins, shiny green above, glaucous beneath, abruptly narrowed at the base into a short petiole: staminate aments globose, 3 mm. broad: fruit bright red, insipid in taste: stone broadly ovate, acute, somewhat flattened, 3-4 mm. long. Infrequent along streams, Thatuna Hills.

Class 5. ANGIOSPERMAE.

Ovules (macrosporangia) enclosed in a cavity (the ovary) formed by the infolding and uniting of the margins of a modified rudimentary leaf (carpel), or of several such leaves joined together, in
which the seeds are ripened: stigmas present: cotyledons one or two, very rarely wanting: perianth present or wanting.

**Sub-class 1. Monocotyledones.**

Embryo of the seed with but a single cotyledon, that is with the first leaves of the germinating plantlet alternate: stem composed of a mass of soft tissue in which bundles of wood cells are irregularly imbedded: no distinction into bark, wood and pith: leaves usually parallel-veined, mostly alternate and entire, commonly sheathing the stem at the base and often with no distinction of blade and petiole: parts of flowers mostly in threes.

**Family 9. Typhaceae.**

Marsh or aquatic herbs with creeping rootstocks and linear flat sheathing leaves: stems erect, terete: flowers monoecious, densely crowded in terminal spikes which are subtended by spathaceous bracts: ovary one, 1-2-celled, with as many persistent styles: fruit nutlike; endosperm copious.

19. Typha.

Flowers in a dense cylindrical spike; staminate and pistillate portions of spike either contiguous or separate: stamens with very short connate filaments, mixed with numerous long hairs: ovary long-stalked, one-celled, surrounded by numerous bristles and rudimentary ovaries: fruit minute, usually splitting on one side.

*T. latifolia* L. Stout, 1-3 m. tall: leaves flat, sheathing at base, 1-2 cm. wide: pistillate and staminate portions of the spike close together, each 8-30 cm. long; the pistillate dark brown: stigmas rhombic-spatulate: pollen grains in fours. In shallow water, not rare.

**Family 10. Najadaceae.**

Immersed aquatic plants with slender often branching leafy stems: leaves flat or filiform: flowers spicate, perfect (in ours): perianth usually of four herbaceous segments: stamens 1-4, occasionally more, distinct, hypogynous: ovaries 1-9, mostly distinct, 1-celled, mostly 1-ovuled: seeds straight or curved; endosperm none.

Flowers perfect.  
Flowers monoecious or dioecious.  

20. Potamogeton.  

20. Potamogeton.

Leaves alternate or the uppermost opposite, often of two kinds: the submersed mostly linear; the floating lanceolate, ovate or oval: spathes enclosing the young buds usually perishing soon after
expanding: flowers small, perfect, spicate, green or red; parts of flower in fours: ovaries 4, sessile, distinct, 1-celled, 1-ovuled.

With both floating and submersed leaves, the former broad.

Submersed leaves of two kinds, lanceolate, and oval or oblong; floating leaves broad-oval.

Submersed leaves all alike, lanceolate; floating leaves narrow-elliptic.

Leaves all submersed, linear.

**P. amplifolius** Tuck. Stem stout, simple or branched; floating leaf-blades oblong-oval, acute, rounded at the base, 5-10 cm. long, on petioles about as long; submersed leaves mostly linear-lanceolate, the uppermost frequently oval or oblong; stipules large, 5-10 cm. long: spike stout, dense, 2-3 cm. long, on stout peduncles: fruit large, 4-5 mm. long, with a broad beak. Collected in a pond at Pullman by Henderson in 1892. Not since seen.

**P. lonchites** Tuck. Stems slender, flaccid, branched, .5-1 m. or more long; floating leaves narrowly elliptic, pointed at each end, 5-10 cm. long: many-nerved, narrowed at the base into a petiole about as long; submersed leaves linear; stipules narrow, 3-8 cm. long: spike dense, 2-4 cm. long, on stout peduncles: fruit about 3-4 mm. long. In ponds and pools, not common.

**P. foliosus** var. **californicus** Morong. Stems slender, much branched, flattened or somewhat winged, 30-50 cm. long, wholly submersed: leaves linear, sessile, 2-5 cm. long, 1 mm. wide, 3-5-nerved, the midvein thick: peduncles erect, club-shaped: spike containing 6-12 globose fruits, these crested on the back, angled in front, short beaked, about 2 mm. long. Ponds, common.

21. **NAIAS.**

Leaves opposite, alternate or verticillate, sheathing at the base: flowers monoeious or dioecious, axillary, solitary, sessile or pedicelled: sterile flower with a double perianth, the exterior one entire, or 4-horned at the apex, the inner one hyaline, adhering to the anther: fertile flower consisting of a single ovary: mature carpel solitary, sessile, ellipsoid.

**N. flexilis** Rost. & Schmidt. Stems slender: leaves numerous, linear, acute or acuminate, 1-2 cm. long, minutely serrulate, the sheath broadly-oblong: fruit 3 mm. long, oblong-linear, tipped with the persistent style: seed pale-brown, shining. Near Viola, Henderson.

**Family 11. ALISMAECAE.**

Aquatic or marsh herbs with fibrous roots, scape-like stems and basal long-petioled leaves: inflorescence a raceme or panicle: flowers regular, perfect, monoeious or dioecious, pedicelled; the pedicels whorled and subtended by bracts: sepals 3, persistent: petals 3, deciduous: stamens 6 or more: ovaries numerous or rarely few, 1-celled, usually 1-ovuled: carpels becoming akenes in fruit: endosperm none.
Carpels in a ring upon a small flat receptacle.  22. ALISMA.
Carpels crowded in many series upon a large convex receptacle.  23. SAGITTARIA.

22. ALISMA.

Perennial or rarely annual herbs with erect or floating leaves: inflorescence a panicle or umbel-like panicle: flowers perfect, small, numerous, on unequal 3-bracted pedicels: petals small: stamens 6 or 9: ovaries few or many, borne in one or several whorls on a small flat receptacle.

A. plantago L. Scapes stout, 3-1 m. tall: leaves all radical, erect or floating; the petioles usually long; the blades ovate or oblong, acute, rounded or subcordate at the base, 5-15 cm. long, 5-7-nerved: flowers in a large panicle composed of 3-6 whorls of branches, these again branched once or twice; flowers on pedicels 1-5 cm. long; petals white, hardly exceeding the sepals: akenes obliquely obovate, compressed, arranged in a circle on the receptacle. Common in ponds and wet places.

23. SAGITTARIA.

Perennial aquatic or marshherbs with basal long-petioled leaves: flowers monoecious or dioecious, borne near the summits of the scapes in whorls of 3, the staminate usually uppermost: petals usually conspicuous: stamens usually numerous: ovaries numerous, crowded in globose heads.

S. arifolia Nutt. Terrestrial or aquatic, 10-50 cm. tall: petioles stout, ascending, 10-30 cm. long; blades 6-18 cm. long, sagittate, acute, the basal lobes diverging and usually much smaller than the terminal one: sepals becoming reflexed: petals white: fruiting head globose, 8-15 mm. in diameter: akenes obovate-cuneate, much flattened, with a minute erect beak. Common on the margins of ponds and streams.

FAMILY 12. GRAMINEAE.

Annual or perennial herbs, rarely shrubs or trees: stems (culms) generally hollow, nodes closed: leaves sheathing, the sheaths usually split to the base on the side opposite the blade; a scarious or cartilaginous ring (the ligule) usually borne at the opening of the sheath: inflorescence a spike, a raceme or a panicle, consisting of spikelets composed of 2—many 2-ranked imbricated bracts (glumes); the lowest two (empty glumes) without flowers or rarely wanting; one or more of the upper (flowering glume) containing in its axil a flower, which is usually enclosed by a bract-like, generally 2-keeled, awnless organ (palet) opposite the glume and with its back toward the axis (rachilla) of the spikelet; upper flowering glume sometimes bearing a hard protuberance (callus) at the base: flowers perfect or sometimes monoecious
or dioecious, subtended by 1–3 minute hyaline scales (lodicules): stamens 1–6, usually 3; ovary 1-celled, 1-ovuled; styles 1–3, commonly 2 and lateral; stigmas hairy or plumose: fruit a seedlike grain (caryopsis); endosperm starchy.

Spikelets 1 or 2-flowered, when 2-flowered the upper fertile, the lower staminate: rachilla jointed below the glumes and not extending beyond the flowers. Tribe 1. PANICEAE.

Spikelets 1-many-flowered: rachilla generally jointed above the empty glumes (below in Nos. 30, 38 and 39) and in 1-flowered spikelets frequently extending beyond the flower.

Spikelets in two rows forming a one-sided spike or raceme. Tribe 4. CHLORIDEEAE.

Spikelets in two opposite rows forming an equilateral spike. Tribe 6. HORDEAE.

Spikelets on pedicels in panicles, spikes or racemes, not in rows. Spikelets with but 1 perfect flower which is terminal (except in part of No. 32). Tribe 2. AGROSTIDEEAE.

Spikelets with 2 or more perfect flowers (except that 1 is staminate in Nos. 33 and 37). Flowering glumes usually with a bent awn on the back, generally shorter than the empty ones. Tribe 3. AVENAE.

Flowering glumes unawned or with a straight awn from the apex, generally longer than the empty ones. Tribe 5. FESTUCACEAE.

Tribe 1. PANICEAE.

Spikelets single, in panicles or raceme-like sessile or paniced spikes: lower empty glume short: lower flowering glume empty (flower abortive) or with a staminate flower; upper one with a perfect flower. 24. PANICUM.

Tribe 2. AGROSTIDEEAE.

Flowering glume indurated at maturity, of firmer texture than the empty glumes and closely enveloping the grain. Flowering glume with a 3-branched awn. 25. ARISTIDA.

Flowering glume with a simple awn. 26. STIPA.

Flowering glume hyaline or membranous at maturity: empty glumes coarser: grain loose.

Spikelets in dense spikes or spike-like panicles. Spikelets readily deciduous at maturity. Empty glumes not awned. Empty glumes awned. 28. ALOPECURUS.

Spikelets not deciduous: empty glumes persistent. 29. PHLEUM.

Spikelets variously paniced; panicles not spike-like. Flowering glume 1–, rarely 3-nerved: seeds loosely enclosed in the pericarp, which opens readily at maturity. Flowering glume 3–5-nerved: seed adherent to the pericarp.

Callus with a tuft of long hairs at the base. 32. CALAMAGROSTIS

Callus naked. 31. AGROSTIS.
Tribe 3. AVENAE.

Spikelets deciduous: lower flower perfect; upper staminate, awned; plant velvety.

33. HOLCUS.

Spikelets not deciduous: empty glumes persistent; flowering ones deciduous.

Awn of the flowering glume from between the lobes or teeth, generally twisted.

38. DANTHONIA.

Awn of the flowering glume inserted upon the back below the teeth.

Upper flower perfect; the lower staminate, its glume strongly awned.

37. ARRHENATHERUM.

Flowers all perfect; or the upper ones staminate or wanting.

Spikelets over 12 mm. long: grain furrowed, usually adherent to the glumes.

39. SPARTINA.

Spikelets less than 12 mm. long: grain free, unfurrowed.

Flowering glume finely erose-dentate or 2-lobed.

34. DESCHAMPSIA.

Flowering glume cleft or 2-toothed, with the teeth sometimes produced into awns.

35. TRISETUM.

Tribe 4. CHLORIDEAE.

Rachis produced beyond the upper spikelet: spikelet narrow.

39. SPARTINA.

Rachis not produced beyond the upper spikelet: spikelets globose, sometimes 2-flowered.

40. BECKMANNIA.

Tribe 5. FESTUCEAE.

Flowering glume awned.

Spikelets in small fascicles which are united into a densely clustered or interrupted panicle.

45. DACTYLIS.

Spikelets in panicles or racemes, neither imbricated nor in fascicles.

Flowering glume rounded on the back, 3-5-nerved; an awn at the tip.

48. FESTUCA.

Flowering glume convex or keeled on the back, 5-9-nerved; generally an awn below the 2-cleft tip.

49. BROMUS.

Flowering glume keeled, 3-nerved; a short awn at the tip, or glume mucronate or bristle-pointed.

43. KOELERIA.

Flowering glume not awned.

Flowering glume 1-3-nerved.

Rachilla articulated between the flowering glumes.

43. KOELERIA.

Rachilla articulated below the flowering glumes or not articulated.

Spikelets 2-flowered: upper empty glume 3-nerved.

42. EATONIA.

Spikelets many-flowered: upper empty glume 1-nerved.

41. ERAGROSTIS.

Flowering glume 5-9-nerved.

Lower empty glume 3-5-nerved; upper 5-9-nerved.

44. MELICA.

Lower and upper empty glumes 1-3-nerved.

Flowering glume keeled.

46. POA.

Flowering glume round on the back, not keeled.

Flowering glume obtuse.

47. GLYCERIA.

Flowering glume acute.

48. FESTUCA.
TRIBE 6. HORDEAE.

Spikelets solitary at the notches of the rachis: glumes usually acute or awned. 50. AGROPYRON.

Spikelets 2-6 at each notch of the rachis: glumes mostly long-awned.

Rachis readily breaking into joints.

Spikelets 1-flowered, 3 at each joint, only the central one perfect. 51. HORDEUM.

Spikelets 1-5-flowered, 2-4 at each joint, all perfect.

Rachis readily breaking into joints: spikelets 1-7-flowered, 2-4 at each joint.

52. SITANION.

Spikelets 2-6 at each notch of the rachis: glumes mostly long-awned.

Rachis readily breaking into joints.

Spikelets i-flowered, 3 at each joint, only the central one perfect.

53. ELYMUS.

Spikelets i-flowered, 2-4 at each joint, all perfect.

54. PANICUM.

Spikelets 1-2-flowered, when 2-flowered the lower one stamine: empty glumes 2, membranous: flowering glumes 2, the lower empty or with a stamine flower, the upper papery, shining, enclosing a similar palet and with a perfect flower: awns none (in ours): grain free, enclosed in the hardened flowering glume and palet.

Branches of the panicle spikelet-bearing to the base.  P. CRUS-GALLI.

Branches of the panicle capillary, naked below, bearing but few scattered spikelets.

Spikelets acuminate.  P. CAPILLARE.

Spikelets obtuse.  P. SCRIBNERIANUM.

P. crus-galli L. Annual, erect, .6-1.5 m. tall; leaf blades 15-60 cm. long, 6-25 mm. wide, glabrous or nearly so; panicle dense, the branches spike-like, bearing spikelets to the base; spikelets crowded on the lower side of the branches: empty glumes ovate, pointed: flowering glume of the neutral flower bearing an awn 4-30 mm. long. Introduced and becoming abundant.

P. capillare L. Annual, culms erect or decumbent at base, 15-30 cm. tall, mostly simple: leaf blades 15-30 cm. long, pubescent: sheaths villous; panicle 10-15 cm. long, the capillary branches solitary or in twos, ascending, branched and spikelet-bearing above the middle: spikelets 3 mm. long, ovoid, usually on peduncles as long or longer. In sandy soil, common.

P. scribnerianum Nash. Annual, the culms 20-50 cm. tall, erect or ascending, simple or branched above: culm leaves about 6, the blades lanceolate, 4-8 cm. long, 6-10 mm. wide, stiff, ascending, glabrous; sheaths pilose, loose: panicles oblong or pyramidal, 3-8 cm. long, loose, exserted or the smaller one included: spikelets turgid, ovoid, 3 mm. long. Sandy banks of Snake River.

25. ARISTIDA.

Spikelets narrow, i-flowered: empty glumes 2, narrow, often carinate: flowering glume 1, ridged and convolute, bearing 3 awns which are occasionally united at the base; palet 2-nerved: grain free, tightly enclosed in the scale.
A. purpurea Nutt. Perennial, tufted, 15-40 cm. high: radical leaves numerous; culm leaves about three, all strongly involute and filiform, scabrous: panicle loose, purplish, 10-20 cm. long: awns of the flowering glume capillary, 5-10 cm. long, the central slightly longer than the others. Dry soil near Snake River.

26. STIPA.

Inflorescence a panicle: spikelets 1-flowered, narrow: flowering glume 1, bearing a more or less bent awn which is spiral and articulated at the base: grain narrow, free, tightly closed in the flowering glume.

S. viridula Trin. Perennial, tufted, 0.5-1 m. tall, dark green: leaf blades involute, long-attenuate, 10-15 cm. long, scabrous: sheath shorter than the internodes, loose, smooth; ligule very short: panicle erect, rather dense, 8-20 cm. long, narrow, its base included in the uppermost sheath; the branches mostly in pairs: spikelets 10-12 mm. long, purple tinged: flowering glume sparsely appressed hairy, the awns 25-30 mm. long, bent near the middle, below which they are pubescent. Grass on hillsides and pine woods, infrequent. Our form is hardly typical.

27. PHLEUM.

Inflorescence a spike: spikelets 1-flowered: empty glumes membranous, compressed, keeled, the apex obliquely truncate, the mid-nerve produced into an awn: flowering glume much shorter: grain ovoid, free, enclosed in the flowering glume and palet.

P. pratense L. Tall, erect, 0.6-1.5 m. tall: leaf blades 15-20 cm. long, 8-10 mm. wide, smooth or scabrous: spike narrowly cylindrical, erect, 5-15 cm. long: spikelets 2-5 mm. long: empty glumes ciliate on the keels which are prolonged into short awns. Abundantly introduced.

28. ALOPECURUS.

Inflorescence a spike: spikelets 1-flowered, flattened: empty glumes acute, sometimes short-awned: flowering glume 3-nerved,awned on the back, usually with a palet.

A. pallescens Piper n.sp. Perennial, tufted, pale-green, the smooth culms 30-50 cm. tall, erect or slightly geniculate at the base; culm leaves three; sheaths rather loose and inflated, shorter than the internodes, smooth; blades flat, 6-12 cm. long, 2-6 mm. wide, acuminate, strongly scabrous above, less so beneath; ligule scarious, 3-5 mm. long; spike usually well exserted, pale and silvery, 2-7 cm. long, about 5 mm. thick, erect, straight or somewhat flexuous: empty glumes 2-5 mm. long, nearly equal, strongly ciliate on the keels, obtuse; flowering glume hyaline, 2-nerved, as long as the empty glumes, obtuse, bearing from near the base a stout geniculate awn, 5 mm. long, scabrous above the bend. Common in wet places. Nearest A. californicus Vasey. The type is Piper No. 1743, collected at Pullman, June 20, 1893.
29. **SPOROBOLUS.**

Inflorescence an open or contracted panicle: spikelets 1-flowered, occasionally 2–3-flowered, generally small: empty glumes membranous, the first somewhat shorter: flowering glume membranous, equaling or longer than the empty ones: grain free and often deciduous.

Panicle narrow, small: low, densely matted.  
Panicle open, large: tall.  

*S. depauperatus* Scrib. Densely matted, 10–15 cm. high: culms strongly decumbent at base: leaf blades 5–8 cm. long, narrow, involute, minutely scabrous: culm leaves 4–5; ligules entire, acute; panicle very narrow, 2–5 cm. long, erect, frequently with its base in the uppermost sheath: spikelets 2–2.5 mm. long: flowering glume acuminate, scabrous above. In low swales, common.

*S. cryptandrus* Gray. Culms 0.5–1 m. tall, erect, usually simple, smooth: leaf blades flat, becoming involute, 10–15 cm. long, 3–4 mm. wide; ligule minute; sheaths long bearded at the throat: panicle erect, narrowly pyramidal, 10–20 cm. long, its base enclosed in the uppermost sheath; branches mostly in pairs, ascending: spikelets crowded, leaden-colored, 1.5 mm. long. Sandy bars of Snake River.

30. **POLYPOGON.**

Inflorescence a spike-like panicle: spikelets 1-flowered: empty glumes each extended into an awn: flowering glume smaller, generally hyaline, short-awned from below the apex, with a palet which is shorter than the flowering glume: grain free, enclosed in the flowering glume and palet.

**P. monspeliensis** Desf. Annual, with erect or ascending culms, 8–30 cm. high: leaf blades flat, more or less scabrous; sheaths loose, shorter than the internodes: panicle densely flowered, oblong, rarely interrupted, 2–7 cm. long; empty glumes elliptic, notched at the apex, about 2 mm. long, bearing terminal awns 3 or 4 times as long: flowering glume truncate, 1 mm. long, bearing a terminal awn somewhat longer. Moist places near Snake River.

31. **AGROSTIS.**

Inflorescence a panicle: spikelets 1-flowered: empty glumes membranous, keeled, acute: flowering glume shorter, obtuse, hyaline, sometimes bearing a dorsal awn; palet shorter than the flowering glume, sometimes minute or wanting: grain free, enclosed in the flowering glume.

Palet present, one-third the length of the glume.  

*A. alba.*

Palet very minute or wanting.

Branches of the dense narrow panicle spikelet-bearing to the base.  

*A. exarata.*

Branches of the looser panicle, at least the lower ones, naked below.  

Panicle narrow, the branches rather short: perennial.  

*A. scouleri.*

Panicle loose, the branches elongated: annual.  

*A. scabra.*
A. alba L. Perennial with creeping rootstocks: culms erect, 0.5-1 m. tall; leaf blades flat, usually scabrous, the sheaths smooth; panicle 7-20 cm. long, open at first, then contracted, greenish or purple: palet present, one-third to one-half the length of the flowering glume. Abundantly introduced.

A. exarata Trin. Perennial, tufted, the culms 30-90 cm. tall: leaves erect, the blades flat, 2-6 mm. broad, 5-10 cm. long, scabrous, the upper distant from the panicle: panicle strict, pale green, spike-like or interrupted, the short branches appressed and spikelet-bearing to the very base. Common in moist soil.

A. scouleri Trin. Perennial with running rootstocks: culms slender, erect, about 60 cm. tall: radical leaves numerous; those of the culm usually 2-3; the blades flat, 1-2 mm. broad, 7-10 cm. long, strongly scabrous; the sheaths nearly smooth: panicle erect, narrow, purplish, 7-12 cm. long, the branches scabrous, naked below. In moist soil, not common.

A. scabra Willd. Annual, tufted, 15-90 cm. tall: leaves flat or involute, narrow, very scabrous: panicle very loose, 15-30 cm. long; branches in whorls of 2-12, capillary, 5-15 cm. long, branched above the middle and spikelet-bearing only near the tips. Common in both dry and moist places.

32. CALAMAGROSTIS.

Inflorescence paniculate: spikelets 1-flowered, the pubescent rachilla usually prolonged beyond the flower: empty glumes keeled, membranous: flowering glume hyaline, shorter than the empty ones, obtuse, bearing a straight, bent or twisted dorsal awn: callus usually copiously long-hairy at the base or rarely the hairs scant or short: palet shorter: grain free, enclosed in the flowering glume.

Awns geniculate, exserted: panicle usually pale. C. suksdorfii.
Awns straight, included: panicle purple. C. macouniana.

C. suksdorfii Vasey. Culms tufted, 0.6-1 m. tall: culm leaves 3-4, 2-4 mm. wide: panicle usually narrow and dense, 8-12 cm. long, erect, commonly pale green, the branches short and flower bearing to the base: spikelets 3-4 mm. long: flowering glume shorter than the empty ones, obtuse, 4-toothed at apex, bearing a stout, nearly basal, geniculate awn, as long or longer than itself.
var. luxurians Kearney. Panicle larger, 10-20 cm. long, 2-3 cm. wide: spikelets 4-5 mm. long.
The most abundant grass in pine forests, the variety less common than the typical form.

C. macouniana Vasey. Culms 60-120 cm. high, erect, slender: leaf blades narrow, flat, long-attenuate, 15-25 cm. long: panicle 10-12 mm. long, purple, narrow or pyramidal, loose, the branches in fives, slender, naked below: spikelets small, 2-2.5 mm. long: flowering glume equaling the empty ones, 2 lobed at apex: bearing a very short straight awn from above the middle of the back. Wet banks of the Palouse at Pullman, not common.

33. HOLCUS.

Panicles spike-like or open: spikelets deciduous, 2-flowered, the lower flower perfect, the upper staminate: empty glumes mem-
branous, keeled, the lower 1-nerved, the upper 3-nerved and often short-awned: flowering glumes 2, papery, that of the upper flower bearing a bent awn; palet narrow: grain oblong, free, enclosed in the scale.

**H. lanatus** L. Perennial; the whole plant downy with pale pubescence: culms erect, 30-90 cm. high: leaf blades flat, rather broad and short; sheaths loose, shorter than the internodes: panicle pale purplish, 5-10 cm. long, rather densely flowered, the branches in twos or threes: spikelets 4-5 mm. long; upper empty glume short-awned near the apex: glume of the staminate flower with a hook-like awn. Sparingly introduced.

34. **Deschampsia.**

Inflorescence a contracted or open panicle: spikelets 2-flowered, both flowers perfect, the hairy rachilla extending beyond the flowers or rarely terminated by a staminate one: empty glumes keeled, acute, membranous, shining, persistent: flowering glumes 2 (rarely more) of about the same texture, deciduous, bearing a dorsal awn, the apex toothed; palet narrow: grain oblong, free, enclosed in the flowering glume.

Empty glumes scarcely equalling the flowering glume. **D. caespitosa.**

Empty glumes exceeding the flowering glume.

- Empty glume about 4 mm. long. **D. elongata.**
- Empty glume about 7 mm. long. **D. calycina.**

**D. caespitosa** Beauv. Densely tufted perennial: culms 6-1.5 m. high, much exceeding the numerous basal leaves: culm leaves 3, the blades narrow, involute, 5-12 cm. long, scabrous, the smooth sheaths shorter than the internodes: panicle 10-30 cm. long, usually open, the capillary branches in whorls of 2-5, flower bearing above the middle: spikelets shining, greenish or purplish, 2-3 mm. long: flowering glume hairy at the base, erose-toothed at the apex; bearing a slender awn near the base. Plentiful in wet ground.

**D. elongata** Munro. Culms densely tufted, smooth, 30-90 cm. tall: leaves filiform, commonly involute, smooth: panicle narrow, 15-45 cm. long, somewhat nodding: branches very unequal, ascending or appressed, very slender, naked below: spikelets pale green, usually purple-tinged near the apex: flowering glumes hairy at base, shining, irregularly toothed at apex, bearing a slender awn about twice as long. Common in dry soil.

**D. calycina** Presl. Annual: the slender culms erect, 15-40 cm. tall: leaves narrow, involute, the blades 2-6 cm. long: panicle very loose, 7-20 cm. long with subequal branches mostly in twos, these capillary, branched above and bearing spikelets near the tips: spikelets pale green, sometimes purple-tinged, about 7 mm. long: flowering glume long hairy at the base, minutely toothed at the apex, bearing a geniculate awn three or four times as long. Very abundant in dry soil.

35. **Triquetrum.**

Inflorescence a spike-like or open panicle: spikelets 2-4-flowered, the flowers all perfect or the uppermost staminate; rachilla glabrous or with long soft hairs extended beyond the flowers: empty
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glumes unequal, acute, persistent: flowering glumes 2–4, usually shorter than the empty ones, deciduous, 2-toothed, bearing a dorsal awn below the apex or the lower one sometimes awnless: palet narrow, hyaline, 2-toothed: grain free, enclosed in the flowering glume.

Leaf blades and sheaths smooth.
T. cernuum.
Leaf blades and sheaths hairy.
T. canescens.

T. cernuum Trin. Culms .6–1 m. tall, erect, the nodes pale: leaf blades flat, merely scabrous, 15–20 cm. long, 6-10 mm. wide: panicle 10–15 cm. long, loose, nodding; branches in distant whorls, capillary, cernuous, flower bearing above the middle: spikelets 2–4 flowered, 6–7 mm. long without the awn: flowering glume 2–3 mm. long bearing an awn about twice its length. Moist woods and copses.

T. canescens Buckley. Much like the preceding, the leaf blades and sheaths pubescent: nodes usually dark: panicle erect, 7–16 cm. long. In coniferous woods.

36. AVENA.

Inflorescence a panicle: spikelets 2–many-flowered or rarely 1-flowered; lower flowers perfect, the upper often staminate: empty glumes somewhat unequal, membranous, persistent: flowering glumes 2–many, rarely one, deciduous, rounded on the back, acute, generally bearing a dorsal awn; apex often 2-toothed: palet narrow, 2-toothed: grain oblong, deeply furrowed, enclosed in the flowering glume and palet, free or sometimes adherent to the latter.

A. fatua var. glabrescens Coss. Culms stout, pale, smooth, .5–1 m. tall, erect: leaf blades broad and flat, the sheaths about equalling the internodes: panicle loose, 15–20 cm. long, spikelets, including awns, 3.5–4 cm. long, erect or drooping, on slender branches: flowering glume smooth, except the scabrous apex and the ring of stiff white hairs at the base, bearing on the back a geniculate, stout, twisted awn below the 2-cleft apex. A troublesome weed in cultivated land.

37. ARRHENATHERUM.

Inflorescence a contracted or open panicle: spikelets 2-flowered, lower flower staminate, upper perfect; rachilla extending beyond the flowers: empty glumes thin-membranous, keeled, very acute or awn-pointed, unequal, persistent: flowering glumes 2, rigid, 5–7-nerved, deciduous, the first bearing a long bent and twisted dorsal awn inserted below the middle, the second unawned; palet hyaline, 2-keeled: grain ovoid, free.

A. avenaceum Beauv. Glabrous perennial, 1–1.5 m. high: culm leaves 3, the blades flat, minutely scabrous, the sheaths shorter than the internodes: panicle shining, 15–25 cm. long, rather narrow, the branches sub-
erect: flowering glume 6–7 mm. long, tipped with a long geniculate awn, which is twisted below. Sparingly escaped from cultivation.

38. DANTHONIA.

Inflorescence a contracted or open panicle: spikelets 3–many-flowered, the flowers all perfect or the upper stamine; rachilla pubescent, extending beyond the flowers: empty glumes keeled, acute, subequal, persistent, generally extending beyond the uppermost flowering one: flowering glumes rounded on the back, 2-toothed, deciduous, the bent awn flat and twisted at the base, arising from between the acute or awned teeth; palet hyaline, 2-keeled near the margins, obtuse or 2-toothed: grain free, enclosed in the flowering glume.

Spikelets racemose: leaves smooth.  
D. CALIFORNICA.
Spikelets mostly solitary: leaves hairy.  
D. UNISpicATA.

D. californica Boland. Erect, 5–1 m. tall: leaf blades flat, scabrous; sheaths loose, shortly retrorse pubescent, with a tuft of hairs at the throat: spikelets 1–2 cm. long, 3–5 in a raceme, rarely more numerous or even solitary, usually long-pedicelled: flowering glume long-ciliate below the middle, two cleft at apex, bearing an awn of about equal length. Common in low places.

D. unispicata Munro. Closely resembling D. californica but not so large, 15–30 cm. tall: leaf blades sparsely hairy, the sheaths villose with long white hairs: spikelets small, solitary. In dry soils, rare.

39. SPARTINA.

Inflorescence of one-sided spreading or erect alternate spikes: spikelets 1-flowered, narrow, deciduous, borne in two rows on the rachis, articulated with the very short pedicels below the glumes: empty glumes keeled, very unequal: flowering glume keeled, equalling or shorter than the second empty glume: palet often longer than its glume: grain free.

S. cynosuroides Willd. Culms 1–2 m. tall, simple, smooth: leaf blades flat, keeled, long-acuminate, involute in age, scabrous on the margins: spikes 5–20, 5–12 cm. long, ascending, sometimes peduncled: spikelets closely imbricated: empty glumes very scabrous on the keels, awn-pointed: flowering glume scabrous on the midrib, which terminates below the 2-toothed apex. Rocky banks of Snake River at Almota.

40. BECKMANNIA.

Inflorescence a terminal panicle of erect spikes: spikelets 1–2-flowered, globose, compressed: empty glumes membranous, saccate, obtuse or abruptly acute: flowering glumes 1 or 2, narrow, thin-membranous; palet hyaline: grain oblong, free, enclosed in the flowering glume and palet.
B. erucaeformis Host. Perennial, the culms stout, 60–90 cm. tall, glabrous throughout; leaf blades 10–30 cm. long, 6–10 mm. wide, scabrous, the loose sheaths exceeding the internodes; panicle narrow, 10–30 cm. long, the densely flowered branches mostly solitary and erect; spikelets nearly orbicular, flattened, 2 mm. long. In shallow water or very moist places.

41. ERAGROSTIS.

Inflorescence a contracted or open panicle: spikelets many-flowered, more or less flattened, rarely dioecious: empty glumes unequal, shorter than the flowering glumes, keeled, 1-nerved; flowering glumes membranous, keeled, 3-nerved, awnless; palet shorter than the flowering glumes, prominently 2-nerved or 2-keeled, usually persisting on the rachilla after the flowering glume has fallen: grain free, loosely enclosed in the flowering glume and palet.

Culms erect: leaves 2–12 cm. long. E. lutescens.
Culms prostrate: leaves 2–3 cm. long. E. reptans.

E. lutescens Scrib. Culms tufted, erect, 10–30 cm. high, branched near the base; leaf blades 2–12 cm. long, 2–4 mm. wide, scabrous above; panicle silvery green, narrow, 5–10 cm. long, the branches ascending, naked below: spikelets oblong, 4–7 mm. long, usually 10–12 flowered. Very rare, on the sandy banks of Snake River near Almota.

E. reptans Nees. Culms prostrate, creeping, much branched from the base, forming dense circular mats; leaf blades 2–3 cm. long, somewhat pubescent; sheaths loose, inflated, hairy: panicles very numerous, pale green, dense, 2–4 cm. long, usually with their bases included in the uppermost sheaths: spikelets oblong, 4–7 mm. long. Banks of Snake River, common.

42. EATONIA.

Panicles usually contracted: spikelets 2-flowered; the rachilla extending beyond the flowers: empty glumes shorter than the spikelet; the lower linear, acute, 1-nerved; the upper much broader, 3-nerved, obtuse or rounded at the apex, or sometimes acute, the margins scarious: flowering glumes narrower, generally obtuse, 1-3-nerved, awnless; palet narrow, 2-nerved: grain free, loosely enclosed in the scale and palet.

Panicle dense, erect: flowering glume obtuse. E. obtusata.
Panicle loose, usually nodding: flowering glume acute. E. pennsylvanica.

E. obtusata Gray. Somewhat tufted, perennial, .6–1 m. tall, the culms smooth: leaf blades flat, scabrous, 10–15 cm. long, 3–5 mm. wide: panicle erect, narrow, 5–12 cm. long, pale green, the branches short and densely flowered: flowering glume narrowly obovate, obtuse. Rather rare, on sandy bars of Snake River.

E. pennsylvanica Gray. Culms 3–90 cm. tall, glabrous: leaf blades 6–15 cm. long: panicle slender, 8–15 cm. long, usually loose and nodding, the branches 3–7 cm. long: spikelets about 3 cm. long, usually numerous: flowering glume narrow, acutish. Near Steptoe Butte.
43. KOELEKIA.

Inflorescence a spike-like panicle: spikelets 2–5-flowered: rachilla articulated between the flowering glumes: empty glumes narrow, acute, unequal, keeled, scarios on the margins: flowering glumes 3-nerved, keeled, acute, sometimes mucronate or bristle-pointed; palet hyaline, acute: grain free, enclosed in the flowering glume and palet.

K. crista Pers. Perennial, the erect culms densely tufted, 30–70 cm. tall, usually glabrous: leaves narrow, commonly involute: panicle dense, greenish or purplish, shining, 5–10 cm. long, often more or less interrupted: spikelets 4–5 mm. long, 2-4-flowered: glumes acuminate, scarios margined. Common on dry hillsides.

44. MELICA.

Inflorescence a contracted or open panicle: spikelets 1–several-flowered, often one-sided: rachilla extending beyond the flowers and usually bearing 2–3 empty club-shaped or hooded glumes twisted around each other: empty glumes membranous, the lower 3–5-nerved, the upper 5–9-nerved: flowering glumes larger, rounded on the back, 5–7-nerved, awnless, the margins more or less scarios; palet broad, shorter than the flowering glume: grain free, enclosed in the flowering glume and palet.

M. scabrata Scribn. ined. Culms 30–90 cm. tall, erect, smooth, mostly solitary, with bulbous bases about 1 cm. in diameter, these appearing on the apices of stout rootstocks: culm leaves 3, rarely 4; sheaths strongly veined, scabrous, nearly as long as the internodes, sometimes overlapping; blades flat, linear, attenuate at apex, 10–15 cm. long, 2–4 mm. wide, scabrous on both sides: panicle erect, narrow, 5–15 cm. long; lower branches mostly in threes, the two outer of which are short and bear a single spikelet, the central longer and bearing 2–5 spikelets; upper branches solitary, bearing a single spikelet: spikelets ovate-lanceolate, 10–12 cm. long, 5–7-flowered, usually purple: lower empty glumes 5 mm., the upper 7–8 mm. long, acutish: flowering glumes about 7 mm. long, all minutely scabrous. In low meadows, infrequent, Piper No. 1745.

45. DACTYLIS.

Inflorescence a densely clustered or interrupted panicle: spikelets 3–5-flowered, short-pedicelled, in small fascicles, the flowers all perfect or the upper staminate: empty glumes thin, membranous, unequal, mucronate: flowering glumes larger than the empty ones, rigid, 5-nerved, keeled, the midnerve extending into a point or short awn; palet shorter than the flowering glume: grain free, enclosed in the flowering glume and palet.

D. glomerata L. Perennial, tufted, the stout culms .6 to 1.5 m. tall: leaf blades flat, scabrous, 6–8 mm. broad; sheath scabrous, exceeding the internode: panicle 3–10 cm. long, pyramidal-ovate, greenish or purplish; branches
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solitary, ascending, spikelet-bearing above: glumes conspicuously ciliate on the keels. Escaped from cultivation.

46. POA.

Inflorescence a contracted or open panicle: spikelets 2–6-flowered, compressed, the rachilla usually glabrous: flowers perfect, or rarely dioecious: empty glumes membranous, keeled, 1–3-nerved: flowering glumes membranous, keeled, awnless, longer than the empty ones, generally with a tuft of cobwebby hairs at the base, 5–7-nerved, marginal nerves usually pubescent, often also the dorsal one; palet a little shorter than the flowering glumes, 2-nerved or 2-keeled: grain free, or sometimes adherent to the palet.

Annual. Perennial.

With running rootstocks.
Culms terete.

Culms flattened.

Without running rootstocks.
Leaves filiform.
Leaves broader.

Leaves glaucous.
Leaves not glaucous.

P. annua L. Annual, the flattened culms 5–15 cm. tall: leaves glabrous, the blades short and soft: panicle pyramidal, sometimes one-sided: spikelets 3–5-flowered, crowded, 4 mm. long: flowering glume 3–3.5 mm. long, hairy at base. In moist places becoming common.

P. pratensis L. Perennial, with conspicuous running rootstocks, the terete culms 30–90 cm. tall: panicle pyramidal, open, 6–20 cm. long, the ascending or spreading branches in whorls of 3–5, spikelet-bearing above the middle: spikelets 3–5-flowered: flowering glume 3–5 mm. long, 5-nerved, silky-pubescent on the midnerve and margins, cobwebby at the base. Everywhere introduced.

P. compressa L. Usually low, spreading by rootstocks and forming dense mats: the much flattened culms 15–30 cm. high, decumbent at base, glabrous: panicle about 2 cm. long, contracted, the branches spikelet-bearing to the base or nearly so: spikelets 3–9-flowered: flowering glume 3-nerved, the nerves slightly pubescent below. Sparingly introduced.

P. filifolia Vasey. Perennial, tufted: the slender culms 30–50 cm. tall: leaves all filiform, involute, the numerous basal ones 10–20 cm. long, scabrous; panicle 6–8 cm. long, the ascending branches very slender, flexuous, bearing 1–3 spikelets near the top: spikelets 7–10 mm. long, 2–5-flowered; flowering glume compressed, 4–5 mm. long, 5-nerved, smooth or minutely scabrid. Bluffs of Snake River near Lewiston.

P. nevadensis Vasey. Tufted, pale and glaucous throughout: the stout culms 60–90 cm. tall: basal leaves numerous, 30–40 cm. long, flat or involute, smooth or nearly so; culm leaves 2: panicle erect, 10–20 cm. long, narrow, dense, the appressed branches in half-whorls of 3–5, the shorter ones spike-
let-bearing to the base; spikelets 8-12 mm. long, 5-8-flowered: flowering glumes minutely scabrous, 4-5 mm. long. A very variable species or aggregate, no one of our several forms being typical.

**P. sandbergii** Vasey. Perennial, glabrous, not glaucous, tufted: the culms 15-50 cm. tall; basal leaves numerous, the blades 5-10 cm. long, linear; culm leaves two, low down, the blades 1-2 cm. long, the sheaths usually purple: panicle 4-7 cm. long, narrow, the ascending branches in twos or threes, spikelet-bearing near the top: spikelets 2-4-flowered, usually purplish: flowering glumes oblong, 3.5 mm. long, sparsely pubescent above, villous near the base. The commonest native species; flowering early.

47. **GLYCERIA.**

Inflorescence a panicle, spikelets few—many-flowered, terete, or somewhat flattened: empty glumes obtuse or acute, 1-3-nerved: flowering glumes membranous, obtuse, rounded on the back, 5-9-nerved, the nerves disappearing in the hyaline apex; palet scarcely shorter than the flowering glume, rarely longer: grain smooth, enclosed in the flowering glume and palet, free, or when dry slightly adhering to the latter.

Spikelets linear, 1-1.5 cm. long.  
G. borealis.

Spikelets ovate or oblong, less than 1 cm. long.  
Leaves 6-10 mm. broad: flowering glume 5-nerved. G. pauciflora.

Leaves less than 5 mm. broad: flowering glume 7-nerved.  
G. nervata.

**G. borealis** Piper, n. comb. *(Panicularia borealis Nash.)* Culms weak, erect, glabrous, .5-1 m. tall: leaf blades 8-20 cm. long, pale green, nearly smooth; sheaths loose, longer than the internodes: panicle lax, 15-30 cm. long, the branches single or in twos, usually short and erect: spikelets linear, 10-15 mm. long: flowering glumes thin, 3.5-4 mm. long, 7-nerved, the nerves minutely hispid. Common in shallow ponds.

**G. pauciflora** Presl. Culms .5-1 mm. high, smooth: leaf blades 10-20 cm. long, nearly 1 cm. broad, acute, scabrous; sheaths nearly equalling the internodes: panicle loose, 15-20 cm. long, usually purplish, its base included in the upper sheath; branches slender, spreading, 2-5 at a node, flower-bearing above the middle: spikelets 4-5 mm. long, 4-6-flowered: flowering glumes prominently 5-nerved, rarely 7-nerved. In moist places or even in water, not rare.

**G. nervata** Trin. Culms .5 to 1 m. tall, slender, glabrous: leaf blades 15-30 cm. long, 4-5 mm. wide, scabrous above: panicle 6-20 cm. long, long peduncled, its branches in twos and threes, slender and spreading: spikelets 2-4 mm. long, 4-7-flowered: flowering glume prominently 7-nerved. In wet places, infrequent.

48. **FESTUCA.**

Inflorescence a panicle: spikelets 2—several-flowered: empty glumes more or less unequal, acute, keeled, 1-3-nerved: flowering glumes membranous, narrow, rounded on the back, 3-5-nerved, acute or awned at the apex; palet scarcely shorter than the flow-
ering glume: grain glabrous, elongated, often adherent to the flowering glume or palet.

**Annuals.**

- Awns short, 2-4 mm. long.
- Awns long, 10 mm. or more long.
  - Panicle spike-like, 5-15 cm. long.
  - Panicle with lower branches longer and divergent.

**Perennials.**

- Densely tufted, without rootstocks.
  - Flowering glumes awned.
  - Flowering glumes awnless or very short awned. **F. ovina.**
- Not densely tufted, creeping by rootstocks.
  - Leaves narrow, involute: flowering glumes awned.
  - Leaves broader, flat: glumes awnless. **F. rubra.**

**F. octoflora** Walt. Tufted annual, 8-20, rarely 30 cm. tall: panicle 2-6 cm. long, rather dense, often one-sided: spikelets 6-10 mm. long, 2-13-flowered: flowering glumes 3-4 mm. long, scabrous, attenuate into an awn about as long. Banks of Snake River near Lewiston, rare; also near Steptoe Butte.

**F. myuros** L. Tufted annual, 30-40 cm. tall, smooth: spike-like panicle elongated, flexuose, 5-25 cm. long, pale-green: spikelets 5-8-flowered, 2-2.5 cm. long including the awns: flowering glume lanceolate, scabrous, the body 5 mm., the awn 10-15 mm. long. Sparingly introduced.

**F. microstachys** Nutt. Annual, stem single or a few in a loose tuft, 5-30 cm. tall: panicle 4-10 cm. long; branches mostly solitary, longest below, all erect at first but becoming spreading or reflexed by means of a prominent pulvinus at the base: spikelets 1-5-flowered: flowering glume 4-5 mm. long, the awn somewhat longer. Very common.

The species as at present received is very variable, the spikelets being either glabrous or pubescent. Nuttall's types consist of at least two forms, that in the Gray Herbarium being very different from that in the Philadelphia Academy of Sciences. Our form accords accurately with neither.

**F. ovina** L. Densely tufted perennials, the culms 30-50 cm. tall: leaves very numerous, setaceous, mostly basal, 10-15 cm. long: panicle 3-5 cm. long, narrow, one-sided, the short branches erect: spikelets 3-5-flowered: flowering glume, including awn, 5-7 mm. long. Two forms of this variable species occur in our limits, one, with smooth leaves, in open pine woods; the other, with scabrous leaves, on open prairies.

**F. scabrella** Torrey. Densely tufted perennial, .5-1 m. tall, scabrous throughout: leaf blades very scabrous, strongly involute, breaking away early from the sheaths which remain for several seasons at the base: panicle 7-10 cm. long, narrow, the ascending branches mostly in pairs, spikelet-bearing above the middle: spikelet 8-10 cm. long, 3-5-flowered: flowering glumes 6-7 mm. long, very short awned. Near Steptoe Butte.

**F. rubra** L. Perennial, with short running rootstocks; the whole plant smooth: culms .6-1 m. tall, slender: leaves narrow, involute, 10-20 cm. long: panicle narrow, erect, about 10 cm. long, the short erect branches in twos, spikelet-bearing to the base: spikelets frequently purplish, 10-12 cm. long, 5-6-flowered: flowering glume smooth, 5-6 mm. long, tipped with an
awn 3-4 mm. long. In moist soil. Our plant is not typical and has been named F. vallicola Rydb.

**F. elatior** L. Perennial: the stout culm 1-1.5 m. tall, smooth and glabrous throughout; leaves flat, dark green, 7-15 cm. long, 3-4 mm. wide; panicle narrow, erect, 10-20 cm. long, the branches solitary or in twos: spikelets rather crowded, lanceolate-oblong, 12-18 mm. long, 5-10-flowered; flowering glume scarios margined, acute or obtuse, awnless.  
var. **pratensis** Gray. Not so tall, 0.3-1 m. tall, the panicles smaller.  
Both the type and the variety have escaped from cultivation.

49. **BROMUS.**

Inflorescence of terminal panicles, the peduncles thickened at the summit: spikelets few-many-flowered: empty glumes unequal, acute: flowering glumes rounded on the back, or sometimes compressed-keeled, 5-9-nerved, the apex usually 2-toothed, generally bearing an awn just below the summit; palet shorter than the flowering glume: grain adherent to the palet.

Annuals, or sometimes biennials: introduced.

Glumes rather broad.

Awns wanting or very short.  
Awns present.  
Panicle contracted.  
Panicle loose.

Glumes narrow.

Flowering glumes 17-20 mm., its awn 20-30 mm. long; spikelets solitary on the branches of the panicle. **B. sterilis.**

Flowering glume 11-13 mm., its awn 13-15 mm. long; spikelets several on each branch of the panicle. **B. tectorum.**

Perennials: native.

Spikelets narrow, 2-3 cm. long, not compressed.  
Spikelets broad, 2.5-4 cm. long, compressed and keeled.

**B. brizaeformis** F. & M. Annual, erect, 30-60 cm. tall: leaf blades pubescent: panicle 5-25 cm. long, loose, one-sided, nodding: spikelets 15-25 mm. long, elliptical, compressed: flowering glumes very broad, smooth, awnless, or the uppermost with short awns, 1-2 mm. long. Introduced and becoming abundant.

**B. hordeaceus** L. Annual, erect, 20-60 cm. tall: leaf blades pilose or smooth, the sheaths pubescent with retrorse hairs: panicle narrow, dense, 5-10 cm. long: spikelets erect, 12-15 mm. long, 5-12-flowered: flowering glume pubescent, bearing a stout straight or somewhat twisted awn 6-9 mm. long.  
var. **glabrescens** Shear. Spikelets smooth or nearly so.  
Both the typical form and the variety are very common.

**B. secalinus** L. Annual, erect, 30-70 cm. tall: leaf blades 10-20 cm. long, sparsely hairy above, smooth beneath; sheaths usually glabrous: panicle 8-18 cm. long, pyramidal, erect at first, in fruit somewhat drooping: spikelets oblong-lanceolate, turgid in fruit, 10-18 mm. long: flowering glume glabrous or nearly so, 6-8 mm. long, its margins involute in fruit, tipped with an awn 3-5 mm. long; palet nearly equal to the flowering glume. Common in fields.
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**B. sterilis** L. Annual, the stout culms 5–1 m. high, usually decumbent at base; panicle 10–20 cm. long, loose and drooping, its branches in whorls of 2–6, long and slender, usually bearing but one spikelet: spikelets drooping, 2.5–3.5 cm. long, 6-10-flowered: flowering glume narrowly lanceolate, 17–20 mm. long, bearing a stout rough awn, 2–3 cm. long. In waste places, infrequent.

**B. tectorum** L. Annual, 20–60 cm. tall, mostly erect, panicle one-sided, drooping, the slender branches in threes and fours, and bearing several spikelets above the middle: spikelets nodding, 15–20 mm. long, rather dense: flowering glume lanceolate, pubescent, 11–13 mm. long, the awn 13–15 mm. long. Sparingly introduced in waste places.

**B. vulgaris** Shear. Perennial: the culm slender, 8–1 m. tall: leaf blades 15–25 cm. long, glabrous or sparsely pilose; sheaths pilose with spreading or reflexed hairs; ligule truncate, fringed, 3–5 mm. long: panicle sparse, more or less nodding, 8–12 cm. long, spikelets 2–3 cm. long, 3–4 mm. wide: flowering glume 8–10 mm. long, sparsely pubescent on the back, somewhat ciliate on the margin, the awn 6–9 mm. long. In woods, Thatuna Hills.

**B. marginatus** Nees. Perennial, tufted: the stout culms about 1 m. high: leaf blades coarse, sparsely pubescent, 15–25 cm. long, rather narrow, the branches in whorls of 2–4, about 7 cm. long, and bearing two spikelets: spikelets 2.5–4 cm. long, 5–7 mm. wide, compressed and keeled, 7–9-flowered: flowering glume rough pubescent, 11–14 mm. long, 2-toothed at apex, and bearing a stout awn 4–7 mm. long.

var. *laticius* Shear. Larger and stouter, 1–1.5 m. tall: panicle 20–30 cm. long; the lower branches 10–20 cm. long.

The typical form occurs mostly in mountain woods; the variety is common at the edges of wheat fields, roadsides, etc.

50. **AGROPYRON.**

Inflorescence of terminal spikes: spikelets 3–many-flowered, sessile, single and alternate at each notch of the usually continuous rachis, the side of the spikelet turned toward the rachis: flowering glumes rigid, rounded on the back, 5–7-nerved, usually acute or awned at the apex: palet often with hairy keels: grain pubescent at the apex.

Densely tufted, the short innovations usually not exceeding the sheath.  
**A. divergens.**

Stoloniferous, the innovations exceeding the sheath.  
Flowering glumes pubescent.  
Flowering glumes merely scabrous.  
**A. elmeri.**  
**A. pseudoporphyrus.**

**A. divergens** Nees. Culms 5–1 m. tall, densely tufted, glabrous and glaucous: culm leaves 3, the blades becoming strongly involute, minutely pubescent above, scabrous beneath, the sheaths smooth or pubescent: spikes erect, 5–15 cm. long: spikelets regularly scattered, lanceolate-oblong, 1–1.5 cm. long, without the awns: flowering glumes tipped with stout divergent awns, 1–2 cm. long.

Very abundant on dry hills and exposed ledges. Both the typical form
and the variety are frequently found growing together. Under some conditions the plants may produce long stolons as in the following species.

A. elmeri Scrib. & Smith. Culms erect, 60-120 cm. tall, smooth, from elongated creeping rootstocks: culm leaves 4, the blades becoming involute, rather narrow, ascending, strigose above, smooth beneath, the sheath loose, exceeding the internodes: spikes erect, 15-25 cm. long: spikelets not crowded, 3-3.5 cm. long, 6-10-flowered: flowering glumes sparsely pubescent, tipped with a very short awn. Common on the dry sandy bars of Snake River.

A. pseudorepens Scrib. & Smith. Perennial from creeping rootstocks: culm erect, 30-100 cm. high, rather slender, glabrous: culm leaves 3 or 4, the blades becoming involute, scabrous on both sides; the sheaths glabrous and shorter than the internodes: spike 10-20 cm. long, narrow, the spikelets densely crowded: flowering glumes linear-oblong, 5-nerved, scabrous, acuminate, or short-awned. Common in low ground.

51. HORDEUM.

Inflorescence a terminal cylindrical spike: spikelets 1-flowered, usually in threes at each joint of the rachis, the lateral generally short-stalked and imperfect; rachilla produced beyond the flower; lower empty glumes often reduced to awns and forming an apparent involucre around the spikelets: empty glumes rigid: flowering glumes rounded on the back, 5-nerved at the apex, awned; palea scarcely shorter than the flowering glume; grain usually adherent to the flowering glume, hairy at the summit.

Floret of the central spikelet sessile.

Empty glumes 2.5-6 cm. long, capillary: lateral flowers long-awned.

H. JUBATUM.

Empty glumes broader at the base, less than 2-5 cm. long: lateral flowers sterile, the glumes subulate.

H. NODOSUM.

Floret of the central spikelet stalked.

H. MURINUM.

H. jubatum L. Annual, tufted, erect, 30-60 cm. high, glabrous or sometimes pubescent: leaf blades flat, becoming involute, the sheaths shorter than the internodes: spike-like panicle pale green or yellowish, 7-10 cm. long, readily breaking apart; central spikelet sessile, fertile, the lateral ones peduncled and sterile: empty glumes all subulate, 3-6 cm. long. In moist places, not plentiful.

H. nodosum L. Annual or perennial, 30-90 cm. high, erect: leaf blades flat or involute, the sheaths smooth or hairy; panicle spike-like, 3-8 cm. long, narrow, usually flexuous, readily separating into joints: central spikelet sessile, fertile, the lateral ones peduncled and sterile: empty glumes all subulate, 2 cm. or less in length. Common in moist ground.

H. murinum L. Culms 15-30 cm. tall: leaf blades 2-12 cm. long, 2-6 mm. wide: spikes 5-10 cm. long, thick: spikelets mostly in threes, all stalked: both empty glumes of the central spikelet and the inner empty glume of the lateral spikelets ciliate and flattened, bearing awns 20-25 mm. long; outer empty glumes of lateral spikelets neither flattened nor ciliate: flowering glume scabrous at the apex, long awned. A troublesome weed, sparsely introduced.
52. **SITANION.**

Cespitose perennials, with spike-like panicles, which readily break up into segments: spikelets 2–3 at each joint of the rachis, rarely solitary, 1 5-flowered: empty glumes 2 to each spikelet, subulate and entire, or lanceolate and bifid, or parted into several long-awned lobes: flowering glumes lanceolate and acute, or those of the lowest floret sterile and subulate, entire with a single awn, or trifold and three-awned. This genus is hardly distinct from Elymus.

Empty glumes many-lobed: central awn of flowering glume 5–10 cm. long: S. **villosum**.

Empty glumes entire, subulate: lowest flower perfect. S. **leckenbyi**.

Empty glumes entire, lanceolate or lobed, awned: lowest flower perfect.

Spike flexuous; flowering glume smooth or nearly so. S. **flexuosum**.

**S. villosum** J. G. Smith. Culms stout, mostly erect, 20–30 cm. high: leaf blades short, flat, strigose-pubescent and somewhat hirsute, 4–8 cm. wide, sheaths densely hirsute: spike 6–8 cm. long, the base enclosed in the elongated upper leaf-sheath: empty glumes 3–8-parted, each lobe bearing a slender awn 3–8 cm. long: lowest floret sterile, its glume resembling the empty glumes: flowering glume of perfect florets lanceolate, 3-awned, the middle awn stout, 8–10 cm. long, the lateral ones slender and usually shorter. Common in dry ground.

**S. leckenbyi** Piper. Culms stout, erect, 60–80 cm. tall: leaf blades stiff, erect or ascending, 4–12 cm. long, involute, glabrous beneath, strigose above, sharply acuminate; sheaths glabrous, or, on sterile shoots, ciliate: spike 10–15 cm. long, slender, usually erect, long-exserted: empty glumes 4, equal, entire, setaceous, 2.5–3 cm. long: flowering glume lanceolate, 8–9 mm. long, smooth at base, scabrid above, bifid at apex and tipped with a straight awn, 3–4 cm. long. Bars of Snake River at Wawawai.

**S. flexuosum** Piper. Culms tufted, 5–11 m. tall: leaf-blades stiff, or, on sterile shoots villous: spikes slender, erect, flexuous, 8 cm. long, long-exserted: empty glumes subulate-setaceous, 3–4 mm. long, tipped with an awn 9–10 mm. long, sometimes with two very short lateral awns in addition: flowering glume lanceolate; smooth at the base, scabrid above, bifid, bearing a divergent awn 3.5–4 cm. long. Bars of Snake River at Wawawai.

**S. brodiei** Piper. Culms erect, 40–50 cm. high: leaf-blade stiff, smooth on each side, involute 9–14 cm. long: spike pale-green, long exserted, erect, 5–7 cm. long: empty glumes subulate, entire, 7 mm. long, bearing an awn 10 mm. long: flowering glume lanceolate, densely appressed pubescent, to 10 mm. long, rarely with two short lateral awns in addition: joints of the rachis linear, flattened, scabrous on the margins. Bishop’s Bar, Snake River.
53. **ELYMUS.**

Perennial cespitose grasses with spike-like inflorescences which do not readily break up into segments: spikelets 1-7-flowered, 2-4 at each joint of the rachis or rarely solitary; empty glumes entire, about equal, two to each spikelet: flowering glumes acute, acuminate or awned, entire.

Glumes long-awned.

Spike narrow, erect; spikelets appressed. **E. GLAUCUS.**

Spike broad, usually nodding; spikelets divergent. **E. CANADENSIS.**

Glumes not awned or only short-awned.

Culms very stout, 1-2 m. tall, densely tufted. **E. CONDENSATUS.**

Culms about 1 m. tall, not so stout and not tufted. **E. TRITICOIDES.**

**E. glaucus** Buckl. Culms 5-1 m. tall, erect: leaf-blades spreading or drooping, 10-30 cm. long, 6-16 mm. wide; spike-like panicle narrow, erect or rarely nodding above, 5-15 cm. long, greenish or purplish, glaucescant; spikelets usually appressed, mostly in pairs, 3-6-flowered; flowering glume rough near the apex, tipped with an awn nearly twice as long. Common and variable; some forms approach **E. canadensis.**

**E. canadensis** L. Culms stout, about 1 m. tall, pale and somewhat glaucous throughout: leaf-blades flat or involute, nearly smooth; spike pale-green, flexuous or nodding, 10-15 cm. long; spikelets 3-5-flowered, mostly in pairs, somewhat divergent; flowering glume hairy, the stout awn usually spreading. Infrequent on the bars of Snake River.

**E. condensatus** Presl. Culms 1-2 m. tall, stout, densely tufted: leaf-blades flat, glaucous, smooth except the scabrous margin, usually 1-2 cm. broad; spikes 3-30 cm. long, erect; spikelets 3-6-flowered, usually several at each node, commonly densely crowded: flowering glumes mucronate pointed. Abundant in moist soil.

**E. triticoides** Nutt. Culms erect, about 1 m. tall, not densely tufted: leaves 4-6 mm. wide, sometimes scabrous; panicle spike-like or with some of the lower branches elongated, usually purplish, rather loose: flowering glume acuminate short-awned. Moist banks of Snake River.

**Family 13. CYPERACEAE.**

Grass-like or rush-like herbs: stems slender, solid (rarely hollow), triangular, quadrangular, terete or flattened: leaves narrow with closed sheaths: flowers perfect or imperfect in spikelets, one (rarely two) in the axil of each scale (glume or bract): spikelets solitary or clustered, 1 to many-flowered; scales two-ranked or in a spiral, persistent or deciduous; perianth hypogynous, of bristles, or interior scales rarely calyx-like or wanting: stamens 1-3, rarely more: ovary 1-celled, sessile or stipitate; ovule 1; style 2-3-cleft: fruit an akene; endosperm mealy; embryo minute.
Flowers of the spikelet all, or at least one of them perfect: spikelets all similar.
Spikelets flattened: scales 2-ranked. 54. CYPERUS.
Spikelets not flattened: scales in a spiral.
Base of style swollen, persistent as a tubercle on the akene. 55. ELEOCHARIS.
Base of style not swollen, deciduous or persistent as a subulate tip.
Bristles present; hyaline scales none. 56. SCIRPUS.
Bristles none; perianth of a single minute posterior scale. 57. HEMICARPHA.
Flowers monoecious or dioecious, usually borne in separate spikes. 58. CAREX.

54. CYPERUS.

Annual or perennial: stems simple, triangular, leafy near the base, and with one or more leaves at the summit which form an involucre for the simple or compound umbellate or capitulate inflorescence: rays of the umbel sheathed at the base, usually very unequal, one or more of the heads or spikes commonly sessile: spikelets flat or roundish: scales concave, 2-ranked, all flower-bearing or the lower ones empty: flowers perfect: perianth none: stamens 1–3: akene 3-angled.

Rachis naked.
Scales tipped with recurved awns. C. INFLEXUS.
Scales acuminate, not awned. C. ACUMINATUS.

Rachis winged.
Wing of rachis persistent, continuous. C. ESCULENTUS.
Wing of rachis separating from it as small scales. C. ERYTHRORHIZOS

C. inflexus Muhl. Annual: stems 1–15 cm. tall, ascending: leaves flat, about 1 mm. wide, often curved, about equaling the stems: bracts much exceeding the inflorescence: spikelets ovate-lanceolate, 3–5 mm. long, in dense heads, terminating the branches of an unequally rayed umbel, or rarely all aggregated into a single compound head: scales green, becoming brown, all with strongly recurved awn-like tips. Stream banks, common.

C. acuminatus Torrey. Much like the preceding, usually taller: spikelets pale green, oblong-lanceolate, the scales merely acuminate, the tips slightly recurved. Banks of Snake River at Almota, rare.

C. esculentus L. Perennial, with horizontal tuber-bearing rootstocks: stems 30–60 cm. tall: leaves flat, 4–5 mm. long, exceeding the stem: involucral leaves as long as the others, far exceeding the inflorescence: umbel usually simple or nearly so, the rays very unequal, the spikelets arranged in loose spikes: spikelets linear, diverging, mostly two-ranked, 8–12 mm. long; scales yellowish or rusty, strongly-nerved, scarious-margined, the green midribs ending in very short points: wing of the rachis narrow, not becoming divided into scale-like parts. Banks of Snake River, rare.

C. erythrorhizos Muhl. Annual: stems usually 15–60 cm. tall, sometimes much smaller: leaves flat, commonly 2–4 mm. broad, shorter than the stem: involucral leaves 4–8, broad at base, far exceeding the inflorescence: spikelets bright chestnut, linear, 5–6 mm. long, densely crowded into flattened spikes, 1–3 cm. long, the latter unembellished on the unequal branches of the primary umbel: scales oblong, keeled, the green midrib prolonged into a
short, mucronate tip: wings of the rachis separating to the base, forming pairs of small scales. Banks of Snake River, frequent.

55. ELEOCHARIS.

Annual or perennial: stems simple, triangular, quadrangular, terete, flattened or grooved, the leaves reduced to sheaths or the lowest very rarely blade-bearing: spikelets solitary, terminal, erect, several—many-flowered, not subtended by an involucre: scales convolute, in a spiral: perianth of 1–12 bristles usually barbed: stamens 2–3: akene 3-angled, but sometimes appearing turgid: base of the style persistent on the summit of the akene forming a terminal tubercle.

Spike small, few-flowered: akene 3-angled. E. ACICULARIS.
Spike many-flowered: akene biconvex. E. PALUSTRIS.

E. acicularis R. & S. Perennial by creeping rootstocks, usually forming extensive mats: stems very slender, 7–15 cm. tall, erect: spikes 3–10-flowered, 3–5 mm. long: bristles 3–4, shorter than the akene, or wanting: akene oblong or obovoid, somewhat 3-angled, marked with 9–12 longitudinal ribs, with very numerous cross-lines between them: tubercle broad, contracted at its junction with the akene: style 3-cleft. Very abundant in wet places.

var. bella Piper n. var. Rootstocks very short, so that the plant forms dense round tufts 5–10 cm. in diameter: stems ascending or spreading, only 2–5 cm. long: otherwise as in the species. Rare on muddy banks of streams. In habit very different from E. acicularis, but lacking good morphological characters. In marked contrast to E. acicularis, the variety produces akenes freely. The type is Piper No. 3055, Pullman, Aug. 1899.

E. palustris R. & S. Rootstocks extensively creeping: stems 30–70 cm. tall: spike lanceolate-oblong, 1–2 cm. long: bristles 4, usually exceeding the obovate smooth biconvex akene: tubercle obtuse, contracted at its junction with the akene: style 2-cleft. Abundant at the edges of ponds or in shallow water.

56. SCIRPUS.

Annual or perennial: stems leafy or the leaves reduced to basal sheaths: spikelets terete (in ours), umbellate (in ours), subtended by a 1–several-leaved involucre, which is rarely wanting: scales in a spiral, usually all fertile, the 1–3 lower sometimes empty: flowers perfect: perianth usually of 1–6 bristles: stamens 2–3: style 2–3-cleft, not swollen at the base: akene triangular, lenticular or plano-convex.

S. microcarpus Presl. Perennial, the stout stems about 1 m. tall: leaves 8–10 mm. broad, smooth beneath, rough on the margins and upper surface of the midvein, the upper leaf usually exceeding the stem: inflorescence a two to three times compound umbel, the primary rays 3–10 cm. long, unequal: bracts leaf-like, about equaling the inflorescence: spikelets ovoid, numerous, dark green, 3–5 mm. long, in heads of 3–12 or more: scales broadly ovate, acute: stamens 2: styles bifid: bristles 4: nutlet white, oblong-lenticular, very short-beaked. Common on the margins of ponds and streams.

57. HEMICARPHA.

Mostly annual, low tufted plants: stems and leaves erect or spread-
ing, almost filiform: spikelets terete, terminal, clustered or solitary, subtended by a 1–3-leaved involucre: scales in a spiral, deciduous, all subtending perfect flowers: perianth of a single hyaline bract between the flower and the rachilla: bristles none: stamens 1–3: style 2-cleft, deciduous, not swollen at the base: akene oblong, turgid or lenticular.

**H. intermedia** Piper n. sp. Tufted, glabrous, the numerous stems 5–8 cm. tall, erect or spreading; leaves narrow, involute, the recurved blades 1–3 cm. long, as long as or longer than the sheaths: spikelets ovoid, obtuse, solitary or two in a cluster, 2–4 mm. long: involucral bracts 3, the uppermost 1–3 cm. long, the others much shorter: scales 1–1.5 mm. long, broadly obovate; the abruptly-acuminate recurved apex as long as the body: akene oblong, ovate or obovate, .5 mm. long, with a short beak, the surface very minutely and regularly hexagonal-reticulate and rugose: styles shorter than the akene, 2-cleft half-way to the base: hyaline bract triangular-ovate. Very rare on the banks of Snake River at Almota. The species has the habit of *H. subsquarrosa* Nees, but the heads of *H. occidentalis* Gray.

58. **CAREX.**

Grass-like sedges, perennial by rootstocks: stems mostly triangular: leaves 3-ranked, the upper (bracts) elongated or very short, and subtending the spikes of flowers, or wanting: flowers solitary in the axils of bracts (scales), monoecious or dioecious: spikes either wholly staminate, or pistillate, or sometimes androgynous: perianth none: staminate flowers of 3 stamens: pistillate flowers of a single pistil with a style and 2–3 stigmas borne in the axil of a second bract (the perigynium) which completely encloses the akene: akene 3-angled, lenticular or plano-convex.

Inflorescence a solitary terminal spike, staminate at top.

- Leaves filiform.
- Leaves flat.

Inflorescence a head composed of several sessile densely aggregated spikes.

- Spikelets staminate at top.
- Spikelets staminate at base.
- Bracts longer than the head.
- Bracts short.

Inflorescence composed of several distinct spikes.

- Spikelets sessile, all androgynous.
- Spikelets or some of them stalked, the uppermost staminate.

**Stigmas 3.**

- Perigynium pubescent: pistillate spikes several, stalked.
- Perigynium pubescent: pistillate spikes 1–3, sessile.
- Perigynium smooth: pistillate spikes slender, 5–8 cm. long.
- Perigynium smooth: pistillate spikes stout, 3–5 cm. long.

**Stigmas 2.**

- Perigynium globose, almost beakless.
- Perigynium flattened, short-beaked.
- Perigynium oval, resinous.

C. FILIFOLIA.
C. GEVERI.
C. STIPATA.
C. ATHROSTACHYA.
C. FESTIVA.
C. LIDDONI.
C. MONILE.
C. AUREA.
C. RIGIDA.
C. NEBRASCENSIS.
C. filifolia Nutt. Densely matted in extensive tufts: culms 10-20 cm. tall: leaves numerous, filiform, about equalling the stem; inflorescence a solitary terminal spike, the upper portion of which is staminate: perigynium triangular-ovoid, pale below, darker at apex and very minutely pubescent, the short beak with an entire orifice: stigmas 3. In dry soil, rare within our limits, but exceedingly abundant in western Whitman county.

C. geyeri Boott. Densely tufted, 30-45 cm. high: leaves flat, rigid, very scabrous, 2 mm. wide, about as long as the stems: inflorescence a single terminal straw-colored spike, the upper and larger portion of which is staminate: pistillate flowers several, usually but one maturing; perigynium smooth, oblong, with a very short entire beak, 1-nerved on each side; scales pale or rusty, elongated, acuminate, exceeding the perigynia: stigmas 3. Very abundant on dry hillsides.

C. stipata Muhl. Culms 1-5 m. tall, sharp-angled: leaves flat, 6-8 mm. wide, shorter than the stem; sheaths somewhat rugulose on the inner side: inflorescence a dense ovate head of many crowded spikes, 3-5 cm. long, straw-colored or olive-colored, commonly exceeded by the slender lowest bract; perigynium spreading, triangular-ovate, many-nerved, tapering into a long stout 2-toothed beak, whose margins are serrulate: scales much shorter than the perigynia: stigmas 2. Moist woods and copses.

C. athrostachya Olney. Culms tufted, 30-60 cm. tall: leaves 2-3 mm. wide, shorter than the stems: inflorescence a dense ovoid straw-colored head composed of 5-20 crowded spikes, these staminate below: lower bracts 2-5, exceeding the head: perigynium lanceolate, spongy at base, the long beak 2-toothed, its margins serrulate: scales acuminate, about equalling the perigynia: stigmas 2. Common in wet places.

C. festiva var. pachystachya Bailey. Culms tufted, 30-90 cm. tall: leaves flat, flaccid, 3-4 mm. broad, shorter than the stems: inflorescence a dense oblong head of from 6-12 crowded sessile spikes, these brownish, 1-1.2 cm. long: perigynium spreading, ovate-lanceolate, flat, about 4 mm. long, the beak bidentate, serrulate on the margins; scales acutish, equalling the perigynia: stigmas 2. Very common in wet meadows.

C. liddoni Boott. Culms erect, 30-60 cm. tall, scabrous above: leaves 2-4 mm. wide, shorter than the stems: spikes 3-6, ovoid or oblong, pointed at each end, 2 cm. long, all androgynous, pale, sessile, distinct but usually close together: perigynium smooth, broadly lanceolate, about 6 mm. long, the broad beak exceeding the akene in length; scales acuminate, about as long as the perigynia: stigmas 3. Rare, in meadows near Pullman.

C. lanuginosa Michx. Culms erect, slender, 30-60 cm. tall, somewhat tufted: leaves flat, 2-5 mm. wide, as long or nearly as long as the stem: staminate spikes 1-3, sometimes pistillate at base: pistillate spikes 1-3, mostly long peduncled, 18-30 mm. long: perigynium oval, densely pubescent, with a short 2-toothed beak; bracts acute or acuminate, about equal to the perigynium: stigmas 3. Swamps near Moscow.

C. deflexa var. rossii Bailey. Densely tufted, the culms 20-40 cm. tall: leaves pale, flat, scabrous, 1-3 mm. wide, commonly equalling the stems: inflorescence of 1-4 spikes, the uppermost staminate: staminate spike slender, 2-3 mm. long, pale, long-stalked: pistillate spikes 1-3, distinct, loosely few-flowered: perigynium oblong, pubescent, with a 2-toothed beak; scales purple with hyaline margins or greenish, sharply acuminate, shorter than the perigynia: stigmas 3, rarely 2. Kamiack Butte, in stony soil.
C. *amplifolia* Boott. Culms about 2 m. tall, smooth; leaves flat, 12-20 mm. broad, longer than the stem; bracts very large, the lower over-topping the culm: spikes 5-7, the uppermost staminate, 5-8 cm. long; pistillate spikes narrowly cylindrical, straight or curved, 6-10 cm. long, dark olivaceous, the lower ones long peduncled; perigynium sub globose, glabrous, the beak with an oblique entire orifice; scales purple with a green midrib; stigmas 3. Along streams in woods, Thatuna Hills.

C. *monile* var. *pacific* Bailey. Culms 30-50 cm. tall, rather slender: leaves pale, flat, 3-5 mm. wide, shorter than the stem, more or less nodose, reticulate; lower sheaths fibrose margined: inflorescence of from 3-6 spikes, overtopped by the long bracts: staminate spikes 1-3, 2-4 cm. long, sometimes pistillate at top: pistillate spikes usually 3, yellow, 3-5 cm. long, short-stalked or sessile: perigynia 7-8 mm. long, ovate, turgid, strongly nerved, with a stout 2-toothed beak; scales pale, acuminate, much shorter: stigmas 3. Wet places, quite common.

C. *aurea* Nutt. Culms loosely tufted, from long horizontal rootstocks, 10-30 cm. high: leaves flat, pale green, 3-4 mm. wide, usually overtopping the stems: spikes 3-6, the uppermost staminate and linear, or rarely androgynous, the rest pistillate, narrowly cylindrical, loosely flowered, 1-3 cm. long, all stalked; bracts mostly exceeding the stem: perigynia globose, very minutely beaked, reddish when mature, strongly nerved: stigmas 2 or rarely 3. Union Flat, rare.

C. *rigida* var. *strictiformis* Bailey. Culms tufted, slender, 15-40 cm. tall, erect: leaves numerous, flat, 2-3 mm. wide, commonly as long as the stem, sometimes longer: spikes 4-15, the bracts commonly exceeding the stem: staminate spike usually single, slender, purplish: pistillate spikes 3-many, mostly sessile or nearly so, greenish, dense, 2-4 cm. long, 3 mm. thick: perigynia promptly deciduous, 2 mm. long, smooth, flattened, 3-4-nerved on the outer face, stipitate at base, short-beaked, the beak bidentate: scales green with purple margins, obtusish, shorter than the perigynia: stigmas 2. Innundated banks of the Palouse River at Pullman.

C. *nebrascensis* Dewey. Culms 5-1 m. tall from stout horizontal rootstocks: leaves pale, 5-10 mm. broad, shorter than the stems: inflorescence of from 3-6 spikes, these sessile or nearly so: bracts foliaceous, usually exceeding the stems: staminate spikes 1-3; pistillate spikes 2-3, cylindric, dense, 2-3 cm. long, about 6 mm. thick: perigynia oval or obovate, brownish, resinous-dotted, short-beaked, the beak bidentate: scales purple with a green midrib, usually shorter than the perigynia: stigmas 2. Wet places, frequent.

**Family 14. Juncaceae.**

Perennial, grass-like, usually tufted herbs: inflorescence a compound panicle, corymb or umbel, (rarely reduced to a single flower) bearing its flowers singly or loosely clustered or aggregated into spikes or heads: flowers small, regular, with or without bractlets: perianth 6-parted, the parts glumaceous; stamens 3 or 6 (rarely 4 or 5): pistil superior, tricarpellary: ovary one-celled or 3-celled; ovules 3-many; stigmas 3: fruit a loculicidal capsule; seeds 3-many, small.
Leaf-sheaths open: capsule 1 or 3-celled, many-seeded; placentae parietal or axial.
Leaf-sheaths closed: capsule 1-celled, 3-seeded; placentae basal.

59. JUNCUS.

Annual or perennial plants: stems leaf-bearing or scapose: leaves glabrous, round, grass-like or channelled: inflorescence a panicle or corymb, often one-sided, bearing its flowers either singly and with two bractlets or in heads and without bractlets, but each in the axil of a bract: stamens 3–6: ovary 1-celled or 3-celled; placentae parietal or axial: seeds several to many.

Panicle apparently lateral: stems naked. J. BALTICUS.
Panicle terminal: leaves without transverse cross partitions.
Annual: stems leafy. J. BUFONIUS.
Perennial: stems leafy.
Panicle loose. J. TENUIS.
Panicle compact. J. CONFUSUS.
Perennial: stems leafy. J. LATIFOLIUS.

Panicle terminal: leaves with transverse cross partitions.
Leaves equitant: stamens 3. J. ENSIFOLIUS.
Leaves not equitant: stamens 6.
Panicle loose: heads dark brown. J. NEVADENSIS.
Panicle dense: heads cinnamon brown. J. sp. innom.

J. balticus Willd. Stems erect, terete, naked, 30–60 cm. tall, from stout horizontal rootstocks; leaves consisting only of sheaths: panicle apparently lateral, the elongated bract appearing like a continuation of the stem: panicle simple or compound, 1–16 cm. long; perianth segments lanceolate, acute or obtuse, about 4 mm. long; usually brown; stamens 6: capsule acutely angled and short beaked: seeds oblong, the surface reticulated. Abundant in wet places.

J. bufonius L. Annual, branching from the base, 5–30 cm. tall: leaf blades flat or involute, slender: flowers loosely scattered, usually on but one side of the long branches of the panicle: perianth segments pale, scarious-margined, lanceolate, acuminate: stamens 6: capsule narrowly oblong, with a short blunt beak: seeds very finely reticulate. Everywhere common.

J. tenuis Willd. Perennial: stems naked, in dense tufts. 15–30 cm. tall: leaves flat or somewhat involute, narrow, shorter than the stems: panicle loose, seldom exceeded by the slender bract: perianth segments lanceolate, pale: stamens 6: capsule obovate, rounded at the apex, 1-celled with 3 parietal placentae; seeds minutely reticulate. Very common.

J. confusus Coville. Much like the preceding, but the inflorescence capitate, much exceeded by the bract: capsule somewhat 3-angled, 3-celled, Rare in our limits.
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**J. latifolius** Buch. Perennial, with creeping rootstocks: stems leafy, 30-70 cm. tall; leaves flat, 2-3 mm. broad, pale green, shorter than the sheaths, without ligules; flowers aggregated into few-flowered heads, these panicked; perianth segments straw-colored, lanceolate, acuminate, scarious-margined, rough, 5 mm. long; stamens 6: capsule 3-angled, oblong, acute, short-beaked. Common along streams.

**J. ensifolius** Wiks. Perennial, with thick rootstocks; stems compressed, two-edged, 15-40 cm. tall, leafy: leaves equitant, with internal transverse partitions: heads several or numerous in a panicle, globose, usually dark brown; perianth segments lanceolate, acuminate, 3 mm. long: stamens three: capsule 3-angled, acute, barely exceeding the perianth. Common in wet places.

**J. nevadensis** Watson. Stems terete, leafy, 30-60 cm. tall, from running rootstocks: leaves somewhat flattened, with few partitions, 2-3 mm. wide, 15-30 cm. long: ligules present: panicle loose, composed of numerous small dark brown heads, these few-flowered; perianth segments lanceolate, acuminate, 4 mm. long, smooth: stamens 6. Our form, common along streams, is not typical. It very rarely produces good seeds.

**J.** Stems terete, leafy, 30-45 cm. tall, slender: leaves narrowly linear, becoming somewhat involute, with few cross partitions, 10-15 cm. long: heads cinnamon color, aggregated into a dense panicle: perianth segments lanceolate, acuminate, equaling the three-angled acute capsule: stamens 6. In springy places, rare.

60. **LUZULA.**

Perennial, with glabrous or sparingly pubescent herbage: stems leaf-bearing: leaf-sheaths with united margins: blades grass-like: inflorescence umbellate, paniculate or corymbose, often congested: flowers always bracteolate: bractlets usually lacerate or denticulate: stamens 6 (in ours): ovary 1-celled; ovules 3, basal: seeds 3.

**L. campestris** DC. Stems tufted, 15-40 cm. tall, the whole plant loosely villous: leaves flat, 2-5 mm. broad, 5-15 cm. long; flowers in short spikes, these in cymes: longest bract usually exceeding the inflorescence: spikes oblong, 5-1.5 cm. long, on peduncles 1-5 cm. long, erect or nodding; perianth segments straw-color or brownish, lanceolate, acuminate, 3 mm. long; capsules obtuse, short-beaked, equaling the perianth. Dry woods, common.

Family 15. **LILIACEAE.**

Terrestrial plants, mostly herbs: stems usually from bulbs, corms or more or less thickened rootstocks: leaves usually parallel-veined, sometimes net-veined: flowers mostly perfect; perianth regular, of 3 sepals and 3 petals, these all separate or more or less united into a tube (sepals sometimes dissimilar to the petals): stamens 6, opposite the segments of the perianth: ovary superior, 3-celled: fruit a few to many-seeded 3-celled capsule or berry.
Plants with bulbs or corms.

Flowers in umbels.

Perianth-lobes united, funnel-form: stamens on the throat.
64. BROADIAEA.

Perianth-lobes not united: stamens on the bases of the lobes.
63. ALLIUM.

Flowers solitary or in racemes or cymes.
Perianth-segments all alike or nearly so.
Stem leafy: flowers leafy-bracted.
Leaves only two, opposite, appearing basal: flowers bractless.
65. FRITILLARIA.

Leaves linear, basal: flowers bracted.
Flowers small, greenish-white.
Flowers large, blue.
66. ERYTHRONIUM.

Outer perianth-lobes narrower than the inner.
67. CALOCHORTUS.

Plants with rootstocks.
Leaves all basal.
Leaves alternate, cauline.
Flowers terminal.
Flowers racemed or panicled.
Flowers polygamous or monoecious, rather large.
68. CAMASSIA.

Flowers perfect, small.
Flowers umbelled or solitary, terminal.
69. CLINTONIA.

Flowers axillary.
Leaves in a whorl of three below the flower.
70. SMILACINA.

71. DISPORUM.

72. STREPTOPUS.

61. ZYGADENUS.

Glabrous erect perennial herbs from bulbs (in ours), and with leafy stems: leaves narrowly linear; inflorescence a terminal panicle or raceme; flowers perfect or polygamous, greenish, yellowish or white; perianth-segments lanceolate or ovate, separate or united below, sometimes adnate to the lower part of the ovary, with one or two glands or a spot just above the narrowed base: stamens free from the perianth-segments, about equalling them in length: ovary 3-celled: ovules several or numerous in each cavity.

Z. venenosus Wats. Stems 30-50 cm. tall, from ovate, dark-coated bulbs: leaves several, linear, keeled, 3-5 mm. broad, shorter than the stems; raceme many-flowered, 5-10 cm. long, much longer in fruit: flowers yellowish, on pedicels 5-10 mm. long; bracts awl-shaped: perianth segments clawed, elliptical, the blade obtuse; nectaries with thick margins. Common in meadows and hillsides. Bulbs poisonous.

62. VERATRUM.

Tall perennial herbs, from short thick poisonous rootstocks; stem pubescent: leaves mostly broad, clasping, strongly veined and plaited; inflorescence pubescent, of terminal panicles; flowers greenish, yellowish or purple, rather large, polygamous or monoecious, on short stout pedicels; perianth-segments 6, glandless or nearly so, adnate to the base of the ovary: stamens opposite the
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perianth-segments and free from them, short, mostly curved: ovary ovoid, 3-celled, the cavities several ovuled.

Flowers green: lower branches of the panicle drooping.  
V. viride.  
Flowers white: branches of the panicle not drooping.  
V. californicum.

V. viride Ait.  
Stems stout, 1-1.5 m. tall: leaves ovate, or the upper lanceolate, pubescent beneath, 20-30 cm. long; panicle open, 30-60 cm. long, the lower branches more or less drooping, usually simple: perianth green, pubescent outside, the segments obovate, obtuse, about 8 mm. long; principal bracts foliaceous, like the upper leaves.  
Deep woods, Cedar Mountain.

V. californicum Durand.  
Very similar to the preceding, but flowers white, and the branches of the panicle not drooping, usually again branched: principal bracts not foliaceous, small.  
Common in moist meadows.

63. ALLIUM.

Bulbous herbs, with the characteristic odor of the onion, the bulbs solitary or clustered on short rootstocks: stem usually a scape, simple, erect: leaves narrowly linear, or rarely lanceolate or oblong, sheathing, basal, or sometimes also on the stem: inflorescence a terminal simple umbel, in the axils of 2 or 3 membranous, separate or united bracts; pedicels slender, not jointed: flowers white, purple, pink or green: perianth-segments 6, separate or united by their very bases: stamens 6, on the bases of the perianth-segments: ovary sessile or nearly so, completely or incompletely 5-celled; ovules 1–6 in each cavity.

Leaves 2, broad: flowers dark red.  
Leaves 2–several, narrow: flowers pink.  
Bulb-coats fibrous.  
Bulb-coats reticulated.

A. douglasii Hook.  
Stems stout, 15-25 cm. tall: bulb ovate, 2 cm. long, the coats not reticulated: leaves two, 10-20 cm. long, about 1 mm. wide, flat; flowers very numerous in a dense globose umbel, dark red; bracts 2, large: perianth segments broadly lanceolate, acuminate, 7 mm. long; pedicels 1.5-2 cm. long: ovary not crested.  
In gravelly springy places, rare.

A. geyeri Watson.  
Stems slender, 15-30 cm. tall: bulbs elongate, the coats fibrous: leaves 2-4, slender, blunt, 10-20 cm. long: flowers pale rose-color: bracts broad: perianth segments ovate, acute or acuminate: ovary crested.  
Low meadows, not common.

A. acuminatum Hook.  
Stems 10-20 cm. tall: bulbs globose, the outer coats finely reticulate: leaves terete, narrow, shorter than the stem: flowers many, pink, on pedicels 2-3 cm. long: perianth segments ovate, acuminate, 10-12 mm. long: ovary only obscurely crested.  
Rocky soil, abundant.  
var. cuspidatum Fern.  
Perianth segments smaller, 7-8 mm. long, abruptly cuspidate.  
Near Wawawai.

64. BRODIAEA.

Usually erect scapose herbs from a membranous-coated corm:
leaves linear: inflorescence a several-bracted umbel of few to many flowers, on jointed pedicels: perianth funnel-form, not contracted at the throat, blue, purple or sometimes yellow or white, the segments united: stamens 3 on the throat opposite the inner lobes and alternate with three sterile stamens, or 6 in one or two rows: ovary stalked or sessile, 3-celled, each cavity containing 3–8 seeds.

Flowers white, the stamens in one row. B. lactea.

Flowers blue, the stamens in two rows. B. douglasii.

B. lactea Wats. Scapes 30–70 cm. tall; leaves linear-lanceolate, shorter than the stem, 5–8 mm. broad: flowers numerous; perianth open-campanulate, white, each lobe with a green midvein; the tube about half as long as the lobes; stamens in one row, the filaments broadly dilated, equal: capsule subglobose. Low meadows, common.

B. douglasii Wats. Scape 3–6 cm. tall: corm globose, the outer coats coarsely fibrous: leaves two or three, shorter than the stem, 2–4 mm. broad: flowers blue, usually numerous in a dense umbel; pedicels 2–30 mm. long: perianth tubular-campanulate, 2–3 cm. long, the tube longer than the lobes: stamens in two rows, the upper and shorter ones on the petals; filaments naked: capsule oblong-ovate, short-stipitate. Plentiful on hillsides.

65. FRITILLARIA.

Bulbous herbs: stems simple, leafy: inflorescence of rather large nodding solitary or racemed leafy-bracted flowers: perianth mostly campanulate, of 6 separate and nearly equal oblone or ovate segments, each with a nectar-pit or spot at the base: stamens 6, hypogynous: ovary nearly or quite sessile, 3-celled: ovules numerous in each cavity.

Flowers yellow: styles united the whole length. F. pudica.

Flowers brown, spotted: styles not united the whole length. F. lanceolata.

F. pudica Spreng. Stems 10–30 cm. tall: bulb-scales round, numerous: leaves several, linear, obtuse, 4–12 cm. long, 5–12 mm. wide, in a single whorl or scattered: flowers commonly single, sometimes 2–6: perianth-segments oblone, obtuse, 1–2 cm. long, yellow, each with a reddish mark at the base: stamens about equalling the united styles: capsule oblone, not winged. Hillsides, common.

F. lanceolata Pursh. Stems 30–90 cm. tall, glaucous: leaves in two or three whorls of 4–6, lanceolate, sessile, 5–12 cm. long: flowers 1–6, brown purple with greenish-yellow spots: segments oblone-lanceolate; nectaries conspicuous: capsule 2–3 cm. long, with 6 broad wings. Said to occur near Palouse City.

66. ERYTHRONIUM.

Low herbs, from deep membranous-coated corms: stem simple: leaves but one pair, broad or narrow, usually below the
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middle of the stem and thus appearing basal: flowers large, nodding, bractless, solitary or several: perianth-segments separate, lanceolate, oblong or oblanceolate: stamens 6, hypogynous, shorter than the perianth: ovary sessile, 3-celled; ovules numerous or several in each cavity.

E. grandiflorum Pursh. Scape 15-30 cm. tall; corm elongate; leaves dark green, oblong-lanceolate, acute, 10-20 cm. long; petioles short, grooved above; flowers solitary or 2-6 in a cluster; perianth lobes yellow, pale at base, becoming recurved; anthers dark reddish; capsule oblong-lanceolate, attenuate at base, 2-3 cm. long. Abundant on north hillsides.

67. CALOCHORTUS.

Branched or simple herbs with coated corms: leaves narrowly linear: flowers large, showy, erect, peduncled; perianth-segments separate, spreading, or united, whitish, purplish or variegated; the three outer sepal-like, narrow; the three inner petal-like, gland-bearing, and bearded or spotted within: stamens 6, hypogynous: ovary 3-celled; ovules numerous.

Flowers whitish: petals hairy. C. elegans.
Flowers pink.
   Petals obtuse, with peacock-eye spot at the base. C. nitidus.
   Petals acute or acuminate, yellow at base. C. macrocarpus.

C. elegans Pursh. Low, the stems 5-15 cm. tall, bearing a single lanceolate leaf, which much exceeds the stem: flowers solitary, or 2-5 in a cyme, the pedicels ascending, 2-6 cm. long, each subtended by a lanceolate-acuminate bract: sepals broadly lanceolate, acuminate, greenish or purplish, shorter than the petals; petals ovate, obtuse, greenish-white with a purple-violet blotch at base, very hairy on the upper surface; nectary covered by a fringed scale. Common especially in open pine woods.

C. nitidus Dougl. Stems slender, 30-50 cm. tall: cauline leaves 2, the lower nearly as long as the stem: flowers usually 2-4 in an umbel-like cyme: sepals lanceolate, acuminate, 2-3 cm. long, scarious-marginated, purple tinged: petals cuneate-obovate, truncate or rounded, lilac-purple, sparsely hairy over the upper surface, about 4 cm. long; nectary oblong, covered with a small densely hairy scale, the whole surrounded with several arched bands of yellow and purple: capsule oval, acuminate, prominently winged, 2-3 cm. long. Common in low meadows.

C. macrocarpus Dougl. Stems stout, 30-60 cm. tall: leaves 3-5, involute, narrow, 7-15 cm. long; flowers 1-4: sepals greenish or purplish, lanceolate, acuminate, scarious marginated, 3-5 cm. long, equalling the petals: petals broadly obovate, abruptly acuminate, pink-purple, paler toward the base; nectary oblong, hairy: capsule lance-oblong, not winged, 3-4 cm. long. Dry hills, quite common. A white flowered form rarely occurs.
68. CAMASSIA.

Scapose herbs, with membranous-coated edible bulbs: leaves linear, basal: inflorescence a terminal raceme: flowers large, blue, purple or white, bracted; pedicels jointed at the base of the flower: perianth-segments 6, separate, equal, spreading, persistent, 3-7-nerved: stamens at the bases of the perianth-segments: ovary 3-celled, sessile; ovules numerous in each cavity.

C. esculenta Lindl. Scape stout, 30-70 cm. tall: leaves several, mostly shorter than the stem, 5-10 mm. broad, sometimes glaucous; raceme elongated, 10-30-flowered, the pedicels short; bracts narrowly lanceolate, about equalling the flowers: flowers dark blue, or rarely white; perianth lobes unequally spreading, lanceolate, acute, 2 cm. long; capsule oblong-ovate, somewhat 3-angled, 10-12 mm. long; seeds black, shining. Abundant in wet meadows.

69. CLINTONIA.

Somewhat pubescent herbs, with slender rootstocks and erect simple scapes: leaves few, broad petioled, sheathing, basal: flowers solitary-terminal or umbellated on the erect scapes, bractless: perianth-segments distinct, equal or nearly so, erect or spreading: stamens 6, inserted at the base of the perianth-segments: ovary 2-celled; ovules 2-3 several in each cavity.

C. uniflora Kunth. Rootstock creeping, slender: scapes slender, pubescent, naked or with one or two small linear bracts, 6-10 cm. tall, bearing a solitary white flower or rarely two; proper stem short: leaves 2-5, oblong, acuminate, pubescent beneath, 10-20 cm. long; calyx pubescent on the outside: filaments attenuate from a thicker base, pubescent below: fruit globose or pyriform, blue. Thatuna Hills, in rich woods.

70. SMILACINA.

Herbs with slender or short and thick rootstocks: stem simple, scaly below, leafy above: leaves alternate, short-petioled or sessile, ovate, lanceolate or oblong: inflorescence a terminal raceme or panicle: flowers white or greenish, small: perianth of 6 separate spreading equal segments: stamens 6 on the base of the perianth-segments: ovary 3-celled, sessile, subglobose; ovules 2 in each cavity.

Flowers numerous in a dense panicle. S. amplexicaulis. Flowers few in a raceme S. sessilifolia.

S. amplexicaulis Nutt. Rootstocks stout: stems .5-1 m. tall, usually puberulent: leaves oblong or ovate, acuminate, puberulent, 6-12 cm. long, sessile, clasping the stem somewhat: panicle pyramidal or narrow, 3-10 cm. long; pedicels very short; perianth spreading, the segments oblong, 2 mm. long, as long as the ovary: filaments subulate, longer than the perianth: style about as long as the ovary. In rich woods, Kamiack Butte and Thatuna Hills. Variable.

71. DISPORUM.

More or less pubescent herbs with slender rootstocks: stems branching, scaly below, leafy above: leaves alternate, somewhat unsymmetrical, sessile or clasping: flowers terminal, drooping, whitish or greenish-yellow, solitary or few in simple umbels: perianth-segments 6, narrow, equal, separate: stamens 6, hypogynous: ovary 3-celled; ovules 2 or sometimes several in each cavity.

D. trachycarpum B. & H. Stems branched, 30–50 cm. tall, the branches pubescent: leaves oblanceolate or oblong-ovate, long-acuminate, sessile and half-clasping, 5–7 cm. long, glabrous: flowers solitary or in pairs, yellowish-white, or more or less curved pedicels, 5–8 mm. long: perianth campanulate, the segments narrow, oblanceolate, 10–12 mm. long: berry pyriform-globose, 6–8 mm in diameter, roughened with minute shallow pits. In woods, Thatuna Hills.

72. STREPTOPUS.

Herbs with stout or slender rootstocks: leaves thin, sessile or clasping, alternate, many-nerved: flowers solitary or two together, axillary, slender-peduncled, greenish or purplish, small, nodding; peduncles bent or twisted at about the middle: perianth somewhat campanulate, its segments 6, recurved or spreading, the outer flat, the inner keeled: stamens 6, hypogynous: ovary 3-celled; ovules numerous, in two rows in each cavity.

S. amplexifolius DC. Stems branched, about 1 m. tall, from horizontal creeping rootstocks, glabrous except at the base: leaves ovate, acuminate, cordate and clasping at base, 5–12 cm. long, usually glaucous, especially beneath: flowers solitary in the upper axils; pedicels bent at the base and geniculate in the middle, so that the flower is concealed by the leaf: perianth narrowly campanulate, the segments greenish, lanceolate, acuminate, strongly curved outward: anthers acuminate: berry oblong-globose, red, about 1 cm. in diameter. Moist woods, Thatuna Hills.

73. TRILLIUM.

Glabrous erect unbranched herbs, with short scarred rootstocks: leaves 3 in a whorl at the summit of the stem just under the sessile or peduncled, solitary, bractless flower: perianth of two distinct series of segments, the outer 3 (sepals) green, the inner 3 (petals) white, pink, purple or sometimes greenish: stamens 6, hypogynous: ovary sessile, 3–6-angled or lobed; ovules several or numerous in each cavity.
Floras of the Palouse Region

Flowers white, peduncled.  
Flowers purple, sessile.

**T. ovatum** Pursh. Stems 15-40 cm. tall, from a stout horizontal rootstock, 2-5 cm. long; leaves broadly ovate, acuminate or acute, 5-15 cm. long, nearly sessile; flowers odoriferous; peduncles erect, 3-6 cm. long; petals lanceolate, acute, white, in age changing through various shades of pink to dark red, exceeding the green sepals; anthers yellow. Thatunia Hills, in woods.

**T. petiolatum** Pursh. Stems short, usually subterranean, enclosed in sheath-like bracts and arising from a stout oblong upright rootstock: leaves oval or orbicular, 5-15 cm. long, petioled; flowers sessile; petals narrow, dark purple, scarcely longer than the sepals; anthers dark purple. Rich hillsides and copses.

**Family 16. Iridaceae.**

Perennial herb.: leaves narrow, equitant, 2-ranked: flowers perfect, regular or irregular, mostly clustered, subtended by bracts: perianth of 6 segments or 6-lobed, its tube adnate to the ovary, the segments or lobes in 2 series: stamens 3, inserted on the perianth opposite its outer series of segments or lobes: ovary inferior, mostly 3-celled; ovules mostly numerous in each cell; style 3-cleft, its branches sometimes divided.

Style-branches opposite the anthers, very broad, petal-like.

Style-branches alternate with the anthers, slender or filiform.

74. **Iris.**

75. **Sisyrinchium.**

74. **Iris.**

Herbs with creeping or horizontal, often woody and sometimes tuber-bearing rootstocks: stems erect: leaves erect or ascending, equitant: flowers large, regular, terminal, solitary or clustered: perianth of 6 clawed segments united below into a tube, the three outer dilated, spreading or reflexed, the three inner narrower, smaller, usually erect or in some species about as large as the outer: stamens inserted on the base of the outer perianth-segments: ovary 3-celled: divisions of the style petal-like, arching over the stamens, bearing the stigmas immediately under their mostly 2-lobed tips; style-base adnate to the perianth-tube.

**I. missouriensis** Nutt. Rootstocks stout, short branched: stems 20-50 cm. tall, naked or with one or two leaves: leaves pale or glaucous, usually shorter than the stem, 5-8 mm. wide: flowers violet-blue, rarely white, 2-4 in each umbel; bracts scarious, 2-6 cm. long, acute: sepals narrowly clawed, 5-6 cm. long, the honey guides yellowish: petals erect, shorter: capsule oblong-ovate, somewhat 3-angled; seeds brown. Wet places, common.
75. SISYRINCHIUM.

Perennial tufted slender herbs, with short rootstock: stems simple or branched, 2-edged or 2-winged: leaves linear, grass-like: flowers rather small, mostly blue, terminal, umbellate, from a pair of erect green bracts: perianth-tube short or none, the 6 spreading segments oblong or obovate, equal: filaments more or less united: ovary 3-celled, each cavity several-ovuled: style-branches filiform, undivided, alternate with the anthers.

Flowers blue: filaments united to the top. S. idahoense.

Flowers purple: filaments united only at the base. S. grandiflorum.

S. idahoense Bicknell. Stems tufted, 20-45 cm. tall, flattened and winged, the edges serrulate: leaves shorter than the stems, linear, acute, 1-3.5 mm. wide, all radical, or occasionally one on the stem: bracts long and narrow: flowers 3-6, pedicelled, dark blue, with a small yellow center: perianth segments 12-18 mm. long, mucronate: filaments broad at the base, shorter than the 3-cleft style. Low meadows, common.

S. grandiflorum Doug. Stems mostly solitary, 15-30 cm. tall, compressed: roots fascicled, stout: leaf-blades 5-10 cm. long, erect, shorter than the sheaths: flowers 1-4, the pedicels shorter than the largest bract: perianth segments reddish-purple, broadly lanceolate, acuminate, 15-18 mm. long: filaments broad at the base, shorter than the 3-cleft style. Very common.

FAMILY 17. ORCHIDACEAE.

Perennial herbs, with corms bulbs or tubers: leaves entire, sheathing, sometimes reduced to scales: flowers perfect, irregular, bracted, solitary, spiked or racemed: perianth superior, of 6 segments, the three outer (sepals) alike or nearly so; two of the inner ones (petals) lateral, alike; the third inner one (lip) dissimilar, often markedly so, usually larger, often spurred, sometimes inferior by the twisting of the ovary or pedicel: stamens variously united with the style into an unsymmetrical column; anther one (rarely two); pollen more or less coherent into masses (pollinia): ovary inferior, usually long and twisted, 3-angled, 1-celled; ovules numerous on three parietal placentae: seeds numerous: endosperm none.

Anthers 2: lip a large inflated sac. 76. Cypripedium.

Anthers solitary. 77. Platanthera.

Anther-sacs divergent. Pollinia granulose or powdery.

Anther-sacs parallel. Pollinia smooth and waxy.

Leaves green, borne on the stem. 78. Listera.

Leaves white-reticulated, basal. 79. Goodyera.

Plants with corms or solid bulbs: leaves basal. 80. Calypso.

Plants with coral-like roots: leaves reduced to scales. 81. Corallorhiza.
76. CYPRIPEDIUM.

Glandular-pubescent herbs with leafy stems or scapes and tufted roots of thick fibres: leaves large, broad, many-nerved: flowers solitary or several, drooping, large, showy: sepals spreading, separate or two of them united under the lip: lip a large inflated sac: column bearing a sessile or stalked anther on each side and a dilated petal-like sterile stamen above, covering the summit of the style; pollinia granular: stigma terminal, broad, obscurely 3-lobed.

C. montanum Dougl. Whole plant glandular pubescent: stems 30-50 cm. tall, erect: leaves 4-6, oval, acuminate, 6-12 cm. long: flowers 1-3, pedicelled: sepals brown, usually dark, narrowly lanceolate, 5-6 cm. long: upper petals like the sepals, but narrower and longer, wavy-twisted: lip white, veined with purple, oblong; 3 cm. long: sterile anther somewhat triangular, yellow with purple spots, about 1 cm. long. Woods, Thatuna Hills, rare; a single specimen found at Pullman.

77. PLATANTHERA.

Stems leafy, from elongate tuberous roots: flowers numerous, white or greenish, small, racemose or spicate: sepals and petals similar, spreading or converging: lip flat, spreading, 3-lobed, entire, bearing a spur at base: column very stout: anther one, the two cells widely divergent at base: pollen masses coarsely granular, one in each anther sac, each attached by a slender stalk to a viscid gland on the side of the stigma.

Stems leafy throughout.

Stems leafy only at the base.

Flowers white: spur long.

Flowers greenish: spur short.

P. gracilis Lindl. Stems stout, leafy, 5-1 m. tall: leaves lanceolate, acuminate, 10-15 cm. long, gradually diminishing upward into the bracts: spike slender, 20-30 cm. long, loose, the lower flowers remote: bracts narrowly lanceolate, exceeding the lower flowers, equalling the upper ones: sepals 3-nerved: lip linear, thick, as long as the spur, which is inflated and very obtuse at the tip. Springy places, Thatuna Hills.

P. elegans Lindl. Stouter than the preceding, somewhat taller: basal leaves 2-4, oblong or lanceolate, 10-15 cm. long, 3-5 cm. wide, obtuse or acute: cauline bracts oblong, acuminate, 1-3 cm. long: spikes usually dense, 8-20 cm. long: bracts ovate, acuminate, about equalling the white flowers or the mature ovary: sepals and petals similar, 4 mm. long, obscely 3-nerved: lip like the petals, the spur slender, 7-10 mm. long: capsule oblong, nearly sessile. Pullman, very rare.

P. foetida Geyer. Stems stout, 20-40 cm. tall, leafy at base, bracteate above: leaves 2-3, oblanceolate, obtuse, about 15 cm. long, usually withering before the flowers bloom: spike narrow, rather dense, 8-15 cm. long: bracts triangular, acute or acuminate, shorter than the ovary, a few along the stem below the spike: flowers small, greenish: sepals and petals lanceolate, 1-nerved, 1.5-2 mm. long: lip scarcely exceeding the petals; spur curved, about 3 mm. long: capsule oblong, sessile. Pullman, very rare.
78. LISTERA.

Small herbs, with fibrous or sometimes rather fleshy roots: leaves two, opposite, green, near the middle of the stem; flowers in terminal racemes, spurless: sepals and petals nearly alike, spreading or reflexed, free: anther without a lid, erect, jointed to the column; pollinia 2, powdery.

L. caurina Piper. Stems slender, 15-30 cm. high, glabrous below the leaves, the inflorescence glandular-puberulent: leaves sessile, ovate, obtuse or acutish, glabrous, 3-5 cm. long; flowers small, the slender pedicels longer than the bract or the ovary: sepals and petals lanceolate, spreading; lip 4 mm. long, cuneate, obovate, with a slender tooth on each side near the base: capsule ovoid, 5-6 mm. long. Deep woods, Thatuna Hills.

79. GOODYERA.

Herbs with bracted erect scapes and thick fleshy-fibrous roots: leaves basal, tufted, often blotched with white: flowers in bracted spikes: lateral sepals free, the upper ones united with the petals into a hood-like structure (galea): lip sessile, entire, roundish, ovate, concave or saccate, without protuberances, its apex reflexed: anther without a lid, erect or incumbent, attached to the column by a short stalk; pollinia composed of angular grains, one in each sac, attached to a small disk which coheres with the top of the stigma.

G. menziesii Lindl. Scape 15-30 cm. tall, erect, glandular-puberulent, bearing several short bracts: leaves ovate, acute, with a broken white stripe down the midvein, 3-5 cm. long, short-petioled: spike bracteate, densely many-flowered, 6-10 cm. long, one-sided: perianth glandular-hairy, white, the sepals and petals 6-8 mm. long, about as long as the glandular ovary: lip concave, erect, the tip recurved, obtuse: column short, straight. Deep woods, Thatuna Hills.

80. CALYPSO.

Herbs with solid bulbs and coral-like roots: scape low, 1-flowered, sheathed by two or three loose scales: leaf at the base of the stem, solitary, petioled: flower large, terminal, showy, bracted: sepals and petals similar, nearly equal: lip large, saccate or swollen, 2-lobed below: column dilated, petal-like, bearing the lid-like anther just below the summit; pollinia two, waxy, each 2-parted.

C. borealis Salisb. Stems 10-15 cm. tall, enwrapped toward the blade with 3-4 scarious sheaths, the uppermost prolonged into a narrow bract: leaf solitary, radical, ovate, acute, 3-5 cm. long, on a petiole about as long: sepals and petals ascending, lanceolate, purple, about 2 cm. long: lip about as long, purple lined, sac-like, two-lobed at the apex, with a patch of yellowish hairs within; the apex of the slipper prolonged into two tooth-like projections: column half as long as the petals. Deep woods, Cedar Mountain, rare,
81. CORALLORHIZA.

Scapose herbs, saprophytes or root-parasites, with large masses of coral-like branching roots: leaves all reduced to sheathing scales: flowers in terminal racemes: sepals nearly equal, the lateral ones united at the base with the foot of the column, forming a short spur or protuberance, the other one free, the spur adnate to the summit of the ovary: petals about as long as the sepals, 1–3-nerved; lip 3-ridged: column nearly free, slightly incurved, somewhat 2-winged; anther terminal; pollinia 4, in two pairs, oblique, free, soft-waxy.

Plant greenish-white: sepals and petals 1-nerved. C. innata.
Plant reddish: sepals and petals 3-nerved. C. multiflora.

C. innata R. Br. Scapes 10–20 cm. tall, pale yellowish, 3–15-flowered: sepals lancolate, somewhat acute, 1-nerved, 3–4 mm. long; spur very short: petals like the sepals but broader, obtuse: lip oblong, obtuse or notched, somewhat 3-lobed: column shorter than the petals. Very rare in deep woods, Cedar Mountain.

C. multiflora Nutt. Whole plant reddish or sometimes green, 15–25 cm. tall, the spike many-flowered: sepals and petals 6–8 mm. long, 3-nerved: spur grown to the ovary, 1–2 mm. long: lip ovate, white, mottled with purple, 3-lobed, with prominent ridges; middle lobe obtuse or notched, the lateral ones acute: column nearly as long as the petals. Deep woods, Thatuna Hills.

**Sub-class 2. DICOTYLEDONES.**

Embryo of the seed with two cotyledons, that is with the first leaves of the germinating plantlet opposite: stem usually differentiated into bark, wood and pith by the regular arrangement of the bundles of wood cells in one or more annual rings surrounding the central cylinder of pith: leaves mostly net-veined: parts of flowers in fours or fives, rarely in twos or sixes.

**Family 18. SALICACEAE.**

Trees or shrubs with light wood, bitter bark and brittle twigs: leaves alternate; stipules often minute: flowers solitary in the axil of each bract, dioecious, both staminate and pistillate in aments which expand before or with the leaves; staminate aments often pendulous; pistillate pendulous, erect or spreading; staminate flowers of many hypogynous stamens, subtended by a gland-like or cup-shaped disk: pistillate flowers of a sessile or short-stipitate 1-celled ovary subtended by a minute disk; ovules usually numerous: fruit an ovoid or oblong or conic 2–4-valved capsule; seeds minute; endosperm none.

Ament-bracts fimbriate or incised: stamens numerous: stigmas elongated. 82. POPULUS.
Ament-bracts entire: stamens 1–10: stigmas short. 83. SALIX.
82. **POPULUS.**

Trees with scaly resinous buds and round or angled twigs: leaves long-petioled, broad or narrow; bracts of the aments fimbriate or incised: disk cup-shaped, oblique, lobed or entire: staminate aments dense, pendulous; pistillate aments sometimes racemelike by the elongation of the pedicels, pendulous, erect or spreading: staminate flowers with from 4–60 stamens; filaments distinct: ovary sessile; tuft of hair on the seed very conspicuous.

Styles 2, with linear lobes; petioles flattened.

**P. tremuloides** Michx. Small tree, 10–12 m. tall with smooth light bark: leaves broadly ovate, subcordate or obtuse at base, abruptly acuminate, 3–8 cm. long, ciliate when young, glabrate: petioles long and slender, much flattened laterally: staminate aments dense, 3–5 cm. long; stamens 7–10: bracts long-ciliate: pistillate aments 5–10 cm. long. Common on north hillsides and along streams.

**P. trichocarpa** T. & G. Large tree, 10–30 m. tall, with rough fissured bark; leaves broadly ovate, rounded at the base, acuminate, 5–12 cm. long, puberulent when young, whitish beneath: petioles slender, terete, about equalling the blades: staminate aments dense, the bracts long-hairy: stamens 50–60: pistillate aments becoming loose: capsules nearly sessile, globose, puberulent or glabrate. Banks of streams, infrequent.

83. **SALIX.**

Trees or shrubs with single-scaled buds, the scales with an adherent membrane within: leaves short-petioled, mostly narrow, with broad or minute stipules: bracts of the aments mostly entire, small or minute: flowers each with one or two small glands at their base: staminate aments dense, erect, spreading or drooping: pistillate aments usually erect or spreading: staminate flowers with 1–10, mostly 2 or 5, stamens: ovary sessile or short-stipitate.

Aments on short leafy branches.

Stamens 3–5.

- Petioles with glands.
  - Petioles without glands.

Stamens 2: scales pale: leaves very narrow.

Twigs glabrous.

- Leaves pale, entire, usually pubescent beneath.
  - Leaves green, denticulate, glaucous beneath.

Twigs pubescent: leaves silvery-hairy on both sides.

Aments sessile or nearly so, appearing with or before the leaves: stamens 2.

Capsules pubescent.

- Scales black: style none.
  - Scales black: style elongate.
  - Scales pink or pale.

Capsules glabrous.

- Capsules long-pedicellated: filaments free.
  - Capsules short-pedicellated: filaments united at the base.

**S. lasiandra.**

**S. amygdaloides.**

**S. exigua.**

**S. melanopsis.**

**S. argophylla.**

**S. scouleriana.**

**S. bella.**

**S. rostrata.**

**S. cordata.**

**S. lasiolepis.**
S. lasiandra var. fenderiana Bebb. Tree 10-20 m. tall, with rough longitudinally-fissured bark; leaves lanceolate, long-acuminate, crenulate, green and glabrous on both sides, 8-16 cm. or more long; the short petioles and the very base of the leaf glandular; stipules ear-shaped, sometimes large: aments on leafy branchlets: staminate dense, 3-5 cm. long: scales pale, oblong, more or less dentate: stamens 5 or more, the filaments hairy at the base: pistillate rather loose, the pale oblong scales hairy at the base, deciduous: carpel glabrous, short-pedicelled: stigma nearly sessile. Common on stream banks.

S. amygdaloïdes Anders. Tree 5-10 m. tall, with cinnamon-colored fissured bark; leaves glabrous, lanceolate, serrate, attenuate-acuminate, green above, glaucous beneath, 10-15 cm. long: petioles slender, without glands; stipules ear-shaped or reniform, usually small and quickly deciduous: aments on leafy branchlets: staminate flexuous, dense, 5-6 cm. long: scale pale, hairy; stamens 5 or more: pistillate becoming loose and elongated: capsules glabrous, the slender pedicels much exceeding the pale fugacious scales: stigmas sessile or nearly so. Common on the banks of Snake River.

S. exigua Nutt. Shrub, 3-5 m. tall, usually with a single trunk: bark rough, longitudinally cracked: twigs glabrous; leaves acute, sub-entire, narrowly lanceolate or oblanceolate, 3-10 cm. long, 4-10 mm. wide, glabrate above, sparsely appressed-silky beneath, the veins obscure; petioles very short; stipules none or very small: aments on leafy branchlets, solitary or 2-4; staminate aments 2-5 cm. long, slender, the scales lanceolate, acute: capsules becoming glabrous, sessile: stigmas sessile. Common along streams. Forms with denticulate leaves are probably referable here.

S. melanopsis Nutt. Much like the preceding species: twigs glabrous: leaves glabrous on both sides or glaucous beneath, remotely denticulate: stipules triangular-ovate, acute, few-toothed: capsules glabrous; scales obtuse. Low shrub on the edge of Snake River, where it is frequently covered with water until July.

S. argophylla Nutt. Very similar to S. exigua, but the young twigs pubescent and the leaves densely appressed-silky on each side: capsules somewhat hairy. Banks of Snake River.

S. scouleriâna Barratt. Shrub or tree, 4-10 m. tall, with dull gray bark: leaves very variable, oblong, elliptic or obovate, acute, acuminate, or obtuse, entire or serrulate, green above, usually downy beneath, this becoming rusty in age, 2-12 cm. long; petioles rather short; stipules large, ear-shaped, dentate, persistent on sterile shoots: aments appearing before the leaves, very densely flowered; scales black, hairy, persistent: staminate aments sessile: stamens 2, with glabrous separate filaments: pistillate short-peduncled: carpels hairy, long-beaked, the pedicels equalling the scales; stigmas sessile. Frequent along streams and in open coniferous woods.

S. bella Piper. Shrub, 2-4 m. tall, with slender, erect branches, the bark gray and smooth: branchlets shining yellow, usually glabrous, very brittle: leaves lanceolate or oblong, or oblong-ovate, acute, 3-6 cm. or more long, green and glabrate above, densely silvery-woolly beneath, entire or nearly so; petioles short; stipules lunate, usually present: aments appearing before the leaves: staminate sessile, short and thick, 1-2 cm. long: scales acute, black, densely villous; stamens 2: pistillate short-peduncled, 2-3 cm. long: scales black, obtuse, densely villous; capsules silky-hairy, nearly sessile; style 1.5 mm. long. Near Garrison, rare; along the North Fork of the Palouse, common.
S. rostrata Richardson. Much branched shrub, 2-5 m. tall; leaves oblong, elliptic, acute or acuminate, crenulate or nearly entire, pale and downy beneath, green and puberulent above, strongly reticulate, 3-8 cm. long; petioles short; stipules ear-shaped, usually falling quickly; aments on short bracteate peduncles appearing with the leaves; staminate dense; the obuse scales pale, hairy; stamens 2; filaments glabrous; pistillate looser, the linear scales pale and pink-tipped; capsules pubescent, long beaked, with sessile stigmas, the slender pedicel equalling or exceeding the persistent scales. Common along streams.

S. cordata Muhl. Shrub, 2-5 m. tall, with elongate branches: leaves oblong or oblong-lanceolate, acuminate, glandulate-serrulate, rounded or cordate at the base, glabrous above, glaucous beneath, 4-8 cm. long; petioles stout; stipules conspicuous, reniform; aments appearing with the leaves, on leafy peduncles; staminate narrow, densely flowered, 4-6 cm. long, the black hairy scales persistent; pistillate looser; capsules glabrous, the long pedicels far exceeding the scales; style as long as the stigmas. Common along streams. Our form is somewhat different from the typical plant as found in the Atlantic States.

S. lasiolepis Benth. Large shrub, 5-6 m. tall; leaves petioled, oblong or oblanceolate, obliquely acute or acuminate, serrulate, shining green above, densely glaucous and somewhat pubescent beneath; stipules rarely present, triangular; aments appearing with the leaves; staminate cylindrical, 3-5 cm. long, short-peduncled; scales black, hairy; stamens 2, the glabrous filaments united at the base for half their length; pistillate aments small, 1-3 cm. long, on short leafy peduncles; capsules glabrous, short-pedicelled; style about equalling the stigma. Along the Palouse at Pullman, infrequent.


Trees or shrubs: leaves alternate, petioled, simple; stipules early falling away; flowers small, monoeious, in linear-cylindric, oblong or subglobose aments; staminate aments pendulous; pistillate aments erect, spreading or drooping, spike-like or capitate; staminate flowers 1-3 in the axil of each bract, with a membranous 2-4 parted calyx, or calyx none, and 2-10 hypogynous stamens; pistillate flowers with or without a calyx adnate to the solitary 1-2 celled ovary; ovules 1-2 in each cavity; fruit a small, compressed, or ovoid-globose, mostly 1-celled and 1-seeded nut or samara; endosperm none.

Stamens 2; filaments 2-cleft, each fork bearing an anther sac: fruiting bracts 3-lobed or entire.

84. Betula.

Stamens 4; anther-sacs adnate: fruiting bracts woody, erose or 5-toothed, persistent.

85. Alnus.

84. Betula.

Aromatic trees and shrubs: leaves dentate or serrate; buds scaly; both kinds of flowers in aments, expanding before and with the leaves: the pistillate aments erect or spreading; staminate flowers about 3 in the axil of each bract, with a membranous, usually 4-toothed perianth, and 2 stamens, and subtended by 2 bractlets:
pistillate flowers 2–3 (rarely 1) in the axil of each bract: perianth none: ovary sessile, 2-celled: nut small, a samara, shorter than the bracts.

Three species occur within our limits, none of which seem to be named at the date of writing, though two of them have frequently been mentioned in publications under wrong names.

B. Tree with a single trunk, 8–20 m. high, erect: bark grayish-bronze, the erect or spreading branchlets a dull gray: leaves broadly ovate, attenuate-acute at base, somewhat lobed at the ends of the prominent nerves, serrate, acuminate, very sparsely hairy on both sides, scarcely glandular, 4–7 cm. long, on slender petioles 2–3 cm. long: pistillate aments cylindrical, 3 cm. long, 1 cm. thick, usually drooping on slender peduncles: bracts pubescent, the central lobes longest. Thatuna Hills, not common.

B. Small tree, 5–8 m. high, the several trunks rarely erect, the bark dark bronze; branchlets drooping, grayish, warty: leaves broadly ovate, obtuse or acute, coarsely serrate-dentate, glandular and sparsely hairy on each surface, 2–4 cm. long, on slender petioles half their length: stamine aments about 2 cm. long: pistillate aments solitary, cylindrical, 2–3 cm. long, drooping with the branchlets, sessile or on short peduncles: fruiting bracts pubescent and ciliolate, the central lobe largest and narrowest: wings as broad as the obovate nutlet. Along streams eight miles southwest of Pullman.

B. Graceful tree, 8–15 m. tall, with drooping branches: bark dark bronze, even the branchlets scarcely gray, these latter very glandular: leaves ovate, obtuse or acute at the base, coarsely doubly serrate, acuminate, shining green above, glandular on both surfaces, 2–4 cm. long, on petioles half as long: pistillate aments cylindrical: 5 cm. long, .5 cm. thick, often flexuous, mostly in twos, dark green: stamine aments narrow, flexuous, 4–8 cm. long. Springy hillsides near Almota.

85. ALNUS.

Trees or shrubs: leaves dentate or serrulate: buds few-scaled: both kinds of flowers in aments, expanding before, with or after the leaves; the staminate pendulous; the pistillate erect, clustered: stamine flowers 3, sometimes 6, in the axil of each bract, consisting of 4, mostly 4-parted perianth and 4 stamens, and subtended by 1 or 2 bractlets; filaments short, simple; anther-sacs adnate: pistillate flowers 2–3 in the axil of each bract, without a perianth, but subtended by 2–4 minute bractlets: ovary sessile, 2-celled; styles 2: bracts woody, persistent, 5-toothed or erose: nut small, compressed, wingless or winged.

Leaves simply denticulate, not at all lobed. A. RHOBINIFOLIA.
Leaves doubly denticulate or with short lobes at the ends of the main veins. Peduncles slender, exceeding the cones. A. SINCATA.
Peduncles stout, shorter than the cones. A. TENUIFOLIA.
A. *rhombifolia* Nutt. Tree 10–15 m. tall, with white bark, which on older trees becomes broken into rectangular blocks: leaves ovate, elliptic or obovate, mostly cuneate at the base and obtuse at the apex, glandular-denticulate, finely puberulent on each surface, somewhat glandular beneath, 5–8 cm. long; petioles 1 cm. or less long; fruiting aments oblong-ovate, 2–3 cm. long, on short stout peduncles: nutlets broadly obovate, the margins thickened. Banks of Snake River.

A. *sinuata* Rydb. Small tree or shrub, 3–5 m. tall, erect or ascending: bark rather dark, except in old stems: twigs chestnut brown: buds smooth, gummy: leaves ovate, acuminate, obtuse or cuneate at the base, bright green, doubly dentate, glabrous above, nearly so beneath, thin, very gummy when young, 5–8 cm. long; petioles slender, 1–2 cm. long: fruiting aments 1–1.5 cm. long; on slender longer peduncles. Thatuna Hills, along streams.

A. *tenuifolia* Nutt. Small tree, 5–10 m. tall: bark whitish even on the twigs; buds pubescent: leaves ovate or somewhat obovate, mostly obtuse, rounded or subcordate at the base, with small lobes at the end of each vein, dentate-serrate, dull-green, 3–8 cm. long, sparsely pubescent on both sides, becoming glabrous above; petioles stout, pubescent, 1–1.5 cm. long: fruiting aments ovate, 1–2.5 cm. long, resinous. Along the South Fork below Pullman, and along the North Fork of the Palouse.

**Family 20. URTICACEAE.**

Herbs, shrubs or trees: leaves alternate or opposite, simple, mostly stipulate: flowers small, monoecious, dioecious, polygamous or perfect: calyx 2–9-cleft or 2–9 sepals: petals none: stamens as many as the calyx-lobes and opposite them: ovary 1-celled, rarely 2-celled, mostly superior: ovule solitary: fruit a drupe or akene (in ours); endosperm not copious, or scanty or none.

Trees or shrubs: fruit a drupe.

Herbs: fruit an akene.

Leaves opposite, with stinging hairs.

Leaves alternate, without stinging hairs.

86. *CELTIS*.

87. *URTICA*.

88. *PARIETARIA*.

86. *CELTIS*.

Trees or shrubs: leaves serrate or entire, pinnately veined or 3–5-nerved: flowers polygamous or monoecious, borne in the axils of this season’s leaves, the staminate clustered, the fertile solitary or 2–3 together: calyx 4–6-parted or of distinct sepals: ovary sessile; stigmas 2: fruit an ovoid or globose drupe.

C. *ocidentalis* L. Scraggly tree or shrub, 3–5 m. tall: leaves oblique-ovate, acuminate, cuneate at the base, sharply serrate, pubescent when young, glabrous and shiny above when mature, somewhat pubescent on the veins beneath, rough, reticulated, 4–8 cm. long; petioles about 1 cm. long: fruit reddish, globose, smooth, 5–7 mm. in diameter, on slender peduncles, about 2 cm. long.

Basaltic bluffs on Snake River: a handsome tree when grown in good soil, but under natural conditions very scraggly; leaves often distorted as a result of insect attacks.
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87. URTICA.

Annual or perennial simple or branching herbs with stinging hairs: leaves opposite, 3-7-nerved, petioled, dentate or incised, with distinct or connate stipules: flowers very small and numerous, dioecious, monoecious or androgyrou: stamine flowers with a deeply 4-parted calyx and 4 stamens; pistillate flowers with a 4-parted calyx, the exterior segments of which are usually smaller than the inner: ovary straight: akene compressed, ovate or oblong, enclosed by the persistent membranous or slightly fleshy calyx: endosperm scanty.

Leaves soft-pubescent on both sides. U. holosericea. Leaves quite glabrous above, somewhat pubescent beneath. U. lyallii.

U. holosericea Nutt. Tall, 2-3 m. high, usually somewhat bristly, densely soft-pubescent throughout: leaves ovate-lanceolate, acuminate, subcordate, coarsely and evenly dentate, velvety pubescent beneath, 8-16 cm. long; petioles short: stamine flowers in loose narrow panicles shorter than the leaves: pistillate panicles denser, in the axils of the uppermost leaves. Variable; common along Snake River, also on Union Flat and in the Thatuna Hills.

U. lyallii Wats. Very much like the preceding, but not so tall, 1-2 m. high: stem merely bristly or glabrous: leaves broadly ovate, cordate, very coarsely dentate, green and usually glabrous above, pubescent or glabrous beneath. Infrequent in moist places.

88. PARIETARIA.

Annual or perennial diffuse or erect herbs without stinging hairs: leaves alternate, entire, 3-nerved, petioled, without stipules: flowers axillary, gloemerate, polygamous, involucrate by leafy bracts: calyx of the stamine flowers 4-parted or of 4 distinct sepals: fertile flowers with a tubular or campanulate 4-lobed calyx surrounding the ovary: akene enclosed by the withering-persistent calyx.

Leaves rounded or cuneate at base: bracts equalling the flowers. P. debilis. Leaves attenuate-acute at base: bracts exceeding the flowers. P. pennsylvanica.

P. debilis Forst. Stems slender, pubescent, simple or branched at base, weak, 8-20 cm. long; leaves ovate, obtuse, rounded or cuneate at base, 4-12 mm. long, rough-hairy above; petioles short: flowers few in each cluster: bracts oblong-linear, 1-2 mm. long, scarcely longer than the flowers: akeines shining gray, 1 mm. long. Crevices of basalt cliffs near Lewiston.

P. pennsylvanica Muhl. Very similar to the above: leaves lanceolate, attenuate-acute at base, 2-6 cm. long: bracts much exceeding the flowers, 3-5 mm. long. Basalt crevices at Almota and Wawawai.

Parasitic shrubs or herbs, yellow or yellowish-green, growing on woody plants and absorbing food from their sap through specialized roots (haustoria): leaves opposite; flowers regular, terminal or axillary, clustered or solitary, dioecious (in ours): calyx-tube adnate to the ovary; stamens 2-6; ovary solitary, erect; style simple or none; stigma terminal; fruit a berry; seed solitary; endosperm usually copious and fleshy.

89. Arceuthobium.

Small fleshy glabrous plants, parasitic on the branches of coniferous trees: branches 4-angled: leaves reduced to opposite connate scales: flowers dioecious, not bracted, solitary or several together in the axils of the scales: staminate flowers with a 2-5-parted calyx and usually an equal number of stamens: pistillate flowers with an inferior ovary: berry fleshy, ovoid, more or less flattened.

Two doubtful species occur in the Thatuna Hills, one on Larix occidentalis, the other on Pinus contorta. Both perhaps are referable to A. douglasii Engelm. In the present confusion of this genus and with insufficient herbarium material at hand, we have preferred not to characterize the species.

Family 22. Santalaceae.

Herbs or shrubs: leaves alternate or opposite, entire, without stipules; flowers clustered or solitary, axillary or terminal, perfect, monoecious or dioecious, mostly greenish: calyx adnate to the base of the ovary, or to the disk, 3-6-lobed: petals none: stamens as many as the calyx-lobes and opposite them; filaments slender or short: ovary 1-celled; ovules 2-4: fruit a drupe or nut; seed 1, ovoid or globose.

90. Comandra.

Glabrous erect perennial herbs, sometimes parasitic on the roots of other plants: leaves alternate, oblong, oval, lanceolate or linear, entire, pinnately veined: flowers perfect, terminal or axillary, rarely solitary, cymose, bractless: calyx campanulate; base of its tube adnate to the ovary; limb 5-lobed: stamens 5, rarely 4, at the bases of the calyx-lobes and between the lobes of the disk: fruit drupaceous, globose or ovoid, crowned by the persistent calyx.

C. pallida A. DC. Stems erect, from woody rootstocks, 30-40 cm. high, simple or branched above: leaves sessile, lanceolate or linear, acuminate, pale and glaucous, 2-4 cm. long: umbels clustered: flowers 4-5 mm. long,
the whitish calyx-lobes little spreading, acute, puberulent above, about equaling the green tube; fruit nut-like, globose or ovoid, 7–10 mm. long, glaucous, reticulated, tipped by the persistent calyx. Gravelly soil, bluffs of Snake River. Nuts edible.

**Family 23. ARISTOLOCHIACEAE.**

Herbs or shrubs, acaulescent or with erect or twining leafy stems: leaves alternate or basal, petioled, mostly cordate or kidney-shaped, without stipules: flowers axillary or terminal, solitary or clustered, perfect, mostly large: calyx-tube adnate to the ovary, its limb 3-lobed, 6-lobed or irregular: petals none: stamens 6–many, on the pistil: ovary partly or wholly inferior, mostly 6-celled; ovules numerous in each cavity: seeds ovoid or oblong, angled or compressed.

**91. ASARUM.**

Acaulescent perennial often clustered herbs, with slender aromatic branched rootstocks: roots thick, fibrous-fleshy: leaves long-petioled, cordate, ovate, hastate or orbicular, entire: flowers solitary, large, peduncled, purple-brown or mottled, borne very near or upon the ground: calyx campanulate or hemispheric, adnate to the ovary, at least below, regularly 3-lobed: stamens 12, inserted on the ovary: ovary partly or wholly inferior, 6-celled, the parietal placentae intruded; ovules numerous: capsule coriaceous; seeds compressed.


**Family 24. Polygonaceae.**

Herbs or shrubs: leaves alternate or sometimes opposite or whorled, simple, mostly entire, with usually sheathing united stipules (oecreae): flowers small, regular, perfect, dioecious, monocious or polygamous, in spikes, racemes, corymbs, umbels or panicles: petals none: calyx inferior, free from the ovary, 2–6-cleft or parted, the segments sometimes petal-like: stamens 2–9, inserted near the base of the calyx or in the staminate flowers crowded toward the center: pistil 1; ovary superior, 1-celled; ovule 1: fruit a lenticular 3-angled, rarely 4-angled, akene: endosperm mealy.

Flowers subtended by involucres.

Flowers not involucrate.

- Sepals 6: stigmas 3, tufted.
- Sepals 4–6, usually 5: stigmas capitate.

**92. ERIOGONUM.**

Flowers subtended by involucres.

Flowers not involucrate.

93. RUMEX.

94. POLYGONUM.
92. ERIOGONUM.

Annual or perennial acaulescent or leafy-stemmed herbs or shrubs: stems simple or branched, often tufted: leaves entire, alternate, opposite or whorled: flowers small, fascicled, cymose, umbellate or capitulate, subtended by 5-8-toothed or cleft campanulate, top-shaped or almost cylindric involucres: calyx 6-cleft or parted, usually colored; segments equal or the outer ones larger: stamens 9: akenes pyramidal, 3-angled, more or less swollen near the base, invested by the calyx-segments or winged.

Annuals: inflorescence loose, the small umbels scattered along the branches.  
E. vimineum.

Perennials.

Inflorescence loosely dichotomous.  
E. niveum.

Inflorescence umbellate, simple or compound, rather dense.  
Flowers hairy, yellow.  
E. piperi.

Flowers not hairy.  
Basal leaves large, oblong-ovate, cordate.  
E. compositum.

Basal leaves small, oblanceolate.  
E. heracleoides.

E. vimineum Doug.  Annual: stems erect, 15-40 cm. tall, much branched above the base, tomentose below, the branches long and slender: leaves commonly in a single rosette at or near the base, broadly oblong or orbicular, 2-4 cm. long, densely tomentose beneath, less so above; petiole slender, about as long as the blade: umbels small, 2-8-flowered, sessile and scattered along the sides of the long branches, or in the forks: involucres narrow, 3-4 mm. long, 5-toothed and nerved, glabrous: flowers white or pink, 2 mm. long.  In basaltic gravel or sandstone, along Snake River.

E. niveum Doug.  Densely white-tomentose throughout: stem tufted from a loose woody caudex, 30-50 cm. tall, loosely several-times forked, the branches in twos or threes, ascending: basal leaves ovate or oblong, obtuse, 1-3 cm. long, densely white-woolly on each side, on slender petioles; cauleine narrower, nearly sessile, whorled at the forks, the upper reduced: umbels in the forks or on the sides of the branches: involucres short and broad, 4 mm. long, 5-6-toothed, the tips somewhat recurving: flowers white or pinkish, 4-5 mm. long.  Banks of Snake River in stony soil.

E. piperi Greene.  Densely tufted on a stout woody caudex: stems erect, leafless, tomentose, 10-20 cm. tall: leaves all basal, lanceolate or oblanceolate, acute or obtuse, densely hairy beneath, green and less hairy above, 2-4 cm. long, attenuate into a usually shorter petiole: umbels several-rayed, simple, or contracted into a dense cluster: bracts 3-8, oblanceolate, 2-3 cm. long: involucres short-toothed, villous: flowers yellow, very villous, 5-6 mm. long.  Summit of Cedar Mountain.  Hardly distinct from E. flavum Nutt.

E. compositum Doug.  Stems stout, simple, 20-30 cm. tall, glabrous or nearly so: leaves ovate or oblong-ovate, cordate, acute, densely white-woolly beneath, green and less so above, 4-10 cm. long, on petioles as long or longer: umbels 6-10-rayed, mostly compound, rather dense: principal bracts linear or oblanceolate; branches very short or 2-4 cm. long: involucres glabrous, deeply 5-lobed, the lobes acute, spreading: flowers white or yellow, glabrous.  Rocky places, banks of Snake River.
E. heracleoides Nutt. Loosely tufted, thinly tomentose throughout: flowering stems erect, 20–40 cm. tall, with a single whorl of leaves half way up; leaves linear or oblanceolate, acute, 3–5 cm. long, attenuate at base into a short petiole, paler and more pubescent beneath; bracts similar to the leaves, but smaller: umbels 1–10-rayed, simple or compound: involucres woolly, deeply lobed, the lobes reflexed: flowers whitish. Common on basaltic ledges.

93. RUMEX.

Perennial or annual leafy-stemmed herbs, some species slightly woody: stem grooved, mostly branched: leaves entire or undulate, flat or crisped; ocreae usually cylindric, brittle, soon falling away: inflorescence of simple or compound often panicled racemes: flowers green, perfect, dioecious or polygamous-monoeious, whorled, on jointed pedicels: calyx 6-parted, the three outer sepals unchanged in fruit, the three inner ones mostly developed into valves which are entire, dentate or fringed with bristle-like teeth: stamens 6: stigmas 3: anthers 3-angled, the angles more or less margined. All of our species are perennial.

Plants small: flowers dioecious.
Plants large: flowers perfect or polygamous.

R. acetoella. Outer sepals without tubercle-like thickenings in fruit.
Fruiting-valves 15–20 mm. long.
Fruiting-valves 6–10 mm. long.
Outer sepals with a tubercle-like thickening in fruit.
Leaves crisped.
Leaves flat.

R. acetosella L. Dioecious, widely spreading by creeping rootstocks: stems slender, 10–30 cm. high, simple or somewhat branched: leaves 3–10 cm. long, very acid, glabrous, mostly hastate, the basal lobes entire or toothed; ocreae scarious, becoming cut into lobes: panicle narrow, the branches ascending: bracts wanting: flowers small, on short jointed pedicels, clustered: sepals remaining small, much shorter than the 3-angled akene. Introduced: a weed in lawns and pastures.

R. venosus Pursh. Stems 30–60 cm. tall, commonly woody, strongly grooved, erect or decumbent, from woody creeping rootstocks: leaves elliptic or lanceolate, entire, acute at each end, 5–12 cm. long; petioles stout, rather dense, 10–15 cm. long; valves bright red, cordate-ovicular, entire, very large, 1.5–2 cm. long, wholly without tubercles: akenes 6–8 mm. long. In sandy soil along Snake River.

R. occidentalis Wats. Stout, 1–1.5 m. tall: leaves oblong-ovate, mostly obtuse, 15–40 cm. long, entire or undulate, cordate at the base; petioles of the lower leaves long and slender, of the upper stout: panicles 30–60 cm. long, dense, usually reddish: flowers on slender pedicels 1 cm. long, valves broadly ovate-cordate, obtuse, more or less toothed, 6–10 cm. long, wholly without tubercles: akene brown, 4 mm. long. Common in swampy places.

R. crispus L. Stem stout, 1–1.5 m. high, grooved, from an elongated fusiform root: leaves oblong, obtuse, truncate or rounded at the base, 15–30 cm. long, the margin wavy and crisped: petiole short: panicle rather dense, 20–40
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cm. long, greenish: flowers on pedicels 5-10 mm. long; valves 3-4 mm. long, broadly ovate or cordate, each bearing a tubercle: akene about 2-2.5 mm. long, brown. A weed in grain fields and along roadsides.

**R. salicifolius** Weinn. Stems erect or decumbent, 40-60 cm. long, slightly grooved, often branched below: leaves oblong-lanceolate, mostly acute, entire, rounded or cuneate at the base, 8-15 cm. long; petioles rather short: panicle 10-12 cm. long, the branches short; leafy-bracted: valves triangular-ovate, slightly toothed, 3-4 mm. long, each bearing a large oblong tubercle: akene broad, 2 mm. long. Wet places, common.

94. POLYGONUM.

Annual or perennial, terrestrial or aquatic herbs, some species woody: stems erect, prostrate, climbing or floating; leaves alternate, sessile or petioled, continuous with or jointed to the cylindric funnelform or 2-lobed often lacerate or fringed ocreae: flowers small, perfect, green, white, pink or purple, variously clustered, the clusters terminal or axillary; pedicels jointed, subtended by ocreae; calyx 4-5-parted or cleft, the outer segments larger than the inner: stamens 3-9: stigmas capitate: akene lenticular or 3-angled (rarely 4-angled), invested by or exceeding the calyx.


**P. convolvulus** L. Annual: stems twining or prostrate, 5-1 m. long, glabrous or pubescent, scurfy below: leaves heart-shaped or somewhat halberd-shaped, acuminate, 2-6 cm. long, minutely scurfy beneath; petioles equaling or shorter than the blades; ocreae short: flowers in clusters or slender axillary leafy racemes: calyx 5-parted, closely investing the fruit: akene 3-angled, dull black, minutely roughened. Introduced in cultivated or waste soil.

**P. aviculare** L. Annual, glabrous: stems slender, prostrate, much branched, forming dense mats, the branches leafy to the top: leaves oblong or lanceolate, acute, 1-5 cm. long, nearly sessile; ocreae scarious, cut into lobes: flowers 1 or few in the upper axils, pink, on very short pedicels which
are included in the ocreae; akenes 3-angled, dull, minutely granular. Everywhere a weed; much relished by stock.

**P. douglasii** Greene. Annual: stems slender, 15–40 cm. tall, erect, glabrous or nearly so; branches few, erect; leaves lanceolate, acute at each end, sessile at the jointed base; ocreae cylindric, scarious, becoming cut into lobes: flowering branches slender; flowers 1–3 from the axils of the scattered bracts, soon becoming deflexed; calyx purple or whitish, with prominent green midribs: styles very short: akenes 3-angled, black, shiny. In gravelly soil, not common.

var. *latifolium* Engel. Not so tall; leaves broader and shorter; flowering branches more leafy. Gravelly soil in pine woods, Thatuna Hills.

**P. majus** Piper, n. comb. (*P. coarctatum majus* Meisn.) Annual, much branched from the base, erect or nearly so: stems wiry, terec, inconspicuously striate: leaves linear-lanceolate, 2–6 cm. long, jointed at base; ocreae scarious, about 2 cm. long, at length cut into slender lobes: spikes elongate, 5–12 cm. long: flowers remote, short-pedicelled, horizontal or spreading; bracts consisting of the scarious ocreae and short subulate blades, about as long as the buds: calyx broadly campanulate, 4–5 mm. long, white, with simple green midveins, reaching the apex of the short rounded lobes: styles separate for one-half their length: fruit reflexed; akenes black, shiny, smooth, 3-angled, acuminate, 3–3.5 mm. long. Common in stony soil. Differs from true *P. coarctatum* in the following points: flowers larger, white, not pink; scattered not congested; segments with simple midveins having at most two or three branches, not much-branched: styles split only half way, usually two-thirds or more in *P. coarctatum*: ocreae more tardily lacerate.

**P. watsoni** Small. Annual, glabrous: stems very slender, 3–10 cm. tall, with few branches: leaves linear, 1–3 cm. long; ocreae scarious, cut into lobes: spikes few, rather dense, 4–12 mm. long; bracts green, linear, acuminate, longer than the pink flowers, the margins revolute; stamens 3–5: akenes minutely striate. Basalt outcroppings, Pullman, rare.

**P. polygaloides** Meisn. Annual, glabrous: stems slender, much branched from the base, 5–20 cm. tall: leaves linear, sessile, t-nerved, 1–3 cm. long; ocreae scarious, parted into long lobes: spikes dense, numerous, terminal, 5–10 cm. long; bracts oblong, with a broad white margin, crenulate, obtuse or acuminate, exceeding the flower: stamens 8: akenes 3-angled, long, acuminate, longitudinally striate. Moist meadows, frequent.

**P. persicaria** L. Annual, erect or ascending, glabrous or puberulent: stems 15–60 cm. long: leaves lanceolate, acute or acuminate at each end, short-petioled, 5–25 cm. long, frequently with a brown-purple spot near the middle, glabrous or sparsely puberulent below and on the midrib and margins above; ocreae tubular, 1–1.5 cm. long, coarsely fringed: spikes slender, 2–4 cm. long, slender peduncled, erect: calyx pink, 5-lobed: akenes lenticular, black and shining. Sparingly introduced.

**P. lapathifolium** L. Very similar to the above: nodes more or less swollen; ocreae naked or entire: flowers white or pale rose.

var. *incanum* Koch. Leaves small, 2–4 cm. long, tomentose beneath: spikes 1–3 cm. long.

var. *incarnatum* Wats. Leaves large, 20 cm. long, glabrous: spikes somewhat nodding, slender, 5–10 cm. long.

Only the varieties occur within our limits. Banks of Snake River, infrequent.
P. bistortoides Pursh. Perennial, from a thick oblong tuber, glabrous throughout or sparsely puberulent: stem erect, simple, 30-60 cm. tall: radical leaves oblong, acute or acuminate, 5-20 cm. long, 3-5 cm. broad, on slender usually shorter petioles; cauline 3-4, sessile, the uppermost much reduced, lanceolate: spikes oblong, 3-6 cm. long, dense: calyx white, deeply 5-cleft: akenes chestnut-brown, 3-angled, smooth, shiny. Moist meadows near Moscow.

P. muehlenbergii Wats. Perennial, sparsely scabrous throughout: stems erect or decumbent, 1-2 m. long, rooting at the nodes: leaves oblong-lanceolate, acuminate, cuneate or rounded at base, 8-16 cm. long, short-petioled; ocreae cylindric, loose, entire: spikes dense, 3-7 cm. long, short-peduncled: calyx rose-red, 5-parted: akenes lenticular, black, shiny, slightly roughened. Common in wet meadows and on pond and river banks.

P. amphibium L. Very much like the above, but strictly aquatic: leaves oblong, obtuse or somewhat acute, smooth and shiny above. In ponds, near Moscow.

Family 25. Chenopodiaceae.

Annual or perennial herbs, rarely shrubs: stems angled, striate or terete: leaves alternate or sometimes opposite, simple, entire, toothed or lobed, mostly petioled, without stipules: flowers perfect, polygamous, monoecious or dioecious, small, greenish, regular or slightly irregular, commonly in panicled spikes, with or without bracts: calyx persistent, 2-5-lobed or parted, or rarely reduced to a single sepal or in some pistillate flowers wanting: petals none: stamens as many as the calyx lobes or fewer and opposite them: disk usually none: ovary mostly superior and free from the calyx, 1-celled; ovule 1: fruit a utricle: endosperm mealy, fleshy or wanting.

Endosperm little or none. 95. Salsola.
Endosperm copious.

Fruit much exserted beyond the calyx. 97. Corispermum.
Fruit enclosed by or not longer than the calyx or bractlets.
Calyx 2-5-lobed or parted: stamens 1-5. 95. Chenopodium.
Calyx of 1 sepal: stamen 1. 96. Monolepis.

95. Chenopodium.

Annual or perennial, green and glabrous, white-mealy or glandular-pubescent herbs: leaves alternate, petioled, entire, sinuate-dentate or pinnate-lobed: flowers very small, green, perfect, sessile, bractless, clustered in axillary or terminal, often panicled or compound spikes: calyx 2-5-parted or lobed: stamens 1-5: utricle embraced or enclosed by the calyx, the segments of which are herbaceous or slightly fleshy in fruit: endosperm mealy, farinaceous.

Leaves whitish, somewhat mealy. C. album.
Leaves glandular, not mealy. C. botrys.
Leaves green, neither mealy nor glandular. C. capitatum.
C. album L. Erect, stout, 5-1 m. tall, usually simple below the inflorescence, more or less white-mealy throughout; leaves rhombic-ovate, sinuate or dentate, obtuse or acute, 2-4 cm. long, greener above; petioles slender, nearly equalling the blade; uppermost leaves lanceolate and entire; panicle commonly 30 cm. long; spikes axillary or terminal, rather dense; fruiting calyx 1 mm. broad, the sepals keeled and arched over the lenticular fruit; seed black, minutely pitted. A common weed in waste or cultivated ground.

C. botrys L. Stems branched from the base, the branches erect or spreading, 30-50 cm. high, glandular-pubescent throughout; leaves oblong, 2-5 cm. long, pinnately divided into 5-6 irregular toothed lobes; petioles short, or the uppermost leaves sessile; flowers very small, in loose axillary racemes or panicles, these forming strict narrow panicles 10-30 cm. long; sepal dry, ovate, loosely enclosing the fruit. A weed in sandy soil along Snake River.

C. capitatum Aschers. Glabrous throughout; stems erect or spreading, somewhat branched, 10-80 cm. high; leaves triangular, coarsely and unevenly dentate, 2-6 cm. long, on petioles of about the same length; flower clusters globose, dense, in the axils of the reduced upper leaves; calyx fleshy in fruit and bright red, the clusters resembling strawberries; seed black, subglobose. Introduced about Pullman.

96. MONOLEPIS.

Low annual branching herbs; leaves small, narrow, alternate, entire, toothed or lobed; flowers perfect or polygamous, in small axillary clusters: calyx of one persistent herbaceous sepal; stamen 1; utricle flat; endosperm mealy.

M. chenopodioides Moq. Stems erect or decumbent at base, branched below, 10-40 cm. tall, glabrous or very sparsely mealy throughout; leaves lanceolate, attenuate at each end, acute or obtuse, commonly with a single large tooth or lobe on each side near the middle, 1-3 cm. long, the upper sessile or nearly so, the lowermost slender petioled: flowers clustered in the axils of the leaves on the elongate erect simple branches: sepal oblanceolate or spatulate, acutish. Roadsides, rare in our limits.

97. CORISPERMUM.

Annual herbs; leaves alternate, narrow, entire, 1-nerved; flowers perfect, bractless, small, green, solitary in the upper axils, forming terminal narrow leafy spikes, with the upper leaves shorter and broader than the lower: calyx of one solitary thin broad sepal, or sepals rarely 2; stamens 1-3, rarely more and one of them longer: utricle ellipsoid, mostly plano-convex; endosperm fleshy.

C. hyssopifolium L. Stems spreading, much branched, 30-60 cm. high, somewhat pubescent when young; leaves linear or linear-lanceolate, cuspidate, glabrous, 2-3 cm. long, sessile; spikes dense, 2-4 cm. long; bracts ovate-lanceolate, acuminate, scarious-margined, 5-10 mm. long; akenes broadly ovate or orbicular, short-mucronate, narrowly winged, 3 mm. long. Sandy bars of Snake River at Wawawai.
98. SALSOLA.

Annual or perennial bushy-branched herbs: leaves rigid, subulate, prickly-pointed: flowers sessile, perfect, 2-bracteolate, solitary in the axils, or sometimes several together: calyx 5-parted: stamens 5: utricle flattened, enclosed by the calyx, the segments of which are appended by a broad membranous horizontal wing in fruit: endosperm none.

S. kali var. tragus Moq. Much branched from the base, forming hemispherical plants 30-90 cm., or more in diameter: branches striate, often reddish below: leaves linear, bluish-green, sessile, tipped with a sharp point, fleshy at first but becoming dry and stiff, 1-3 cm. long: wings of the calyx persistent, membranous. This is the notorious Russian Thistle. One specimen was found within our limits in 1898.

Family 26. AMARANTACEAE.

Herbs (in ours): leaves thin, simple, mostly entire, alternate or opposite: flowers, small, green or white, perfect, monoecious, polygamous or dioecious, bracteolate, usually in terminal spikes or axillary heads: calyx herbaceous or membranous, 2-5-parted, the segments distinct or united at the base, equal, or the inner ones smaller: petals none: stamens 1-5, mostly opposite the calyx-segments, hypogynous: ovary 1-celled: ovule 1 (in ours): fruit a utricle, 1-seeded (in ours): endosperm mealy, usually copious.

99. AMARANTUS.

Annual branched erect or diffusely spreading, glabrous or pubescent herbs: leaves alternate, petioled, pinnately veined, entire, undulate or crisped: flowers small, green or purplish, mostly 3-bracteolate, in dense terminal spikes or axillary clusters: calyx of 2-5 distinct sepals: stamens 2-5: fruit an ovoid or oblong utricle, 2-3-beaked with the persistent style. Mostly pernicious weeds.

Flowers in dense terminal or axillary spikes. A. retroflexus.
Flowers in short axillary clusters. A. graecizans.
Plant erect. A. blitoides.
Plant prostrate.

A. retroflexus L. Stem stout, 5-2 m. tall, erect, pubescent, simple or branched: leaves ovate or rhombic-ovate, acute or obtuse, obscurely crenate or entire, minutely roughened, 3-10 cm. long, slender-petioled: spikes very dense, cylindric, erect, in large panicles: bracts subulate, 4-5 mm. long: sepals 5: oblong, acute, obtuse or emarginate. A weed in waste ground.

A. graecizans L. Erect, pale green, much branched, glabrous or nearly so, 15-60 cm. tall: leaves oblong or narrowly obovate, obtuse or emarginate, 2-3 cm. long, short petioled: flowers in small axillary clusters: bracts subu-
late, spiny-pointed, much exceeding the sepals: sepals 3, oblong-lanceolate, membranous. A common weed in grain fields.

A. blitoides Wats. Very similar to A. graecizans but the branches prostrate, 30-60 cm. long; bracts little longer than the 3-5 sepals. Apparently native, common.

**Family 27. Ficoideae.**

Soft herbs, often fleshy or succulent: leaves opposite or whorled; stipules scarious or wanting: flowers small, regular, perfect, solitary, cymose or glomerate: calyx 4-5-cleft or parted; petals small or wanting: stamens perigynous: ovary usually free from the calyx, 3-5-celled; ovules numerous in each cell (in ours): fruit a capsule: endosperm scanty or copious.

100. **Mollugo.**

Mostly annual, much branched herbs: leaves whorled, sometimes basal or alternate; stipules scarious, membranous, deciduous: flowers small, whitish, cymose or axillary: sepals 5, white inside, scarious-margined, persistent: petals none: stamens hypogynous, 3 and alternate with the 3 cells of the ovary or 5 and alternate with the sepals: ovary and capsule usually 3-celled.

M. verticillata L. Annual, glabrous throughout, prostrate: stem slender, 10-30 cm. long, branched: leaves spatulate or oblong-lanceolate, acute or obtuse, entire, narrowed at the sessile base, 1-2 cm. long, 3-8 in a whorl: flowers small, solitary in the axis, on pedicels as long or longer: sepals oblong, shorter than the ovoid capsules: seeds shining, brown, curved. Common on the sandy banks of Snake River.

**Family 28. Portulacaceae.**

Annual or perennial herbs, generally succulent: leaves entire, alternate or opposite: flowers regular, perfect, unsymmetrical: sepals 2: petals 4 or 5, hypogynous, early withering: stamens as many as or more numerous than the petals and adherent to their bases: ovary 1-celled: ovules few to many: endosperm mealy.

Calyx-tube adnate at least to the lower half of the ovary. 103. **Portulaca.**

Calyx free from the ovary.

Petals 5, free, equal: stamens 5: ovules about 6. 101. **Claytonia.**

Petals 5 or fewer, sometimes coherent at the base, usually somewhat unequal: stamens 3-5: ovules mostly 3. 102. **Montia.**

101. **Claytonia.**

Low and very glabrous moderately succulent perennials, from a corm or thickened rootstock: leaves opposite (rarely alternate): flowers in loose terminal or axillary racemes, lasting more than one day: sepals 2, persistent: petals 5, equal: stamens 5; ovules few, about 6.
C. lanceolata Pursh. Stems simple, 8-15 cm. tall, erect, from a globose tuber 1-4 cm. in diameter: radical leaves few or wanting, lanceolate, acute, long-petioled; cauline a single pair, sessile, lanceolate or ovate-lanceolate, acute, 2-5 cm. long; flowers 3-10 in a short raceme which scarcely exceeds the cauline leaves; pedicels slender: petals pink, oblong or ovate, emarginate, 8-10 mm. long: seeds black, shiny, 2 mm. broad. Kamiack Butte.

102. MONTIA.

Small branching glabrous succulent annual herbs, or sometimes perennial with rootstocks, never with corms: leaves opposite: flowers small axillary or racemose: sepals 2, ovate, persistent, herbaceous: petals 5, or fewer, usually somewhat unequal and sometimes more or less coherent at the base: stamens 3-5: ovules very few, mostly 3.

Cauline leaves a single pair, distinct.
Leaves broadly ovate: flowers white. M. asarifolia.
Leaves spatulate or lanceolate: flowers pink. M. arenicola.
Cauline leaves a single pair, more or less grown together.

Cauline leaves several pairs.
Cauline leaves several, alternate.

Seeds black, very shiny, 2 mm. broad. M. linearis.
Seeds black, rather dull, less than 1 mm. broad. M. dichotoma.

M. asarifolia Howell. Perennial, with short rootstocks, somewhat tufted: stems 15-30 cm. tall, bearing a single pair of leaves below the inflorescence: leaves rather fleshy, broadly ovate, somewhat cordate, obtuse, 2-3 cm. long; the cauline sessile; the radical slender-petioled: raceme peduncled, 3-12-flowered, with few or no bracts: pedicels slender: petals white,pellucid, 10-12 mm. long: capsule longer than the sepals; seeds bright, shiny, 1-1.5 mm. broad. In cold woods along streams, Cedar Mountain.

M. arenicola Heller. Annual, tufted: stems usually 15-30 cm. high, erect: radical leaves long-petioled, linear, lanceolate or spatulate; cauline pair united into an orbicular somewhat angled disk, 1-4 cm. in diameter: raceme usually loose, interrupted, somewhat one-sided: calyx 2 mm. long: petals pink or white, about twice as long: seeds shiny, usually smooth, 1 mm. broad.

var. depressa Robinson. Small and depressed, more fleshy; whole plant commonly reddish: cauline leaves sometimes nearly separate; radical leaves broadly ovate.

This species is very variable. The typical form grows in coves, the variety depressa in wheat fields and dry pine woods.

M. chamissonis Greene. Perennial, with slender elongate stolons, which finally bear tubers at the apex: flower stems mostly simple, 10-30 cm. tall: leaves 3-7 pairs, broadly spatulate, 2-4 cm. long; raceme few-flowered; pedicels slender: petals pale or white, 6-8 mm. long; stamens 5: capsule equaling the calyx; seeds kidney-shaped, minutely roughened. Moist coves, uncommon.
M. linearis Greene. Annual, branched below, 5-15 cm. tall; leaves linear, succulent, all alternate, 2-5 cm. long, scarious-margined at base; raceme 4-10-flowered, one-sided, the pedicels curving downward; sepals 4 mm. long; capsule shorter than the sepals; seeds shiny, 2 mm. broad. Frequent and abundant.

M. dichotoma Howell. Very similar to the above but smaller in every way, 2-8 cm. tall; calyx 2 mm. long; petals scarcely exceeding the calyx: seeds 1 mm. broad, dull. Common but inconspicuous.

103. PORTULACA.

Low fleshy herbs: leaves alternate or partly opposite; stipules scarious or none, or reduced to hairy tufts: flowers terminal and sessile, expanding in direct sunshine before mid-day, soon closing: sepals 2-5, coherent at the base in a tube and adnate to the ovary: stamens 7-20: ovules numerous.

P. oleracea L. Annual, prostrate, fleshy, forming mats 10-14 cm. in diameter; leaves narrowly obovate, obtuse or truncate, narrowed at base, 1-2 cm. long, glabrous; calyx-lobes ovate, keeled; petals yellow, notched at apex: stamens 7-12: capsule conical, acute, dehiscing below the middle. Common on the banks of Snake River, and also appearing at other places as a weed.

Family 29. CARYOPHYLLACEAE.

Annual or perennial herbs: stems often swollen at the nodes: leaves opposite, entire, with or without stipules: flowers regular and perfect (in ours): sepals 4-5, separate or united into a calyx-tube: petals equal in number to the sepals or none: stamens twice as many as the sepals or fewer, hypogynous or perigynous: styles 2-5; ovary 1-celled, rarely 3-5-celled; ovules several or many, attached to a central column: fruit a capsule, akene or utricle: endosperm mealy.

Sepals united.

Calyx-ribs 10 or more.

- Styles 5, alternate with the calyx-teeth.
- Styles 3, rarely 4-5; if 5 opposite the calyx-teeth.

Calyx-ribs 5.

Sepals distinct or united only at the base.

Stipules present, scarious.

- Styles and capsule-valves 5, the latter opposite the sepals.
- Styles and capsule-valves 3, rarely 5, in which case the latter are alternate with the sepals.

Stipules wanting.

- Petals entire or emarginate, rarely none.
- Petals deeply 2-cleft or parted, rarely none.

- Capsule ovoid or oblong, with as many valves as the styles.
- Capsule cylindric, dehiscient, with equal teeth twice as many as the styles.
104. AGROSTEMMA.

Annual pubescent herbs: leaves linear or linear-lanceolate, acute or acuminate, sessile, flowers solitary at the ends of long axillary peduncles, large, erect, red or white: calyx oblong, not inflated, narrowed at the throat, 5-lobed, 10-nerved: petals 5, shorter than the calyx-lobes, not appendaged: stamens 10: styles 5, alternate with the calyx-lobes: capsule 1-celled; seeds numerous, black.

_A. githago_ L. Annual or biennial, erect, branched above, 30–90 cm. tall, the whole plant more or less pubescent with somewhat appressed hairs: leaves linear, acute, 5-10 cm. long; flowers few on long peduncles: calyx-teeth unequal, 2–3 cm. long, about equaling the tube; petals ovate, dull red, minutely black-spotted. Sparingly introduced in grain fields.

105. SILENE.

Annual or perennial herbs: flowers clustered or solitary, mainly pink, red or white: calyx more or less inflated, tubular, ovoid or campanulate, 5-toothed, 10-many-nerved: petals 5, narrow, clawed, mostly crowned with a scale at the base of the blade: stamens 10: styles 3, rarely 4 or 5, if 5 opposite the calyx-teeth: ovary 1-celled or incompletely 2–4-celled; ovules many: pod dehiscent by 6 or rarely 3 apical teeth.

Annuals.

Stout, viscid, pubescent throughout. 
S. NOCTIFLORA.

Slender, glabrous or puberulent with a portion of each internode sticky. 
S. ANTIRRHINUM.

Perennials.

Stems much branched, leafy. 
S. MENZIESII.

Stems simple; upper leaves reduced. 
S. DOUGLASII.

Merely puberulent. 
S. SCouflERI.

_Stems simple; upper leaves reduced._

_Puberulent, glandular above._

_S. antirrhina_ L. Annual, glabrous or puberulent: stem slender, mostly simple, a portion of each internode sticky-viscid: leaves linear or lanceolate, acute, 2–6 cm. long, sessile: flowers in a forked compound cyme, long pedicelled: calyx 10-nerved, ovate, cylindrical in fruit, 6–10 mm. long: petals white or pinkish, notched, little exceeding the calyx. Sandy or gravelly soil along Snake River.

_S. menziesii_ Hook. Perennial, glandular-puberulent: stems weak, erect or decumbent, usually branched, 10–30 cm. high, leafy: leaves elliptic-lanceolate, acuminate or acute at each end, 2–5 cm. long: flowers small, in forked cymes: calyx obconical, 5–6 mm. long, 5-toothed, nerveless: petals white, 2-cleft, 6–8 mm. long, usually without a crown. In woods and copses, not rare.

_S. douglasii_ Hook. Perennial, tufted, minutely pubescent throughout: flowering stems erect, 30–50 cm. tall, simple: leaves linear or linear-lanceolate, acute or acuminate, 5–8 cm. long; cymes few-flowered, long peduncled: calyx oblong or obovate, somewhat inflated, pale green, the nerves inconspicuous, 10–15 mm. long, the short teeth scarious-margined: petals white or
Annual or perennial herbs: leaves ovate or ovate-lanceolate, sessile or petioled; flowers in corymb or cymes: calyx 5-toothed, ovoid, oblong or cylindric in flower: petals 5, longer or shorter than the calyx: stamens 10: styles 2; ovary 4-celled: capsule dehiscing with 4 teeth.

106. SAPONARIA.

Annual or perennial herbs: leaves ovate or ovate-lanceolate, sessile or petioled: flowers in corymb or cymses: calyx 5-toothed, ovoid, oblong or cylindric in flower: petals 5, longer or shorter than the calyx: stamens 10: styles 2; ovary 1-celled or incompletely 2-4-celled: capsule dehiscing with 4 teeth.

107. STELLARIA.

Annual tufted generally diffuse herbs: leaves flat, rarely subulate; stipules none: flowers solitary or cymose, terminal or becoming lateral: sepals 5 or 4; petals 5 or 4, rarely none, always more or less deeply bifid, often divided almost to the base, white: stamens 3-10: styles 3 or 4, rarely 5: capsules globose, ovoid or oblong, dehiscing by twice as many valves as there are styles.

Lower leaves ovate, petioled.
Stems pubescent in lines.
Stems smooth, shining.
Leaves narrow, sessile.
Seeds very rough.
Seeds smooth.

S. media L. Annual, weak and spreading: stems weak, 10-50 cm. long, glabrous except a line of hairs: lower leaves ovate, petioled, the upper narrower and sessile, all acute, 4-5 mm. long: flowers solitary in the axils or somewhat cymose, on slender pedicels: calyx glandular-pubescent, nearly as long as the capsule: petals deeply 2-parted, shorter than the sepals: stamens 5, 5 or 10. Introduced and becoming common.

S. nitens Nutt. Annual, somewhat tufted: stems erect, slender, shining, 8-15 cm. tall, branched above, pubescent only at base: lowest pair of leaves ovate, acute, petioled, 4 mm. long: the others linear-lanceolate and sessile, 5-10 mm. long: cymes loose, few-flowered, the bracts scarious; pedicels thread-like, 1-5 cm. long: sepals 3-nerved, very acute, scarious-margined, 4
mm. long; petals deeply 2-cleft, half as long as the sepals or wanting. Stony hillsides, abundant.

S. graminea L. Whole plant glabrous, shining: stems 4-angled, ascending, branched above, 35-60 cm. high: leaves sessile, lanceolate, acute, 2-3 cm. long: flowers in a loose much-forked cyme; bracts scarious, somewhat ciliate; pedicels slender, spreading or reflexed: sepals lanceolate, acute, 3-nerved, nearly equalling the capsule: petals 2-cleft, as long as the sepals: Seeds minutely roughened. Very sparingly introduced.

S. longipes Goldie. Somewhat tufted, with creeping rootstocks, smooth and shining throughout: stems 4-angled, erect, 15-40 cm. high; branched above: leaves linear-lanceolate, tapering from the base to the acute apex, prominently 1-nerved, 2-5 cm. long: flowers solitary or in very loose cymes; bracts reduced and scarious or when the flowers are few or solitary foliaceous: pedicels slender, 2-10 cm. long: petals 2-cleft, exceeding the rather obtuse sepals: capsule longer than the calyx: seeds smooth, shining. Moist places, not rare.

CERASTIUM.

Annual or perennial, generally pubescent or hirsute herbs: leaves flat, rarely subulate: stipules none: flowers in terminal bracted dichotomous cymes: sepals 5 (in ours): petals 5, retuse or bifid, very rarely subentire, white: stamens 10, sometimes fewer: styles 5, sometimes 4, or 3, opposite the sepals: capsule cylindric, 1 celled, often curved, dehiscent by 10, rarely 8, apical teeth.

Petals equalling the sepals. C. vulgatum. Petals longer than the sepals. C. arvense.

C. vulgatum L. Perennial, viscid-pubescent throughout, tufted, 10-30 cm. high: leaves oblong, obtuse, or the upper ones acutish, 1-2.5 cm. long: inflorescence loose, the pedicels longer than the calyx: sepals obtuse, 4-5 mm. long, as long as the 2-cleft petals: capsule curved, longer than the calyx. A weed in lawns and pastures; introduced.

C. arvense L. Perennial, tufted, pubescent throughout, or sometimes nearly glabrous: stems weak, erect, 15-40 cm. tall, nearly naked above: leaves linear or lanceolate, 2-3 cm. long: flowers cymose or slender, on slender pedicels: sepals oblong, acute, 5-6 mm. long: petals deeply notched, twice as long as the sepals. In low places, infrequent.

ARENARIA.

Annual or perennial mainly tufted herbs: leaves sessile, often subulate and more or less rigid; stipules none: flowers white, cymosely panicled or capitate, rarely solitary and axillary: sepals 5: petals 5, very rarely minute or wanting, entire or emarginate, white or nearly so: stamens 10, or often fewer: styles generally 3, rarely 2-5: capsule globose or oblong, dehiscent at the apex by as many or twice as many valves as there are styles.
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Perennial: seeds with a strophiole; leaves flat and green.
  Sepals oblong, shorter than the petals.  
  A. lateriflora.

Perennial: seeds without a strophiole; leaves narrow and sharp.
  A. macrophylla.

Annual: leaves very small.
  A. congesta.

A. lateriflora L. Mostly puberulent throughout: stems slender, terete, erect or decumbent, simple or few-branched, 10-30 cm. high; leaves elliptic or oblanceolate, sessile, obtuse, 1-2 cm. long; cymes few-flowered: sepals oblong or acutish, 2 mm. long, one half the length of the obovate petals. Hillsides, not rare.

A. macrophylla Hook. Minutely puberulent: stems erect or decumbent, angled, 5-10 cm. tall, mostly simple: leaves lanceolate, acute at each end, 2-5 cm. long; cymes few-flowered: sepals ovate-lanceolate, acuminate, 3 mm. long, exceeding the petals. Common in dry pine woods.

A. congesta Nutt. Usually glabrous throughout: stems tufted, erect, 15-40 cm. tall; joints prominent: leaves narrowly linear, rather rigid, sharply cuspidate, 2-5 cm. long, the cauline pairs rather distant: flowers congested into 1-3 heads: bracts scarious: sepals ovate-lanceolate, acuminate, 3-nerved, 3-4 mm. long, shorter than the petals, scarious-margined. In rock crevices, summit of Cedar Mountain.

A. pusilla Wats. Wholly glabrous: stems very slender, usually branched, 2-8 cm. high: leaves oblong or ovate, 2-3 mm. long, distant: sepals lanceolate, acuminate, 2-2.5 mm. long: petals wanting. Stony soil, common but very inconspicuous.

110. SPERGULA.

Annual branched herbs: leaves subulate, apparently whorled, with scarious stipules: flowers in a cymose panicle: sepals 5, white: stamens 10, rarely 5: ovary 1-celled: capsule-valves 5, opposite the sepals.

S. arvensis L. Minutely and sparsely glandular throughout: stems several, mostly simple below the inflorescence, 30-50 cm. long, decumbent or ascending: leaves narrowly linear, 2-3 cm. long, in whorls of 6-15: flowers in a loose cyme, the pedicels becoming deflexed: petals white, 4-5 mm. long, equalling or exceeding the sepals: capsule ovoid; seeds black, acutely margined, minutely roughened. Sparingly introduced into grain fields.

111. SPERGULARIA.

Low annual biennial or perennial herbs: leaves fleshy, linear or setaceous, with scarious stipules: flowers in terminal racemose cymes: sepals 2: petals 5, rarely fewer or none, purplish or white: stamens 2-10, commonly 10: styles 3, very rarely 5: ovary 1-celled: capsule-valves as many as the styles, when 5, alternate with the sepals.

Stipules silvery, conspicuous, lanceolate.  
S. rubra.

Stipules small, triangular.  
S. diandra.
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_S. rubra_ Presl. Annual, sometimes biennial or perennial, prostrate or decumbent: stems slender, 10-30 cm. long, smooth below, glandular above: leaves linear, cuspidate, 5-12 mm. long; stipules silvery, attenuate-lanceolate, 4-5 mm. long: flowers in a small cyme; pedicels filiform, exceeding the leaf-like bracts; petals pink, hardly longer than the sepals. Roadsides, not common.

_S. diandra_ var. _bracteata_ Robinson. Much like the preceding but more glandular: leaves, excepting the reduced upper ones, not cuspidate; stipules small, short, triangular: petals pinkish, shorter than the sepals. Banks of Snake River at Almota, rare.

**Family 30. NYMPHAEACEAE.**

Aquatic perennial herbs, with horizontal rootstocks: leaves peltate, floating, submersed or rarely immersed: flowers perfect, solitary, axillary, on long peduncles: sepals 3, 4, 6 or more: petals 5-many, often grading into the sepals or stamens: carpels 5-many, indehiscent, free or immersed in a fleshy receptacle or more or less coalescent into a fleshy fruit: endosperm present or none.

112. _NUPHAR_.

Acaulescent perennials from stout rootstocks, commonly slightly milky: leaves with united stipules which are sometimes adnate to the base of the petioles: calyx more showy than the corolla; sepals 5-12, concave, roundish, mostly yellow, and petal-like: petals 10-20, hypogynous, small and thick, the innermost or sometimes all of them stamen-like: stamens numerous, hypogynous: stigmas radiate on the summit of the 10-25-celled ovary.

_N. polysepalum_ Englem. Leaves orbicular or broadly oval, deeply cordate, 20-30 cm. long, 12-20 cm. broad; calyx subglobose, about 8 cm. broad; sepals 8-12, yellow, often red-tinged; petals 12-18, ovate-cuneate, truncate, 1-1.5 cm. long; stamens very numerous: fruit subglobose, 4-5 cm. long. Ponds near Moscow.

**Family 31. RANUNCULACEAE.**

Annual or perennial herbs or some woody plants with acrid sap: leaves alternate (opposite in _Clematis_), simple or compound; stipules none, but the base of the petioles often clasping or sheathing: flowers regular or irregular: sepals 3-15, generally soon withering, often petal-like: petals 3-15, or wanting: stamens numerous, hypogynous: carpels numerous, or rarely solitary, separate, 1-celled, 1-many-ovuled; endosperm present.
Carpels several-ovuled: fruit a follicle or berry.
Flowers regular.
   Low herbs with solitary or umbelled flowers. 113. COPTIS.
   Tall erect herbs with racemose flowers. 114. ACTAEA.
Flowers irregular.
   Posterior sepals spurred. 115. DELPHINIUM.
   Posterior sepals hooded, helmet-like. 116. ACONITUM.
Carpels 1-ovuled: fruit an akene.
Flowers subtended by involucres remote from the calyx.
Flowers not subtended by involucres.
   Leaves opposite. 117. ANEMONE.
   Leaves usually both basal and cauline: sepals sparrowless.
      Petals none.
      Leaves palmately-lobed.
      Petals present.

113. COPTIS.

Low glabrous perennials with slender rootstocks: leaves all radical, ternately divided or compound: flowers on scapes, solitary or in few-flowered umbels: sepals 5-7, petal-like: petals 5-6, small, linear, hood-shaped: stamens numerous: pistils 3-7, on slender stalks, in fruit forming a cluster of divergent follicles.

C. occidentalis T. & G. Scapes 2-3-flowered, 10-25 cm. tall: leaves trilobate, evergreen; leaflets long-petioled, suborbicular, deeply 3-lobed, the lobes obtuse, dentate, or again lobed: sepals linear, 3-nerved, white, 1 cm. long; petals 5-6 mm. long, short-clawed at the base, broadened at the nectary, attenuate beyond, obtuse; stamens about 12, shorter than the carpels: mature carpels 3.5 cm. long, the fruiting portion spreading, longer than the erect stipe. In woods, Thatuna Hills.

114. ACTAEA.

Erect perennial herbs: leaves large. 2-3-ternately compound: flowers small, white, in a terminal raceme: sepals 3-5, petal-like: petals 4-10, small, spatulate or narrow-clawed: stamens numerous: ovary 1-many-ovuled, in fruit forming a large somewhat poisonous berry.

A. spicata var. arguta Torr. Stems 30-60 cm. tall, erect: leaves trternately compound; leaflets obliquely ovate or lanceolate, acuminate, coarsely incised-serrate or lobed, puberulent when young, 3-6 cm. long; racemes densely flowered, 2-3 cm. long, becoming loose in age: berries bright red, rarely white.

115. DELPHINIUM.

Annual or perennial erect branching herbs: leaves palmately-lobed or divided: flowers showy, in a raceme or panicle: sepals 5, petal-like, the upper one prolonged into a spur: petals 4, sometimes 2; the two posterior ones spurred; the lateral, when present,
small: stamens numerous; pistils 1–5, sessile, many-ovuled, forming follicles at maturity.

Racemes many-flowered, spike-like, the pedicels very short.

Racemes few-flowered, loose, the pedicels longer.  

D. simplex Doug. Roots short, thick: stems strict, erect, puberulent, 30–80 cm. tall, usually simple, rarely with a few erect branches: leaves parted into many lobes, these linear in the upper leaves, broader in the lower ones; only the lower petioles exceeding the blades: raceme spike-like, the pedicels shorter than the pale-blue flowers: calyx pubescent outside, the short sepals exceeded by the stout spur. Very variable: our form, common in low meadows, is not typical.

D. menziesii DC. Root consisting of fasciculate tubers, which are usually short and thick: stem erect, simple or branched above, 30–70 cm. tall, glabrous or puberulent: leaves 3–7-parted, the divisions entire or deeply cleft into 2–4, usually 3, lobes, the ultimate segments linear or lanceolate; petioles mostly exceeding the blades: racemes loose, 5–25-flowered; pedicels spreading, mostly as long as or longer than the dark blue flowers: sepals pubescent on the outside, 2–2.5 cm. long: spur as long, mostly acute and slender: follicles 3, strongly diverging, pubescent or glabrous, 1.4–3 cm. long. Common on rocky hillsides.

116. ACONITUM.

Tall erect ascending or long-trailing perennial herbs: leaves palmately-lobed or divided: flowers large, showy, in terminal racemes or panicles: sepals 5, petal-like, very irregular, the upper one hooded or helmet-shaped: petals 2–5, the upper two hooded, on long claws, concealed in the helmet: stamens numerous, pistils 3–5, many-ovuled, forming follicles at maturity.

A. columbianum Nutt. Stems erect, 0.5–1 m. tall, somewhat pubescent or viscid above: leaves glabrous or the upper puberulent, palmately 5-lobed; lobes cuneate-ovate, incisely serrate or cleft; petioles mostly shorter than the blades: flowers blue, rarely white, in loose racemes or panicles: hood 2–3 cm. long, the helmet-shaped upper part higher than broad, strongly beaked: follicles oblong-linear, 1–1.5 cm. long, the slender beak usually recurved. Along the North Fork of the Palouse and in the Thatuna Hills.

117. ANEMONE.

Erect perennial herbs: leaves compound or divided, all radical, except 2 or 3 cauline which form an involucre usually remote from the flower: peduncles 1-flowered, solitary or in umbels: sepals 4–20, petal-like: petals none: stamens numerous: pistils numerous: akenes pointed or tailed, flattened not ribbed.

A. quinquefolia L. Stems erect, 1-flowered, 10–20 cm. tall, smooth or pubescent: radical leaf and the three of the involucre similar, ternate or often 5-foliolate, petiolate, the leaflets or divisions oblong-cuneate or ovate, acute or acuminate, incisely toothed or lobed, 3–5 cm. long: sepals 4–7, oval, white: akenes puberulent, the style short. Moist woods, Thatuna Hills.
118. CLEMATIS.

Perennial herbs, low and erect, or more or less woody vines, climbing by the petioles: leaves opposite: sepal 4, rarely more, petal-like: petals none or minute; stamens numerous: pistils numerous, 1-ovuled: styles feathery or naked in fruit.


Flowers white, small. C. ligusticifolia. C. verticillaris.

C. hirsutissima Pursh. Stems tufted, 30-50 cm. tall, from a tough woody caudex: leaves 3-4 pairs, twice-pinnately compound, the ultimate divisions linear or lanceolate, pubescent when young, becoming glabrous; flower solitary, at first nodding, then erect, usually long-peduncled; sepal dark-blue, thick, 3-4 cm. long, closely contiguous, pubescent outside: akenes pubescent, their long tails very plumose. Common in low places.

C. ligusticifolia Nutt. Half-woody climber, the stem 2-10 m. long: leaves pinnately compound, of 5-7 leaflets, or the lower pair ternate; leaflets ovate or lanceolate, sometimes 3-lobed, coarsely incised-dentate or subentire, 3-6 cm. long, sparsely pubescent, becoming glabrous; flowers dioecious, in large panicles, the staminate more showy: sepals white, oblong, densely hairy, 2 cm. long: akenes pubescent, the long tails plumose. Common along Snake River.

C. verticillaris var. columbiana Gray. Half woody climber, with slender stems: leaves ternate, petiolar: leaflets ovate, acuminate, sparsely pubescent, entire or nearly so; flowers solitary on naked peduncles: sepals ascending, blue, oblong-lanceolate, acute or acuminate, ciliate, 4-5 cm. long: outer stamens with the filaments more or less dilated and petal-like, the authors wanting: akenes with long plumose tails. Moist woods, Cedar Mountain, infrequent.

119. MYOSURUS.

Very small annual herbs: leaves entire, linear or at first spatulate, in a basal tuft: scapes simple, 1-flowered: sepals 5, spurred at the base: petals 5, greenish-yellow, with long nectariferous claws, or none: stamens 5-20: pistils numerous, borne on a central axis, the receptacle, which becomes greatly elongated in fruit: ovule 1.

Spike 2-6 mm. long: carpels prominently beaked. M. apetalus.

Spike 10-50 mm. long: carpels obscurely beaked. M. lepturus.

M. apetalus Gay. Scapes 3-8 cm. high: leaves linear-spatulate, half the length of the scapes: fruiting spikes 2-6 mm. long: akenes oblong, the back with a prominent keel which is prolonged into a stout beak as long as the body. Rare within our limits. The plant usually becomes reddish when mature, and often forms dense mats.

M. lepturus Howell. Taller, 10-20 cm. tall: leaves linear, one-fourth as long as the scapes: fruiting spikes slender, 1-5 cm. long: akenes scarcely keeled on the back, the beak much shorter than the body. In dried-up ponds, infrequent. Very different from the preceding, but scarcely distinguishable from M. minimus L.
120. TRAUTVETTERIA.

Tall erect perennial herbs: leaves palmately-lobed, the radical large and long-petioled; the cauline few, short-petioled or sessile; flowers white, in corymbs: sepals 3–5, broad, concave; petals none: stamens numerous: pistils numerous, 1-ovuled: akenes capitate, sharply-angled. inflated, tipped with minute styles.

T. grandis Nutt. Stems 30–50 cm. tall, glabrous or nearly so: leaves broader than long, 8–30 cm. across, 5–9-cleft, the lobes oblong or obovate, acute, incisely lobed and toothed: akenes smooth, ovate, three angled, tipped with a slender recurved beak. Infrequent along streams, Thatuna Hills.

121. RANUNCULUS.

Annual or perennial herbs: cauline leaves alternate: flowers solitary or corymbed: sepals usually 5, deciduous: petals as many or more, conspicuous or minute, with a nectariferous pit and a scale at the base of the blade: stamens numerous, occasionally few: pistils numerous, 1-ovuled: akenes capitate or spicate, generally flattened, tipped with a minute or an elongated style.

Aquatic, the immersed leaves finely divided.
Terrestrial, but often growing in wet places.
Akenes hispid: annual.
Akenes smooth: perennials.
Leaves all entire: creeping.
Leaves all entire: erect.
Radical leaves entire or 3-lobed at apex; cauline leaves 3-cleft.
Radical leaves palmately cleft or divided.
  Flowers very small.
  Flowers large.

R. aquatilis L. Stems 5–40 cm. long, slender, growing in water: immersed leaves flaccid, all finely divided into filiform segments, 8–20 mm. long; floating leaves 1–5, reniform or orbicular, 3–5-lobed or parted: petals white, yellow at base, each bearing a naked nectariferous pit: akenes thick, transversely wrinkled, the style short: receptacle hairy.

var. trichophyllus Gray. All the leaves immersed and divided into capillary segments. Common in ponds, both forms often associated; with the drying up of the ponds, a prostrate terrestrial form sometimes occurs.

R. hebecarpus Hook. & Arn. Annual; whole plant hairy: stems slender, mostly erect, 15–30 cm. tall; leaves 2–3 cm. broad, 3-parted, the lobes incisely 3-lobed; petioles of the leaves much longer than the blades: petals small, 2 mm. long, about equaling the sepals: akenes flattened, with short hooked beaks, the sides roughened and covered with hooked hairs. Moist copses, Wawawai.

R. flammula var. intermedius Hook. Stems slender, creeping, rooting at the joints, 15–30 cm. long; leaves narrowly-lanceolate, short-petioled, acute at each end, 2–5 cm. long, shorter than the internodes: flowers small, yellow, mostly solitary on the ascending tips of the stems: akenes small, smooth, short-beaked. Gravelly borders of small streams, infrequent.
R. alismaefolius Geyer. Glabrous throughout, rather stout, 40-60 cm. tall, branched above: radical leaves long-petioled, lanceolate or ovate, obtuse, usually cuneate at the base, entire or obscurely denticulate, 5-10 cm. long; cauline leaves narrower, mostly sessile; peduncles elongated; sepals small; petals yellow, cuneate-obovate, strongly-nerved, 8 mm. long; akenes turgid, smooth, short-beaked. Borders of ponds, common.

R. glaberrimus Hook. Nearly glabrous throughout, the stems erect or ascending; 5-15 cm. high; roots fascicled, elongate, fleshy; radical leaves ovate, entire or crenately 3-lobed at apex, 1-3 cm. long, on petioles as long or longer; cauline cuneate-obovate, deeply 3-lobed, usually sessile; petals 5-15, broadly obovate, 0.5-1 cm. long, bright yellow; akenes subglobose, smooth, short-beaked, aggregated in a globose head about 1 cm. in diameter. Common in moist places; blooming in earliest spring.

R. tenellus Nutt. Erect, 40-60 cm. tall, glabrous or somewhat pubescent; leaves deeply 3-5-serrate, the lower cuneate-obovate, incisely 2-5-toothed; petioles longer than the blades; flowers few in open cymes, long-peduncled; petals 5, very small, pale yellow; akenes much flattened, smooth, each with a hooked beak, aggregated in globose heads.

var. lyallii Robinson. More pubescent; akenes with a few hairs on each face. In copses and low places, infrequent. All intergradations occur between the type and the variety.

R. maximus Greene. Stout and tall, 40-80 cm. high, usually rough-pubescent with long hairs; roots fascicled, thick-fibrous; leaves pinnately 3-5-divided, the divisions stalked and again 3-5-serrate or parted; ultimate segments cuneate-ob lanceolate or obovate, incisely few-toothed; petioles of the radical leaves exceeding the blades; flowers in an open cyme, long-peduncled; sepals hairy; petals 5, bright yellow, obovate, 1.5 cm. long; akenes flattened, smooth, with stout straight beaks. Common in low meadows.

122. THALICTRUM.

Erect perennial herbs: leaves 2-3-ternately compound, radical and cauline, the latter alternate; flowers perfect, polygamous or dioecious, generally small, greenish-white, in corymbs, panicles or racemes: sepals 4 or 5, petal-like or greenish, dull-colored; petals none; stamens numerous: pistils 4-15, commonly few, 1-ovuled: akenes capitate, grooved or ribbed, or inflated.

T. occidentale Gray. Dioecious; stems .5-1 m. tall; leaves ternately decumbent; leaflets oblong, obovate or orbicular, incisely dentate at the apex, glabrous, 1-2 cm. long; panicle loose: sepals elliptic-cuneate, greenish; filaments very slender, anthers linear, slender-pointed: akenes 6-12, in loose clusters, lanceolate, long-acuminata, 3-nerved on each side, 6-8 mm. long. Moist woods and copses, not rare.

Family 32. BERBERIDACEAE.

Shrubs or herbs: leaves alternate, mostly compound or divided, with stipules or dilated bases; flowers perfect, the bracts, sepals, petals and stamens all opposite; all the parts distinct and hypogynous; sepals and petals usually in two rows of three: anthers opening by two valves or lids hinged at the top; pistil single; style
short or none: fruit a berry or pod; seeds few or several; endosperm present.

123. **BERBERIS.**

Shrubs with yellow wood: leaves alternate, simple or compound, often spiny; flowers yellow, in clustered racemes, heavy-scented: bractlets 2-6; sepals 6, petal-like; petals 6, in two rows, each with two basal glands: stamens 6, short: stigma peltate: fruit a berry.

**B. repens** Lindl. Low depressed shrub, 2-3 cm. high: leaves pinnately compound, 3-7-foliolate; leaflets evergreen, ovate, obtuse or acute, pale or glaucous, not shining, sinuately dentate, with numerous spinulose teeth, 2-5 cm. long; racemes few, terminal: berries blackish with a bloom, sour. Common in gravelly or stony ground.

**Family 33. FUMARIACEAE.**

Delicate smooth herbs with watery juice: leaves compound, usually much dissected, tender, alternate: flowers perfect, irregular, the parts hypogynous: sepals 5; petals 4; stamens 6, diadelphous: pistil 1; ovary 1-celled with 2 parietal placentae; ovules several: endosperm fleshy.

Corolla 2-spurred at the base.  
Corolla 1-spurred at the base.  

124. **DICENTRA.**  
125. **CORYDALIS.**

124. **DICENTRA.**

Erect or diffuse glabrous perennial herbs: leaves ternately compound or dissected: flowers in racemes or panicles, irregular, nodding; pedicels 2-bracted: sepals 2, scale-like: petals slightly united into a 2-spurred or swollen nectariferous often withering-persistent corolla: stamens 6, in two sets, opposite the outer petals: placentae 2; style slender: capsule oblong or linear, 2-valved.

**D. cucullaria** DC. Glabrous throughout: rootstock short, covered with grain-like tubers: leaves all basal, twice-ternately compound; ultimate divisions narrow, acute: scapes exceeding the leaves, bearing a one-sided raceme of 4-10 nodding flowers: corolla pinkish, yellow at the summit, the blunt spurs widely diverging, as long as the body of the corolla. Moist copses near Snake River and on Union Plat.

125. **CORYDALIS.**

Biennial erect pale or glaucous herbs: leaves radical and cauline, decompound: flowers in racemes: sepals 2, small: petals 4, slightly united to a 1-spurred corolla; inner petals narrow, keeled: stamens 6, in two sets opposite the outer petals: placentae 2; style entire, dilated or lobed: capsule oblong or linear, 2-valved,
Flora of the Palouse Region

C. aurea Willd. Glabrous, the branched stems decumbent, 30–50 cm. long; leaves bipinnately compound, pale and glaucous; ultimate segments cuneate-ovate, 3–5-lobed; flowers golden yellow, 2–2.5 cm. long, in short racemes; spur blunt, shorter than the body; capsule torulose, long-beaked, 2–3 cm. long; seeds black, very shiny. Near Wawawai.

Family 34. CRUCIFERAE.

Herbs, rarely somewhat woody, with watery sap: leaves alternate; stipules none; flowers perfect, regular, in bractless racemes, spikes or corymbs: sepals 4, usually oblong, often clustered: petals 4, rarely none, hypogynous, in the form of a cross, equal, generally clawed, alternate with the sepals: stamens 6, rarely fewer, hypogynous, of unequal length, the two shorter opposite the sepals, the four longer opposite the petals: pistil 1, of two united carpels: pod usually 2-celled, dehiscing by the separation of two valves from the central partition, or rarely indehiscent, either much longer than broad (a silique) or short (a silicle).

Pod indehiscent, 1-celled.
   Pod winged. 139. THYSANOCARPUS.
   Pod wingless. 136. AThYSANUS.

Pod dehiscent, 2-valved.
   Pod strongly compressed parallel to the partition.
      Pod short.
         Seeds broadly winged. 132. PLATYSPERMUM.
         Seeds wingless. 137. DRABA.
         Pod oblong or linear. 142. ALYSSUM.
      Pod elongated.
         Valves nerveless: leaves all petioled. 154. CARDAMINE.
         Valves 1-nerved: cauline leaves sessile. 140. ARABIS.
      Pod more or less compressed at right angles to the partition.
         Cells of the pod many-seeded. 135. CAPSella.
         Cells of the pod 1-seeded. 127. LEPIDUM.
         Cells of the pod 2–4-seeded. 128. THLAsPI.
      Pod terete or 4-angled, slightly or not at all compressed.
      Pod tipped with a beak. 130. BRASSICA.
      Pod tipped with a short slender style, or style none.
         Seeds flat. 131. BAREBAREA.
         Seeds globose or oblong.
            Seeds in two rows in each cell.
               Leaves not entire. 133. NASTURTIUM.
               Leaves entire. 136. CAMELINA.
            Seeds in one row in each cell.
               Stigma entire. 126. THELYPODUM.
               Stigma 2-cleft.
                  Pod flat or terete. 129. SISYMBRIUM.
                  Pod 4-angled. 141. ERYSIMUM.

126. THELYPODUM.

Stout biennial herbs, often succulent: leaves simple, entire, toothed or pinnatifid, often auricled at the base: flowers usually in
rather dense racemes: sepals oblong to linear, rather short; stigma entire; pods slender, terete or 4-angled; seeds oblong, in one row in each cell.

**T. laciniatum** Endl. Biennial, glabrous; stem stout, 5-1 m. tall, simple or somewhat branched; leaves ovate or lanceolate, irregularly pinnatifid; terminal lobe largest, coarsely dentate or entire; lateral lobes oblong or linear, entire or dentate, sometimes wanting; racemes dense, 5-40 cm. long; sepals pale or purple; petals yellowish; pod slender, spreading, 5-12 cm. long; pedicels stout, 5-8 mm. long. Crevices of basaltic cliffs along Snake River.

127. **LEPIDIUM.**

Erect or diffuse annual or biennial herbs: leaves pinnatifid, toothed or entire; flowers small, white or greenish, in racemes: pod orbicular or obovate, much flattened at right angles to the partition, 2-winged at the summit; seeds flattened, solitary in each cell.

Petals none. **L. apetalum.**
Petals present. **L. medium.**

**L. apetalum** Willd. Annual, erect, branched above, 30-90 cm. tall, minutely puberulent, at least below; lower leaves lanceolate, incisedly serrate or lobed, 3-5 cm. long and petioled; upper narrower, sometimes entire; racemes elongate, densely flowered; petals none; pod orbicular, notched, glabrous, 3 mm. long, on longer pedicels. Plentiful in sandy soil.

**L. medium** Greene. Much like the above but petals present, about as long as the sepals: leaves nearly serrate, seldom lobed; stamens usually 6, but sometimes only 2; pods glabrous or puberulent. Banks of Snake River.

128. **THLASPI.**

Glabrous annual or perennial herbs: basal leaves entire or toothed; cauline oblong, auricled and clasping; flowers white or purplish; pod more or less compressed at right angles to the partition, the valves often winged at the apex; seeds 2-4 in each cell.

**T. arvense** L. Annual, erect, glabrous, simple or branched, 15-40 cm. high; radical leaves oblanceolate, petioled; cauline oblong, obtuse, sagittate and half-clasping; petals white, spatulate, exceeding the sepals; pod orbicular, 8-12 mm. long, broadly winged, deeply notched. A bad weed, very sparingly introduced as yet.

129. **SISYMBRIUM.**

Mostly annual or biennial herbs: leaves neither clasping nor auriculate at the base, rarely entire, often finely dissected; flowers small, usually yellow or yellowish; style short or none; stigma 2-cleft; pod linear, short or long, flat or terete; seeds oblong, in one row in each cell.
Pubescence of simple hairs.
Leaves pinnatifid into rather large irregular segments.  
**S. officinale.**

Leaves pinnatifid in nearly equal linear segments.  
**S. altissimum.**

Pubescence of forked hairs.
Leaves tripinnate.  
**S. sophia.**

Leaves pinnatifid or bipinnatifid.  
**S. incisum.**

**S. officinale** Scop. Erect, sparsely hirsute, with simple hairs or glabrous, 30-90 cm. high, divergently branched above; leaves pinnatifid into 5-13 lobes, the terminal longest, all more or less dentate; upper cauline leaves sessile, the others petioled: flowers yellow, 3 mm. broad; pods tapering from the base to the apex, 1-2 cm. long, erect on short pedicels. A weed in waste ground.

**S. altissimum** L. Erect, much branched, 0.5-1.5 m. tall, glabrous or sparsely hirsute, with simple hairs: basal leaves petioled, pinnatifid, in linear or lanceolate entire or dentate lobes; upper leaves reduced, sessile: flowers yellow, 5 mm. broad; pod spreading, linear, 6-10 cm. long on short stout pedicels. Introduced along railroads: a dangerous weed.

**S. sophia** L. Erect, much branched above, 0.3-1 m. tall, canescent throughout with short stellate pubescence: leaves tripinnatifid, 5-8 cm. long, the segments linear or oblong, small: racemes elongated: pods glabrous, 1.5-2 cm. long, curved upwards, on slender shorter pedicels: seeds in one row in each cell of the pod. Sparingly introduced.

**S. incisum** var. filipes Gray. Stem slender, erect or ascending, sparingly branched, usually minutely stellate-pubescent: leaves pinnatifid or bipinnatifid; segments of the lower leaves oblong, of the upper ones narrowly linear, usually elongate and entire: racemes loose: pods 10-15 mm. long, acute, usually curved, ascending, on slender longer pedicels. Very common on open hillsides: variable.

130. **BRASSICA.**

Erect annual or biennial herbs: lower leaves mostly pinnate or lyrate, with a large terminal lobe: flowers yellow: pod terete or nearly so, tipped with a slender conical or somewhat flattened beak; seeds globose, in one row or rarely in two rows in each cell.

Upper leaves clasping the stem: smooth.  
**B. campestris.**

None of the leaves clasping the stem: hispid.  
**B. sinapis.**

**B. campestris** L. Smooth or nearly so, often glaucescent, 30-90 cm. high: lower leaves petioled, somewhat lobed or toothed; upper entire or nearly so, sessile and clasping by auricled bases: flowers yellow; pedicels spreading: petals 6-10 mm. long: pods terete, 3-5 cm. long, narrowed into a beak about 1 cm. long. Grain fields and waste places: sometimes a troublesome weed.

**B. sinapis** Boiss. Stout, annual, 30-90 cm. high, hispid with scattered hairs: lower leaves pinnately parted, consisting of a large ovate-oblong terminal segment and 1 or 2 pairs of much smaller ones, all dentate; uppermost leaves sessile, none clasping: pods 2-4 cm. long, erect or ascending, the fertile portion torulose, the beak flat and stout. A weed in waste ground.
131. **BARBAREA.**

Chiefly biennials, somewhat succulent: stems angled: leaves entire or pinnatifid: flowers yellow, in racemes: pod linear, terete, or somewhat 4-angled, tipped with the short slender style; seeds flat, in one row.

*B. vulgaris* R. Br. Perennial, glabrous; stems simple or branched above, 30-90 cm. high: lower leaves pinnately cleft or parted, large, orbicular or ovate, entire or nearly so; lateral segments 1-5 pairs, smaller, oblong, entire or toothed; petioles short, auricled at base; upper cauline leaves obovate, clasping, the lower part pinnately-cleft; raceme dense: petals yellow, 4 mm. long, twice as long as the sepals; pods erect or ascending, 2-3 cm. long, beaked with the slender style; petals short and stout. Wet places, not common.

132. **PLATYSPERMUM.**

Low annual herb: leaves lyrate, few-lobed or subentire: flowers minute, solitary, on naked scapes: pods compressed parallel to the partition, short, suborbicular; seeds broadly winged, in two rows.

*P. scapigerum* Hook. Glabrous: scapes 5-15 cm. tall, erect or ascending: leaves spatulate-oblong, nearly entire, mostly coarsely 3-7-lobed, all petioled: pod orbicular-ovate, 5-10 mm. long, beaked with the short style. In moist gravelly places in early spring.

133. **NASTURTIUM.**

Aquatic or marsh herbs: leaves usually lyrate or pinnately parted or toothed, auricled at base: flowers small, yellow or white: style short or slender: pods terete or nearly so; seeds turgid, minute, in two rows in each cell.

Flowers yellow.

Perennial by creeping rootstocks.  
Annual.  
Flowers white.

*N. sinuatum* Nutt. Stems prostrate or decumbent, branched, glabrous or slightly scurfy-pubescent, from perennial creeping rootstocks: leaves lanceolate or oblong, 2-3 cm. long, pinnatifid into numerous equal linear or oblong lobes, these entire or nearly so: flowers 3-4 mm. long: pods oblong, 6-8 mm. long, acute at each end, tipped with the long style: pedicels spreading, 5-8 mm. long. Sandy banks of Snake River at Almota.

*N. curvisilicu* N. Nutt. Annual or biennial, glabrous or slightly pubescent, erect or decumbent, 15-40 cm. high: leaves oblanceolate, sinuate-dentate or pinnately cleft into oblong dentate lobes: flowers small, pale yellow: petals 2 mm. long, exceeding the sepals: pods linear-oblong, 4-16 mm. long; styles stout or none. Wet places, common.

*N. officinale* R. Br. Perennial, aquatic, smooth: stems procumbent, rooting at the lower joints, 13-30 cm. high: leaves pinnate; leaflets 3-11, orbicu-
lar or oblong, sinuate, or the lower ones sometimes reduced to the terminal leaflet: petals white, 3-4 mm. long: pods linear, 12-20 mm. long, acute at each end, a little longer that the spreading pedicels. Introduced.

134. **CARDAMINE**.

Mostly glabrous leafy-stemmed perennial herbs, growing in moist places: leaves entire, lobed or divided, all petiolate: flowers white or purple: pod elongated, compressed parallel to the partition; valves nerveless; seeds in one row, wingless.

**C. oligosperma** Nutt. Annual, erect, usually simple-stemmed, 15-30 cm. high, sparsely hirsute throughout or nearly glabrous; leaflets small, orbicular, petiolulate, 3-5-lobed or toothed: raceme few-flowered: flowers 2 mm. long; pods erect, 8-20-seeded, 12-20 mm. long. Wet places, infrequent.

135. **CAPSELLA**.

Slender and mostly smooth annual herbs: radical leaves tufted: flowers small, white, in racemes: pod compressed at right angles to the partition, many-seeded.

Pods notched at apex. **C. BURSA-PASTORIS.**

Pods entire. **C. ELLIPTICA.**

**C. bursa-pastoris** Medicus. Stellate-pubescent below, glabrous above, 30-60 cm. tall, sparingly branched: basal leaves in a rosette, lanceolate or oblanceolate, pinnately-lobed, 2-8 cm. long, petiolate; cauline sagittate and half-clasping at base, 2-4 cm. long, dentate or entire: flowers white, about 2 mm. long: pods triangular, with a broad shallow notch at the apex. A common weed.

**C. elliptica** C. A. Meyer. Branched from the base, glabrous or sparsely-pubescent, 5-15 cm. high: stems decumbent or ascending: basal leaves pinnately lobed or entire: petioles 1-2 cm. long; cauline spatulate or obtanceolate, sessile, entire or with a few lobes: petals white, about as long as the sepals, 1 mm. long: pods smooth, elliptic, 3-4 mm. long, on slender pedicels. Along Snake River, rare.

136. **CAMELINA**.

Erect annual herbs: leaves entire, toothed or pinnatifid: flowers small, yellowish: style slender: pod obovoid or pear-shaped, slightly flattened parallel to the partition, many-seeded.

**C. sativa** Crantz. Stems erect, mostly simple, 30-90 cm. tall, hirsute below, glabrous above: leaves lanceolate, acute, sagittate at base, half-clasping, erect, entire or nearly so, stellate-pubescent: flowers pale yellow: pods obovate, 6-8 mm. long, beaked by the persistent style, glabrous, on slender pedicels. In fields at Wawawai.

137. **DRABA**.

Low annual or perennial herbs: leaves entire or toothed: flowers white or yellow, mainly in racemes: pod oval to oblong or linear,
compressed parallel to the partition; valves nearly flat, nerveless or faintly nerved; seeds few to many, in two rows in the cell, wingless.


D. verna L. Annual: stems several, leafless, 5-10 cm. high, simple, nearly glabrous: leaves in a rosette, oblong or oval, toothed or entire, obtuse, 4-8 mm. long, pubescent with branched hairs: flowers white, in a loose raceme: petals deeply 2-cleft: pods oblong, glabrous, 4-8 mm. long, shorter than the spreading pedicels. Bluffs of Snake River, not common.

D. nemorosa L. Annual, the simple stems 5-40 cm. high, leafy and pubescent below: leaves sessile, oblong or ovate, usually dentate, acutish, 1-2 cm. long, stellate-pubescent: racemes loose, 3-many-flowered: flowers small, 4 mm. broad: petals yellow, notched, a little longer than the villous sepals: pod oblong, acute, appressed-pubescent or glabrous, about 1 cm. long, much shorter than the spreading pedicels. Stony soil, infrequent.

138. ATHYSANUS.

Annual herbs: flowers minute: ovules 3-4, only one maturing: pod orbicular, indehiscent, 1-celled, 1-seeded.

A. pusillus Greene. Stems slender, branched from the base, 10-20 cm. tall, hirsute-pubescent throughout: leaves oblong-lanceolate, acute, usually coarsely dentate, rough-pubescent, 5-30 mm. long: racemes loose, elongate: flowers very small, on curved pedicels: petals linear, minute or wanting: pod orbicular, about 2 mm. in diameter, hirsute, on recurved longer pedicels. Stony soil, rather common.

139. THYSANOCARPUS.

Erect and slender sparingly branched annual herbs: flowers minute, white or rose-colored, in elongated racemes: pod mostly pendulous, on a slender pedicel, 1-celled, indehiscent, disk-shaped or concave, orbicular, winged, 1-seeded: seed flattened but not winged.

T. curvipes Hook. More or less hirsute below, glabrous above: stem erect, usually branched above, 30-50 cm. tall: radical leaves oblong, obtuse, dentate, 3-4 cm. long, narrowed at base, with a petiole: cauline sagittate and clasping at base, acute, usually entire, commonly smaller: racemes elongated, loose: pedicels slender, recurved: pods orbicular, ovate or obovate, notched, apiculate by the persisting style, puberulent, 4-6 mm. long, the entire or crenulate wings as broad as the body. Gravelly soils, not rare.

140. ARABIS.

Erect annual or perennial herbs: leaves seldom divided, the cauline sessile and usually clasping and auricled at the base: flowers white or purple: pod long-linear, compressed parallel to the
partition; valves more or less 1-nerved; seeds flattened, usually winged, in one or two rows.

Flowers whitish: upper leaves glabrous and glaucous.  
A. *perfoliata*.
Flowers red: pubescent throughout.
Pubescence coarse: pods recurved-spreading.  
A. *arcuata*.
Pubescence fine: pods abruptly reflexed.  
A. *holboellii*.

A. *perfoliata* Lam.  Biennial, pubescent near the base, glabrous and glaucous above: stems usually simple, 60-90 cm. high; basal leaves oblanceolate, dentate or pinnatifid, pubescent, 5-8 cm. long; cauline oblong-lanceolate, sessile, sagittate and auricled at base, all but the lower glabrous; flowers whitish about 5 mm. long; pods erect or ascending, linear, 4-10 cm. long, tipped with the large 2-lobed sessile stigma; pedicels 4-10 mm. long. Low ground, not common.

A. *arcuata* var. *subvillosa* Wats.  Perennial, roughly stellate-pubescent below, glabrous above; stems mostly simple, erect, 30-60 cm. high: radical leaves linear, oblanceolate, dentate, petioloed; cauline lanceolate, subentire, sessile, with a sagittate base: flowers rose-colored; pods recurved, 5-8 cm. long, linear, acute; pedicels pubescent, 6-12 mm. long. Basalt ledges, common.

A. *holboellii* Hornem. Much like the preceding, but the pubescence much finer: pods sharply reflexed: flowers purple or nearly white. Basalt ledges, not rare.

141.  

**ERYSIMUM.**

Biennial or perennial herbs: leaves narrow, entire or toothed, not clasping; flowers often large, usually yellow: pod linear, 4-angled, not stipitate; valves keeled, with a prominent midrib; seeds oblong, marginless, in one row in each cell.

Flowers small: petals 4-5 mm. long.  
E. *cheiranthoides*.
Flowers large: petals 15-25 mm. long.  
E. *asperum*.

E. *cheiranthoides* L.  Erect, branched above, minutely rough-pubescent throughout: leaves lanceolate, acute at each end, entire or minutely dentate, sessile or nearly so; racemes elongate: petals 4-5 mm. long, yellow: pod linear, 4-angled, puberulent, very short-beaked, about 2 cm. long, erect, on spreading pedicels about 1 cm. long. Very sparingly introduced.

E. *asperum* DC.  Whitish throughout with appressed pubescence: stems simple, stout, 20-40 cm. tall, erect: leaves lanceolate or oblanceolate, entire or somewhat dentate, rarely lobed, mostly petioloed, 6-10 cm. long; flowers bright yellow: petals 1.5-2.5 cm. long; pods stout, somewhat 4-angled, about 8 cm. long, tipped with a short stout beak and a large 2-lobed stigma; pedicels stout, 1 cm. long. Bluffs of Snake River.

142.  

**ALYSSUM.**

Low branching annual herbs: leaves mostly simple: flowers yellow: style slender: pod ovoid or orbicular, compressed: valves convex, nerveless; seeds one or two in each cell.
**A. calycinum** L. Annual, 10-30 cm. high, stellate-pubescent throughout, usually branched from the base: leaves entire, spatulate, 1-2 cm. long: flowers in racemes, 5-15 cm. long: petals pale yellow, cuneate, scarcely exceeding the sepals: pods orbicular, margined, notched at apex, minutely pubescent, 3 mm. broad, on spreading pedicels. Introduced and becoming common.

**Family 34. CRASSULACEAE.**

Succulent or fleshy plants, mostly herbs: stipules none: flowers regular and symmetrical, in cymes or rarely solitary: calyx hypogynous, 2-12-parted: petals of the same number as the calyx-lobes, distinct or slightly united at the base, rarely wanting: stamens of the same number as the petals: pistils of the same number as the sepals, distinct or united below; ovules numerous: follicles membranous or coriaceous, 1-celled; seeds minute; endosperm fleshy.

143. **SEDUM.**

Fleshy mostly glabrous herbs, erect or decumbent: leaves alternate, entire or dentate, fleshy: flowers perfect or dioecious, in terminal often one-sided cymes: calyx 4-5-lobed: petals 4-5, distinct: stamens 8-10, perigynous, the alternate ones usually attached to the petals: pistils 4-5, distinct or united at the base; ovules numerous: follicles few-many-seeded.

Leaves becoming scarious.  
Leaves green, not becoming scarious.

S. douglasii Hook. Stems erect, branched at base, from a stout rootstock, 15-20 cm. high: leaves lanceolate, attenuate to the apex, 6-12 mm. long, becoming white-scarios when old: flowers yellow, sessile, in an open cyme: petals lanceolate, acuminate, 5-6 mm. long, twice as long as the stamens: follicles diverging from their united bases: axils of the cauline leaves commonly bearing short deciduous leafy branches by which the plant is propagated. Basalt rocks, common.

S. divaricatum Wats. Annual: stems mostly single, stout, erect: radical leaves spatulate; cauline green, lanceolate, acute, 5-10 mm. long: flowers as in the preceding, the cymes larger: no propagating branches in the cauline leaf axils. Bluffs of Snake River.

**Family 36. SAXIFRAGACEAE.**

Herbs or shrubs: leaves alternate or opposite; stipules usually none: flowers perfect or polygamo-dioecious: calyx usually 5-lobed, free or adherent to the ovary: petals usually 4 or 5, perigynous, rarely none: stamens usually definite in number and not more than twice the number of the calyx-lobes: pistil formed by the partial or complete union of 2-5 carpels; placentae axile or parietal: seeds usually numerous; endosperm present; embryo small.
Shrubs.
Leaves alternate.
Leaves opposite.

Herbs.
Ovary 2-celled; placentae axile.
Ovary 1-celled; placentae parietal.
Petals small and entire or none.
Stamens 10.
Stamens 5.
Petals pinnatifid or 3-cleft into thread-like divisions.
Petals cleft or lobed.

144. SAXIFRAGA.

Chiefly perennial herbs: stem short or none; radical leaves tufted; cauline mostly alternate; flowers perfect, solitary or in cymes or cymose panicles: calyx 5-lobed, free or adhering to the base of the ovary: petals 5, entire, perigonous; stamens 10, perigonous; carpels 2, nearly distinct or uniting into a 2-celled ovary; placentae axile; styles distinct: capsules 2-beaked, 2-celled, sometimes two almost separate follicles.

Petals narrowly obovate, shorter than the calyx-lobes.  
Petals obovate, twice as long as the calyx-lobes.

S. columbiana Piper. Erect, somewhat viscid-pubescent throughout, 30-40 cm. high; leaves all radical, ovate or lanceolate, obtuse, petioled, entire or nearly so, the blades 2-4 cm. long; inflorescence a narrow pyramidal branched cyme; flowers greenish, 5-6 mm. in diameter: calyx-lobes triangular-ovate, obtuse, longer than the short tube, becoming reflexed; petals narrowly obovate, shorter than the calyx-lobes: stamens very short: ovary disk-like, crenate on the edges, half-inferior. Springy places.

S. fragosa Suksdorf. (S. claytoniaefolia Canby.) Very similar to the above, the leaves usually broader and larger: flowers white, larger; cyme usually looser: calyx-lobes longer than the tube, erect: petals obovate, obtuse, twice as long as the calyx-lobes. Mossy bluffs near Almota.

145. TELLIMA.

Perennial herbs: stem simple: leaves few, round-cordate, toothed or palmately-divided, chiefly alternate; petioles with stipule-like dilations at the base: flowers in a single terminal raceme: calyx 5-lobed, campanulate or turbinate, the base adhering to the base or lower half of the ovary: petals 5, white, whitish or pink, on the throat or in the sinuses of the calyx, cleft or lobed: stamens 10, short, included: ovary short, 1-celled, with 2 or 3 parietal placentae; styles 2 or 3. very short: capsule conical, slightly 2-3-beaked; seeds very numerous. Our species bear propagating bulblets at the base and frequently in the axils of the upper leaves.

Calyx obconic: petals 3-parted.
Calyx bell-shaped: petals 3-7-parted.
T. parviflora Hook. Rough-pubescent, 15-30 cm. high; leaves palmately 3-5-parted; segments cuneate, 3-cleft, the lobes sometimes again cleft; pedicels erect, mostly as long as or longer than the calyx; calyx 4-6 mm. long, obconic or club-shaped; petals pink, deeply 3-cleft; ovary half-inferior. Stony soil, common.

T. tenella Steudel. Much like the preceding, smaller and more slender, pubescent, minutely glandular; pedicels spreading; calyx bell-shaped, 3 mm. long; petals 3-7-cleft into linear lobes; ovary free except at base. With the preceding, blooming about two weeks earlier.

146. TIARELLA.

Slender perennial herbs: leaves palmately lobed, sometimes with small stipules: flowers small, white, in a terminal raceme or panicle: calyx-tube campanulate, 5-parted, nearly free from the ovary: petals 5, entire, small, with short claws: stamens 10; filaments long and slender: styles 2; ovary 1-celled, 2-horned; placentae parietal, becoming almost basal in fruit; ovules numerous: capsule 1-celled, 2-valved, the valves usually unequal; seeds usually few.

T. unifoliata Hook. Pubescent throughout or nearly glabrous: stems simple, 15-40 cm. high, erect or ascending: radical leaves ovate or orbicular, cordate, long-petioled, 3-7-lobed, the lobes crenate-dentate; cauline 1-3, similar but smaller, short-petioled: panicle narrow, loose, 5-15 cm. long: flowers white: petals small, thread-like. Thatuna Hills, in moist woods.

147. HEUCHERA.

Perennial herbs: leaves mostly basal, long-petioled, rounded, mostly cordate; cauline, if any, alternate; petioles with dilated margins or adherent stipules: flowers greenish or purple, in clusters which form a long narrow panicle: calyx-tube campanulate, 5-lobed, coherent with the lower half of the ovary; lobes sometimes unequal; petals 5, small, entire, sometimes minute or wanting, or early deciduous: stamens 5: styles 2, slender; ovary 1-celled, with 2 parietal placentae: capsule 1-celled, more or less 2-beaked; seeds numerous.

H. glabella Nutt. Tufted, glabrous or nearly so below the inflorescence: leaves all radical, cordate-orbicular, 5-9-lobed, obscurely crenate, the teeth bristle-tipped, 2-5 cm. broad; petioles slender, mostly 2-4 times as long as the blades: scapes stout, 30-60 cm. high: inflorescence a spike-like panicle, glandular-puberulent: calyx yellowish, campanulate, 6-7 mm. long. Grassy hillsides, common.

148. MITELLA.

Low slender perennial herbs: leaves simple, mostly radical, long-petioled, ovate or orbicular; cauline, if any, few and opposite: flowers small, white or greenish, in a simple raceme: calyx short, the broad tube 5-lobed, adherent to the base of the ovary and dilated beyond it: petals 5, slender, pinnatifid or 3-cleft into thread-like lobes: stamens 10 or 5, very short: styles 2, short; ovary
Stems more and at calyx-lobes ovate, globose, 1-celled, with 2 parietal almost basal placentae, partly superior: capsule globular or depressed, hardly at all lobed; seeds several to each placenta.

**M. stauropetaloides** *Piper.* Scapes naked, 30–50 cm. high, sparsely pubescent below, minutely glandular above: leaves orbicular, indistinctly 5-lobed, faintly crenate, reniform, with a narrow sinus, sparsely pilose and ciliate: raceme one-sided, 6–12 cm. long, 10–25-flowered: flowers white, nearly sessile: calyx-lobes oblong-ovate, crenulate, 3-nerved: petals twice as long as the sepals, 3-parted for half their length into filiform lobes, the lateral lobes divericate. Thatuna Hills, in coniferous woods.

**PHILADELPHUS.**

Shrubs: leaves opposite, petioled, entire or toothed, ovate or oblong, without stipules: flowers large, showy, white, solitary or cymose-clustered: calyx-tube top-shaped, 4–5-lobed, adherent to the ovary nearly or quite to its summit: petals 4–5, large, obovate or roundish: stamens 20–40, on the disk: styles 3–5, more or less united; ovary 3–5-celled, inferior: ovules numerous: capsule 3–5-valved; seeds very numerous.

**P. lewisii** Pursh. Shrubs 1–3 m. high, much branched above: leaves ovate, acute or acuminate, entire or sparingly dentate, glabrous or nearly so, 2–4 cm. long; petioles short: panicles narrow, few-flowered, 5–10 cm. long: calyx-lobes acute or acuminate, twice as long as the tube, densely pubescent at the tips within: petals oblong, 1.5–2 cm. long: styles united for half their length: stigmas narrow. A handsome shrub, rather rare except in Snake River canyon. Flowers odorous.

**RIBES.**

Low sometimes prickly shrubs: leaves alternate, often fascicled, palmately-veined and lobed; stipules adherent to the petiole or none: flowers small, solitary or racemose, mostly terminating short and 1–2-leaved axillary shoots: calyx-tube adherent to the globose ovary and more or less extended beyond it, 5, rarely 4-cleft, commonly colored or petal-like: petals 4–5, small, perigynous: stamens as many as the petals and alternate with them: styles 2, more or less united; ovary 1-celled; ovules few or numerous: berry globose, fleshy, usually many-seeded.

Stems armed with spines and prickles.

R. *lacustre.*

Calyx-tube saucer-shaped: berries bristly.

Calyx-tube campanulate or cylindric: berries smooth.

Calyx-lobes narrow, longer than the narrow tube.

Calyx-lobes shorter than the cylindrical tube.

Calyx-lobes as long as the short broad tube.

Stems unarmed.

R. *niveum.*

R. *cognatum.*

R. *saxosum.*

Flowers yellow.

R. *auratum.*

Flowers whitish: leaves gummy.

R. *ceratum.*

Flowers whitish: leaves pubescent.

R. *viscosissimum.*
R. lacustre Poir. Stout, 1-2 m. high, armed with short 3-5-lobed spines and very numerous bristly prickles: leaves orbicular, cordate, deeply 5-lobed, incisely dentate, minutely glandular, 2-4 cm. long; racemes loose, drooping; flowers greenish or purplish, slender-petioled; calyx short, saucer-shaped, the obtuse lobes spreading; stamens very short; berries nearly black, bristly-glandular. Moist woods, Thatuna Hills.

R. niveum Lindl. Erect shrubs, 1-3 m. high, armed with stout solitary or triple dark spines but not prickly: leaves orbicular, truncate or cuneate at base, the lobes bluntly 3-5-toothed, minutely ciliate, otherwise glabrous, 1-2 cm. long; petioles slender, longer than the leaves: racemes spreading, as long as or longer than the leaves, the 3-5 flowers mostly nodding; calyx-tube narrow, shorter than the linear white lobes: stamens much exerted; filaments hairy: berries smooth, black, as large as a pea. Along Snake River.

R. cognatum Greene. Erect shrubs, 1-2 m. high, armed with pale triple spines, sometimes very prickly as well: leaves and young shoots densely puberulent, sometimes glandular: leaves orbicular, truncate or cordate at base, 3-5-lobed, incisely dentate, 2-3 cm. broad; petals hairy, as long as or shorter than the blades: racemes 2-3-flowered, drooping; bracts glandular; pedicels very short: calyx-tube cylindrical, whitish, pubescent, 5-6 mm. long, larger than the oblong spreading lobes. Along Snake River and and Union Flat Creek.

R. saxosum Hook. Low spreading shrubs, about 1 m. high, unarmed or with feeble simple spines and a few prickles: young shoots glabrous, the leaves somewhat puberulent or glabrous: leaves orbicular, cordate, 5-lobed: coarsely-toothed, 1-3 cm. long and broad: racemes drooping, 2-3-flowered, calyx-tube bell-shaped, green, about 3 mm. long, as long as the obtuse greenish or purplish reflexed lobes: stamens exerted, as long as the lobes; filaments nearly glabrous: berries small, black. Pullman, along streams. Our form is not typical.

R. aureum Lindl. Unarmed, 1-2 m. high, usually glabrous throughout: leaves thick, somewhat orbicular, cuneate or rounded or truncate at base, deeply 3-lobed, the lobes coarsely 3-5-toothed or entire, 2-3 cm. broad; petioles slender, about as long as the blades: flowers bright yellow, in dense ascending or spreading racemes: calyx-tube slender, cylindrical, about 10 mm. long, the obtuse lobes spreading: petals short, oblong, frequently dark-red: stamens short: berries black, red or golden. Snake River canyon; also on Union Flat.

R. cereum Doug. About 1 m. high, with numerous short branches, the young commonly resinous-dotted and glutinous: shoots and under sides of the leaves puberulent: leaves orbicular, somewhat 3-5-lobed, crenate-dentate, rounded or subcordate at base, about 1 cm. long; petioles mostly shorter than the leaves; pedicels very short; racemes short, dense, 3-5-flowered, drooping: calyx white, cylindrical, 6-8 mm. long, glandular, the short lobes obtuse: petals orbicular: berry orange-red, insipid. Common on the bluffs of Snake River, otherwise rare.

R. viscosissimum Pursh. Unarmed, about 1 m. high, pubescent throughout and somewhat glandular: leaves cordate-orbicular, obtusely 5-lobed, somewhat doubly dentate, soft-pubescent, especially beneath, 2-5 cm. broad; petioles about as long as the blades; hirsute-glandular: raceme ascending,
shorter than the leaves; bracts oblong or obovate, obtuse, conspicuous: flowers whitish or purplish, about 10 mm. long, on short pedicels which become slender and elongate in fruit: calyx-tube campanulate, becoming cylindric, the erect lobes acute, shorter: petals small, white: berry black, rather dry. In woods, Thatuna Hills.

FAMILY 37. ROSACEAE.

Herbs, shrubs or trees: leaves alternate, simple or compound, usually with evident stipules often quickly deciduous: flowers regular, mostly perfect, rarely polygamo-dioecious: calyx of 5, rarely 3–8, sepals, united at the base, often surrounded by a row of bractlets; calyx-tube lined by the disk: petals as many as the sepals, rarely wanting, on the edge of the calyx-tube: stamens usually numerous, distinct and free, or few and coherent with the calyx-tube: carpels 1–many, distinct and free, or few and coherent with the calyx-tube into a 2–several-celled inferior ovary: seeds few or solitary; endosperm none, scanty or rarely copious.

Pistil 1; style terminal: fruit a drupe.

Pistils 2–5, united with each other and with the lower part of the receptacle and calyx-tube, with which in fruit they form a pome.

Locules of mature pome, by false partitions, 10: shrub or tree, not thorny: flowers in racemes.

Locules of mature pome 1–5.

Pome drupe-like, with bony kernels: thorny. 164. CRATAEGUS.

Pome with papery or cartilaginous carpels; not thorny: flowers in corymbs.

162. PIRUS.

Pistils few, free, in fruit becoming dehiscent several-seeded follicles.

Leaves palmate: pods 2-valved.

Leaves simple or pinnate: pods 1-valved.

Ovules 5–11: disk free at the edge, not entire. 152. SPIRAEA.

Ovules 2: disk wholly adherent, entire. 153. HOLODISCUS.

Pistils many or few, rarely 1, free, 1–2-ovuled, in fruit becoming akenes.

Receptacle urn-shaped or spherical, fleshy: akenes numerous, enclosed in the receptacle and calyx-tube. 161. ROSA.

Receptacle more or less urn-shaped, dry: akenes few, 1–4, enclosed in the receptacle and calyx-tube: petals none.

Leaves palmately lobed.

Leaves pinnately lobed. 156. POTERIUM.

Receptacle shield-shaped or slightly campanulate, the center convex, bearing many akenes.

Calyx with 5 bractlets: akenes dry.

Styles plumose or jointed, elongating in fruit.

157. GEUM.

Styles neither jointed nor plumose, not elongating in fruit.

Receptacle dry: style terminal or lateral.

Style terminal or nearly so: ovules pendulous.

158. POTENTILLA.

Style nearly basal: ovules ascending.

159. DRYMOCALLIS.

Receptacle fleshy: style lateral.

160. FRAGARIA.

Calyx without bractlets: carpels becoming drupelets in fruit.

154. RUBUS.
151. PHYSOCARPUS.

Branching shrubs: leaves petioled, simple, palmately-lobed; flowers in umbel-like corymb: calyx 5-lobed; petals 5, round, on the calyx-tube: stamens many, distinct, on the calyx-tube: pistils 1-5, more or less united: follicles 1-5, 2-valved; seeds 2-4; endosperm copious.

P. pauciflorus Piper, n. comb. (Spiraea pauciflora Nutt.) Erect shrubs, about 1 m. high, the branches spreading or recurved, the bark shaggy: leaves broadly ovate or orbicular, bluntly 3-5-lobed, somewhat doubly dentate, nearly glabrous above, pubescent beneath with stellate hairs, 2-8 cm. long; petioles 1-2 cm. long; inflorescence a corymbose 3-5 cm. broad, woolly-pubescent throughout; pedicels slender: calyx broadly campanulate, the blunt lobes as long as the tube: petals white, obovate, longer than the calyx-lobes: carpels 2-3, pubescent, flattened, somewhat united at the base, as long as the calyx, tardily dehiscent. Mostly in pine woods, common.

152. SPIRAEA.

Shrubs or perennials herbs: leaves alternate, simple or pinnate, with or without stipules: flowers white or pink, perfect, in racemes, cymes, corymb or panicles: calyx 4-5-lobed: petals 4-5, exceeding the calyx and inserted on the calyx-tube: stamens numerous, distinct, on the calyx-tube; filaments much exserted: pistils commonly 5, rarely 1-8, superior, alternate with the calyx-lobes: ovules 5-11: disk free at the edge, crenate or glandular-toothed: follicles usually 5, not inflated, 1-valved; seeds few—several.

Flowers panicked, red. S. menziesii Flora of the Palouse Region
Flowers corymbose. S. corymbosa.

S. menziesii Hook. Erect shrub, 1-1.5 m. high, not much branched, minutely pubescent on the young twigs and under side of the leaves: leaves oblong, acute or obtuse, rounded or cuneate at base, green on both sides, coarsely serrate above the middle, rarely entire, 3-6 cm. long; petioles short: panicles dense, pyramidal or oblong, 5-20 cm. long; flowers rose-colored: calyx-lobes becoming reflexed: carpels 5, glabrous. Near Palouse City.

S. corymbosa Raf. (S. lucida Greene.) Low shrub, 30-60 cm. high, branched below: leaves elliptic or ovate, rounded at base, 2-6 cm. long, coarsely and unevenly serrate or incised above the middle, green and glabrous on both sides; petioles short: inflorescence a flat-topped dense corymb, 5-12 cm. across: flowers small, white: carpels 5, glabrous. Common in open woods or copses.

153. HOLODISCUS.

Much like the preceding genus, but petals as long as the calyx: filaments scarcely exserted: ovules 2: disk wholly adherent, entire.

H. discolor Maxim. Large shrub, 2-5 m. high: young twigs pubescent: leaves triangular-ovate, mostly obtuse, truncate or cuneate at base, woolly-pubescent beneath, glabrous above, 2-5 cm. long: panicle broadly pyramidal,
much branched, 10–20 cm. long; flowers small, white, becoming yellowish; calyx densely short-pubescent, obscurely 5–9-lobed; the lobes dentate, spreading. Snake River canyon.

154. RUBUS.

Perennial herbs or shrubs, often prickly; leaves alternate, simple or pinnately 3–7-foliolate, with stipules adherent to the petiole; flowers white or reddish, solitary or in racemes or corymbs; calyx 5-lobed, without bractlets; petals 5, conspicuous: stamens indefinite, on the calyx-tube: styles nearly terminal; carpels numerous, on the convex receptacle: carpels drupaceous, 1-seeded.

Fruit separating from the receptacle when ripe.

Leaves simple. R. nutkanus.
Leaves compound: stems bristly. R. strigosus.
Leaves compound: stem prickly, glaucous.
Leaves white beneath. R. leucodermis.
Leaves green beneath. R. hesperius.

Fruit not separating from the receptacle when ripe: trailing shrubs. R. macropetalus

R. nutkanus Michx. Stems wholly unarmed, perennial, 1–1.5 m. high; bark brownish, becoming shreddy, usually glandular-pubescent when young; leaves palmately and acutely 5-lobed, irregularly serrate, cordate at base, soft-pubescent or nearly glabrous, 10–30 cm. broad; petioles about as long as the blades, with stipules; corymbs few-flowered: calyx woolly: petals white, about 2 cm. long; fruit red, low-convex, juicy, about 2 cm. broad. Thatuna Hills, common in open woods, rare away from timber.

R. strigosus Michx. Stems erect, biennial, 1–2 m. high, densely armed with weak, glandular bristles or sometimes nearly unarmed: leaves mostly 3-foliolate, rarely 5-foliolate; leaflets ovate, acuminate, simply or doubly dentate, rounded at base, thin, usually white-tomentose beneath, glabrous above, 2–6 cm. long; corymbs few-flowered: calyx usually pubescent and bristly; petals white, about as long as the acuminate sepals: fruit hemispherical, light red. Thatuna Hills, rare.

R. leucodermis Doug. Erect shrubs; the biennial stems 1–2 m. high, very glaucous, armed with stout straight or curved prickles: leaves 3, rarely 5-foliolate; leaflets ovate, acuminate, doubly serrulate, white-pubescent beneath, the lateral ones oblique and frequently with one or two fleshes; petioles and midribs prickly: flowers small, in few-flowered corymbs; petals white, small, erect, shorter than the reflexed sepals: fruit nearly black when mature, hemispherical, glaucous or tomentose, about 1 cm. broad. Thatuna Hills, rare; also along Snake River.

R. hesperius Piper. Much like the preceding but with more numerous stoutier straight or curved prickles: leaves green and glabrous on both sides: berries black, glabrous. Snake River canyon. Both this and the preceding are perhaps better considered mere varieties of R. occidentalis L. of the Eastern states.

R. macropetalus Doug. Stems slightly woody, biennial, prickly, trailing, 1–8 m. long, usually unbranched the first year, but bearing numerous short flowering branches the second year: leaves 3-foliolate, rarely 5-foliol-
ate; leaflets ovate, mostly acute, rounded or cordate at base, doubly and somewhat incisely dentate, pubescent especially beneath, 2–5 cm. long: calyx glandular and prickly; petals white, about as long as the acute somewhat foliaceous tip of the sepals; fruit black when ripe, cylindrical, 1–3 cm. long, finely flavored. Thatuna Hills, in open woods, rare.

155. ALCHEMILL.A.

Low annual or perennial herbs: leaves palmately lobed or compound, with sheathing stipules: flowers perfect, small, greenish, in corymbs: calyx 4–5-lobed, with as many minute bractlets: petals none: stamens 1–4, very small: styles basal or lateral: carpels 1–4, distinct, free from the calyx-tube: akenes 1–4, enclosed in the calyx-tube.

A. arvensis var. occidentalis Piper, n. comb. (A. occidentalis Nutt.) Annual, 2–8 cm. high, simple or branched below, sparsely hairy: leaves short-petioled, fan-shaped, 3-parted, the lobes acutely 2–3-cleft; stipules conspicuous, cleft: calyx 1–1.5 mm. long, acutely 4-cleft, the bractlets minute: akenes ovate, pale, 1 mm. long. Stony soil, not rare.

156. POTERIUM.

Mostly perennial herbs: leaves alternate, odd-pinnate; stipules adherent to the petiole: flowers small, often polygamous or dioecious, in dense terminal spikes or heads: calyx 4-lobed, petal-like: petals none: stamens 4–many: styles terminal, filament; carpels 1–3, free from the calyx-tube: akenes usually 1, enclosed in the 4-angled dry closed calyx-tube.

P. annuum Nutt. Annual, erect, glabrous, 15–40 cm. high, usually simple below: leaflets 4–6 pairs, 1–2 cm. long, ovate or oblong, deeply pinnatifid into linear obtusish lobes: flowers perfect, greenish, in oblong spikes, 1–3 cm. long: bracts ovate, scarious-margined, persistent: calyx-lobes broadly ovate, scarious: stamens 4, rarely 2, somewhat exserted. Dry ground, common.

157. GEUM.

Perennial herbs: leaves pinnate, with stipules; radical clustered; cauline smaller: flowers rather large, solitary or in corymbs: calyx 5-lobed with 5 alternate bractlets: petals 5, obovate, longer than the calyx-lobes: stamens many, on the throat of the calyx: styles terminal, elongated in fruit, usually plumose or jointed: akenes 2–6, pubescent.

Styles naked, jointed and bent near the middle: sepals reflexed.

G. macrophyllum Willd. Stout, erect, 30–80 cm. high, bristly-hairy: radical leaves pinnate, the terminal leaflet much larger than the 3–8 lateral ones, broadly ovate, 3–7-lobed, dentate, 5–10 cm. long; lateral leaflets ovate
or elliptic, dentate, 2–3 cm. long, usually with smaller ones interspersed; cauline leaves similar, but nearly sessile, with 1–3 leaflets or segments; stipules ovate, toothed, 1–2 cm. long; flowers yellow, about 1 cm. broad, several in a loose cyme: petals obovate, longer than the reflexed acute calyx-lobes: fruiting head globose, 1.5 cm. long; akenes hispid; styles jointed and twisted near the tip. Thatuna Hills, in moist places.

**G. ciliatum** Pursh. Erect, from stout rootstocks, 30–50 cm. high, soft-hairy throughout: radical leaves tufted, ob lanceolate in outline, 10–15 cm. long, pinnate with numerous leaflets, these cuneate, obovate, incisely cleft into acute narrow lobes; cauline leaves 1 or 2, much reduced: flowers long-peduncled, 3–5 in a cyme: calyx purplish, the linear bractlets exceeding the triangular acute calyx-lobes: petals oblong, erect, yellowish or purplish, shorter than the calyx: akenes with straight plumose tails, 2–3 cm. long. Common on grassy hillsides.

158. **POTENTILLA.**

Herbs or rarely shrubs: leaves alternate, pinnate or palmate, with stipules: flowers perfect, solitary or in cymes: sepals 5, rarely 4, with 5, rarely 4, alternate bractlets: petals 5, seldom 4, rounded, mostly yellow: stamens 20–50 or more, in two or three rows on the calyx-tube: style small, terminal or nearly so, not elongating in fruit, neither jointed nor plumose: carpels usually numerous; ovules pendulous, anatropous: receptacle and akenes dry in fruit.

Leaves palmately 5–7-foliolate.

Leaves green on both sides.

Leaves white-woolly beneath.

Leaves pinnately 5-foliolate.

Leaves 3-foliolate.

**P. nuttallii** Lehm. Perennial, the whole plant sparsely hirsute: stems tufted, erect, not branched below the inflorescence, 30–60 cm. high: leaves palmately 5–7-foliolate, oblanceolate, coarsely and evenly toothed, green on both sides, 5–8 cm. long; basal petioles long and slender, cauline ones short: cymes many-flowered, loose: calyx about 1 cm. broad, the lobes longer than the tube: bractlets about as long as the acuminate calyx-lobes: petals broadly obovate, notched, equalling the calyx. Low ground, rather common.

**P. blaschkeana** Turcz. Size and habit of the preceding, the stems finely tomentose; leaflets densely white-tomentose beneath, cut half way to the midrib, into linear acute flat lobes; petals broadly obovate, with a large shallow notch, twice as long as the sepals. Common on hillsides: forms with the leaflets cut nearly to the midrib constitute **P. ctenophora** Ryd.

**P. rivalis** Nutt. Annual or biennial: stems erect or ascending, branched above, villous-pubescent, 30–50 cm. high: leaves pinnate, the lower 5-foliolate, the cauline usually 3-foliolate; leaflets obovate, cuneate at base, incisely toothed, 2–4 cm. long; cymes loose, leafy: flowers 4–6 mm. broad, on slender pedicels, bractlets about as long as the ovate acute calyx-lobes: petals yellow, shorter than the calyx-lobes: akenes smooth, gray. Banks of Snake River.
**P. millegrana** Engelm. Size and habit of the preceding: leaves all ternate: akenes smooth, nearly white. Banks of Snake River, rare. A form with broader leaflets and elongated inflorescence has been named P. biennis Greene.

**159. DRYMOCALLIS.**

Very similar to the preceding genus: leaves pinnate: style lateral, nearly basal: ovules ascending, orthotropous.


**D. convallaria** Ryd. Perennial: stems erect, stout, glandular-viscid and villous, 40-60 cm. high: basal leaves with 7-11 leaflets, these broadly obovate, cuneate at base, coarsely and somewhat doubly dentate or incised, glandular-pubescent or glabrate; cauline leaves with fewer leaflets: cyme usually dense, the branches erect: flowers 10-12 mm. broad: calyx very glandular-viscid; bractlets shorter than the calyx-lobes: petals broadly obovate, yellowish, barely exceeding the calyx-lobes: stamens about 25. Common on hillsides.

**D. glandulosa** Ryd. Perennial: stems erect, 40-50 cm. high, sparsely villous and glandular, loosely branched above: basal leaves with 7-9 leaflets, these obovate or orbicular, simply or doubly dentate, sparsely pubescent, 1-3 cm. long; cauline leaves usually with fewer leaflets: flowers 10-15 mm. broad, in loose open cymes: calyx somewhat glandular; bractlets shorter than the ovate acute or acuminate calyx-lobes: petals oval or obovate, about as long as the sepals. Dry open woods, Thatuna Hills.

**160. FRAGARIA.**

Acaulescent perennial herbs, propagating by runners: leaves alternate, basal, tufted, 3-foliolate, with obovate serrate leaflets: flowers polygamo-dioecious, white, few, in corymbs or racemes, on naked scapes: calyx deeply 5-lobed, with 5 alternate bractlets: petals 5, obovate, short-clawed: stamens numerous, in 1 row: style lateral, very short: carpels numerous: receptacle much enlarged and fleshy in fruit, conical, scarlet, bearing the small turgid akenes on the surface.

Scapes shorter than the leaves: akenes sunk in pits in the fruit.  

**F. platypetala.** Scapes longer than the leaves: akenes not sunk in pits. **F. bracteata.**

**F. platypetala** Ryd. Rootstocks stout: scapes 10-15 cm. high, mostly shorter than the leaves: petioles silky-villous; leaflets somewhat glaucous, elliptic or obovate, broadly cuneate at base, coarsely toothed above the middle, glabrous or nearly so above, appressed silky-villous below, 2-5 cm. long: runners long, rather stout, 12-16 mm. broad: petals nearly orbicular, longer than the sepals: fruit hemispherical, the akenes sunk in shallow pits. Thatuna Hills, common; rare away from the timber.

**F. bracteata** Heller. Rootstocks stout: scapes 10-20 cm. high, usually exceeding the leaves: whole plant sparsely silky-villous: leaflets broadly obo-
vate, cuneate at base, coarsely dentate; lateral leaflets oblique; flowers 1.5–2 cm. broad; petals nearly orbicular, somewhat longer than the spreading sepals; fruit oblong, the akenes on the surface. Thatuna Hills, common.

161. **ROSA.**

Erect or climbing shrubs, usually with prickly stems; leaves alternate, odd-pinnate, with adherent stipules; leaflets mostly serrate; flowers solitary or in corymbss; calyx-tube cup or urn-shaped, becoming fleshy in fruit, usually 5-lobed, without bractlets; petals 5, large, obcordate; stamens numerous, on the calyx-tube; styles distinct or united; carpels indefinite, sessile at the bottom of the calyx-tube; akenes numerous, enclosed in the berry-like calyx-tube.

Flowers small, about 2 cm. in diameter.  R. **gymnocarpa.**

Flowers large, mostly solitary.  R. **nutkana.**

Flowers large, mostly in corymbs.  R. **pisocarpa.**

**R. gymnocarpa** Nutt. Small shrub, about 1 m. high, armed with numerous slender straight prickles; leaflets 5–9, elliptic, cuneate at base, serrate, nearly glabrous, .5–2 cm. long; serratures and petioles glandular; flowers mostly solitary, about 2 cm. in diameter; calyx-lobes acuminate, not foliaceous, appendaged, deciduous from the fruit; fruit oblong or pear-shaped, about 1 cm. long. Dry woods, Thatuna Hills.

**R. nutkana** Presl. Stout, 1–2 m. high, armed with few but stout prickles; leaflets 5–7, ovate or elliptic, obtuse, coarsely serrate, 1–3 cm. long, glabrous or somewhat pubescent, usually glandular on the petioles and serratures; flowers mostly solitary, 4–5 cm. broad; calyx-lobes glandular, foliaceous, appendaged, persistent; calyx-tube globose, smooth; fruit globose, 2 cm. in diameter; seeds large.

var. **hispida** Fernald. Calyx-tube and fruit densely hispid-prickly. Both the type and the variety are common.

**R. pisocarpa** Gray. Very similar to the preceding species, the leaves usually finely pubescent; flowers smaller, about 3 cm. in diameter, usually in corymbs; fruit ovoid or oblong, .5–1 cm. in diameter. Common in low places.

162. **PIRUS.**

Trees or shrubs, not thorny (in ours); leaves simple or compound; flowers in corymbed cymes; calyx urn-shaped, 5-cleft; petals roundish or obovate; stamens numerous; styles 2–5; pome fleshy or berry-like, the 2–5 carpels or cells of a papery or cartilaginous texture, 2-seeded.

**P. sitchensis** Piper. (*Sorbus sitchensis* Roem.) Shrub, 2–5 m. high, with smooth bark; young branches pubescent; leaves pinnate, 12–20 cm. long; leaflets 4–6 pairs, mostly oblong, acute or acuminate, simply or doubly serrate, glabrous or nearly so, shiny above, 2–6 cm. long, 1–2 cm. broad; cymes dense, compound, 8–12 cm. broad; flowers white, 8 mm. broad; calyx and pedicle loosely woolly-pubescent; fruit bright red, about 6 mm. in diameter. Thatuna Hills, in rich woods.
163. AMELANCHIER.

Shrubs or small trees, not thorny; leaves alternate, simple, petioloed, serrate or entire; flowers white, in racemes: calyx-tube campanulate, 5-lobed. more or less adherent to the ovary; petals 5: stamens numerous, on the calyx-tube: styles 2-5, united below or distinct: ovary 5-celled, each cell 2-ovuled: berry-like pome 10-celled, by the growth of a false partition in each cell of the ovary; each cell 1-ovuled.

Young leaves loosely tomentose beneath. toothed only above the middle.
A. ALNIFOLIA.
Young leaves glabrous, bright green, mostly sharply serrate from the base: petals nearly 2 cm. long.
A. CUSICKII.
Young leaves glabrous, pallid: petals 1 cm. long.
A. BASALTICOLA.

A. alnifolia Nutt. Shrub or small tree, 2-5 m. high: leaves broadly oblong, rounded or subcordate at base, obtuse, tomentose when young, especially beneath, glabrate, toothed above the middle or rarely entire, 2-4 cm. long; petioles pubescent, 1-2 cm. long; racemes 4-5 cm. long: calyx pubescent, the triangular acute lobes not longer than the tube: petals oblong-oblanceolate, obtuse, about 1 cm. long. Common along streams and on moist hillsides.

A. cusickii Fernald. Shrub, 3-6 m. high, with numerous virgate branches, the young bark chestnut-brown: leaves glabrous from the first, oblong or orbicular, obtuse or acute, rounded or cordate at base, mostly sharply serrate the whole length: petioles slender, glabrous: racemes short, dense; calyx-lobes slightly hairy, acuminate, longer than the tube: petals oblong-oblanceolate, obtuse, about 2 cm. long. Common on basalt ledges along Snake River and Union Flat: blooming ten days earlier than the preceding.

A. basalticola Piper, n. sp. Small shrub, with pale bark, even on the young branches: leaves appearing before the flowers, orbicular or oblong, mostly truncate at base and apex, serrate above the middle or less commonly from the base, glabrous and glaucous from the first, firm in texture, 1.5-2 cm. long, on slender petioles, nearly as long: racemes very short, few-flowered: calyx-lobes attenuate-acuminate, sparsely hairy, longer than the tube: petals narrow, oblong-oblong-oblanceolate, obtuse, 10-12 mm. long: stamens 20, the filaments united into a disk-like structure at the base: styles separate: mature fruit not seen. Bluffs of Snake River, Whitman county, Wash., near Lewiston, Ida., Prof. Byron Hunter: no. 2988, Heller and no. 53, Sandberg, McDougal and Heller, also collected near Lewiston are referable here. The species is nearest A. pallida Greene.

164. CRATAEGUS.

Shrubs or small trees, mostly thorny; leaves alternate, petioloed, entire, serrate, lobed or pinnatifid; flowers white, rarely rose-colored, in terminal corymbs: calyx-tube cup-shaped or campanulate, adherent to the carpels, the limb 5-lobed: petals 5, roundish, on the calyx-tube: stamens many, or only 5-10: styles 1-5, separate: ovary inferior, or its summit free; ovules one to each carpel: pome small, drupe-like. with 1-5 bony carpels, each 1-seeded.
Calyx woolly; spines 4-6 cm. long; fruit red.  
C. piperi. 
Calyx nearly glabrous; spines 2-3 cm. long; fruit black.  
C. douglasii.

C. piperi Britton. A much-branched shrub, 2-4 m. high; bark of older stems light gray; that of the younger twigs light brown, the lenticels conspicuous; the branches of the season and the inflorescence strigose-villous; thorns 3-5 cm. long, dark-brown, shining, straight or nearly so, somewhat reflexed; petioles 1.5-2 cm. long, bearing several glands; leaf-blades broadly ovate in outline, sparingly strigose on both sides, dark and glossy above, paler and dull beneath, incised and doubly serrate at or above the middle but merely serrate on the cuneate base; teeth sharp and gland-tipped; apex short, acuminate; corymb 4-12-flowered; calyx-tube villous; sepals about 4 mm. long, prominently glandular-dentate; fruit spherical or nearly so, about 12 mm. in diameter, coral-red, sparsely strigose-pubescent, even at maturity. Springy gravelly places, infrequent.

C. douglasii Lindl. Shrubs, 2-6 m. high; spines stout, 2-3 cm. long; leaves obovate, broadly cuneate at base, coarsely doubly dentate above the middle, acute or obtuse, sparsely pubescent on both sides when young, paler beneath, 2-5 cm. long; petioles short, glandless; corymb usually many-flowered: flowers about 12 mm. broad: calyx-tube glabrous, the lanceolate lobes pubescent; fruit black, smooth. Common along streams.

165. PRUNUS.

Small trees or shrubs, many with edible fruits; leaves alternate, simple, usually serrulate: flowers white or rose-colored, solitary or fascicled in the axils or in terminal racemes: calyx 5-lobed, free from the ovary: petals 5, on the calyx-tube: stamens numerous, pistil 1; style 1; ovary 1-celled, 2-ovulated; fruit a drupe; seed 1, rarely 2; endosperm none.

Flowers racemose.  
P. demissa.  
Flowers corymbose.  
P. emarginata.

P. demissa Dietrich. Shrub or small tree, 2-8 m. high; leaves ovate or oblong-ovate, cuneate, rounded or cordate at the base, sharply serrate, 5-10 cm. long; somewhat pubescent beneath; petioles 1-2 cm. long, appearing after the leaves: calyx somewhat glandular: petals nearly orbicular: fruit globose, dark purple, 5-6 mm. in diameter, not edible; stone globose. Scarcely distinct from the eastern P. virginiana L.

P. emarginata Walpers. Shrub or small tree, 3-8 m. high: branches and bark chestnut brown, with prominent lenticels: leaves narrow, ovate, elliptical or ovate, obtuse or acute, cuneate at base, minutely serrate, glabrous or pubescent beneath, 3-8 cm. long, short-petioled; corymb few-flowered, appearing with the leaves: flowers about 1 cm. broad; fruit oblong, bright red, bitter; stone with a grooved ridge on one side. Summit of Cedar Mountain.

Family 38. LEGUMINOSAE.

Herbs or shrubs: leaves alternate, mostly compound, with stipules: flowers regular or irregular (papilionaceous), perfect or sometimes polygamo-dioecious, in spikes heads racemes or panicles:
calyx 4–5-toothed or clef; lobes equal or unequal, sometimes 2-lipped: petals more or less united or separate, perigynous or hypogynous, usually papilionaceous, that is, with the upper or odd petal (standard) larger than the others and usually turned backward or spreading; the two lateral ones winged, oblique and exterior to the two lower; the last pair connivent and commonly more or less coherent by their anterior edges, forming the keel, which usually encloses the stamens and pistil: stamens 10, rarely 5 or many, monadelphous, diadelphous or occasionally distinct: pistil 1, 1-celled or several-celled by the intrusion of partitions, free; ovules 1–many: fruit a legume; endosperm mostly none.

Stamens distinct.

Stamens monadelphous or diadelphous.

Leaves abruptly pinnate, with tendrils, which are sometimes reduced to bristles.

Style slender, with a tuft of hairs at the summit. 166. Thermopsis.

Style flattened, bearded along the inner side. 174. Vicia.

Leaves odd-pinnate or palmate, without tendrils. 175. Lathyrus.

Stamens monadelphous; anthers of two sorts. 167. Lupinus.

Stamens diadelphous; anthers of two sorts. 171. Psoralea.

Stamens diadelphous; anthers all alike.

Leaves digitately 3-foliolate, rarely 1-foliolate.

Leaflets denticulate. 168. Melilotus.

Flowers in long racemes. 169. Trifolium.

Flowers in heads or umbels. 170. Hosackia.

Leaflets entire.

Leaves pinnately several–many-foliolate. 172. Astragalus.

Pod not prickly: foliage not glandular-punctate.

Pod prickly: foliage glandular-punctate. 173. Glycyrrhiza

166. Thermopsis.

Perennial herbs: leaves alternate, palmately 3-foliolate, with large foliaceous stipules: flowers large, yellow, in terminal or axillary racemes: calyx campanulate, the lobes equal and separate or the two upper united: standard nearly orbicular, equalling the oblong wings and about equalling the keel: stamens 10, distinct: ovary sessile or short-stipitate: ovules numerous: pod sessile or short-stipitate in the calyx, flat, linear, straight or curved.

T. montana Nutt. Stout, 6–1 m. high, the glabrous somewhat glaucous stems slightly branched above: leaflets oblong-ovate or obovate, mostly obtuse, cuneate at base, 3–6 cm. long, glabrous above, pubescent beneath; stipules ovate or lanceolate, large; petioles larger than the leaflets: raceme terminal, short-pedicelled, 8–16 cm. long; flowers yellow, somewhat whorled, stout-pedicelled; calyx pubescent, with short broad teeth: corolla nearly 2 cm. long; pods pubescent, dark-colored, linear, slender-beaked, 5–10 cm. long, erect, 8–12-seeded. Common in pine woods, Kamiack Butte and Thatuna Hills.
167. LUPINUS.

Herbs, rarely shrubs; leaves alternate, palmately 5-11-foliolate: flowers showy, often whorled, in terminal spikes or racemes; calyx 2-lipped, the upper lip often bifid, the lower sometimes 3-toothed: standard orbicular with reflexed sides; wings obovate, united at the summit and enclosing the falcate keel: stamens united into a closed tube: ovary sessile: pod more or less flattish, leathery and hairy.

Pubescence silky or silky-villous.

Calyx somewhat spurred. L. laxiflorus.
Calyx spurless: flowers pedicelled. L. sericeus.
Calyx spurless: flowers nearly sessile. L. leucophyllus.
Pubescence hirsute or villous, not silky. L. wyethii.

L. laxiflorus Doug. Rather slender, about 60 cm. high; pubescence finely-silky, but the plant green: leaflets 6-11, oblanceolate, obtuse or acute, silky on both sides, 3-4 cm. long; petioles slender, usually twice as long as the leaflets, or none: racemes loose, 10-15 cm. long; pedicles slender, 5-6 mm. long; calyx short, spurred at base: corolla about 1 cm. long; standard glabrous or pubescent. Open woods, Thatuna Hills.

L. sericeus Pursh. Pubescence silky or silky-villous, the whole plant silvery-green, 30-40 cm. high; leaflets 6-8, oblanceolate, acute, pubescent on both sides, 2-4 cm. long; petioles as long or longer: racemes rather loose, short-peduncled: flowers almost 10 mm. long, stout-pedicelled: standard hairy. Common everywhere.

L. leucophyllus Doug. Densely silky-villous and somewhat tomentose, erect, 60-90 cm. high: leaflets 7-10, oblanceolate, acute or acuminate, pubescent on both sides, 3-6 cm. long; petioles about as long: flowers sessile or nearly so, in elongated short-peduncled dense racemes, often 30-40 cm. long; bracts narrow, exceeding the buds: corolla about 8 mm. long; standard somewhat hairy on the back. Common in low ground.

L. wyethii Wats. Villous, not silky, erect, 30-50 cm. high: leaflets 7-11, oblanceolate, acute or acuminate, 2-4 cm. long, glabrous above; petioles 2-4 times as long as the leaflets: racemes strict, 15-30 cm. long; pedicles slender: flowers dark-blue, 10-15 mm. long: standard glabrous. A very showy species, locally abundant, especially near Snake River.

168. MELILOTUS.

Annual or biennial herbs: leaves pinnately 3-foliolate; leaflets denticulate: flowers in racemes: calyx campanulate, with short equal teeth: corolla deciduous, free from the stamen-tube: stamens diadelphous; anthers all alike: ovary sessile or stipitate, few-ovuled: pod coriaceous, 1 2-seeded.

M. alba Desv. Biennial, stout, erect, branching, 1-2 m. high, finely puberulent or nearly glabrous: leaves slender-petioled; leaflets oblong or obovate, denticulate, mostly truncate at apex, 1-2 cm. long; stipules subulate.
169. TRIFOLIUM.

Tufted or diffuse herbs: leaves mostly palmately, sometimes pinnately, 3-foliolate; leaflets usually toothed; stipules united with the petiole: flowers in heads or in umbel-like heads: calyx-teeth 5, nearly equal: petals more or less persistent, the claws of all but the standard united more or less below the stamen-tube: stamens 10, diadelphous or the tenth only partly separate: pod small and membranous, 1–6-seeded, included in the calyx.

Heads subtended by an involucre.
Heads not subtended by an involucre.
Heads longer than broad.
Heads globose.

Creeping: flowers white.
Procumbent or ascending: flowers pinkish.
Erect: flowers red: peduncles short.
Erect: flowers red: peduncles long.

T. cyathiferum Lindley. Annual, glabrous: stems weak, ascending, 10–30 cm. high: leaflets oblanceolate or obovate, serrulate, acute, obtuse or truncate, cuneate at base, 1–2 cm. long; petioles slender; stipules ovate or lanceolate, laciniate; peduncles longer than the leaves; heads commonly 1.5 cm. broad; involucre large and conspicuous, whitish with green margin, many-nerved, with short sharply-toothed lobes: flowers whitish: calyx membranous, prominently 5-nerved, the nerves prolonged and branched, equalling the corolla: pod 2-seeded. Springy gravelly places, rare.

T. arvense L. Annual, erect, somewhat silky-pubescent throughout, 10–30 cm. high: leaflets linear or oblanceolate, obtuse or notched, denticulate near the apex, 1–2 cm. long; petioles mostly shorter than the leaflets; stipules narrow, with long subulate tips; peduncles 2–4 cm. long; head oblong, dense, 1–2.5 cm. long; calyx silky-hairy, the subulate lobes longer than the tube and the pink or whitish corolla. Sparingly introduced.

T. repens L. Perennial, glabrous or sparsely pubescent, with creeping stems, 10–30 cm. long, which root at the nodes: leaflets obovate, obtuse or notched at apex, cuneate at base, denticulate, 1–2 cm. long; petioles elongated; stipules narrow, acute; peduncles longer than the leaves: head globose: flowers white, 6–10 mm. long, pedicelled, at length reflexed: calyx-teeth acuminate, shorter than the tube. Everywhere introduced.

T. hybridum L. Perennial, erect or decumbent, not creeping, glabrous or nearly so, the stem 30–60 cm. long; leaflets obovate, obtuse or notched, cuneate at base, sharply serrulate, 1–2.5 cm. long; petioles about as long as the leaflets; stipules membranous, ovate-lanceolate, acuminate; peduncles elongated; heads globose: flowers pink or pinkish, 6–8 mm. long, on slender pedicels, at length reflexed: calyx-teeth subulate, about as long as the tube, much shorter than the corolla. Sparingly introduced.
T. pratense L. Perennial, erect or decumbent, rarely branched, 20-40 cm. high, somewhat pubescent throughout; leaflets elliptic or obovate, obtuse or rarely emarginate, denticulate, 1-4 cm. long, frequently dark-spotted near the middle; petioles short; heads globose or ovoid, sessile or nearly so, 2 cm. long; flowers red, 10-12 mm. long; calyx-teeth subulate, shorter than the corolla. Introduced and common.

T. altissimum Dougl. Perennial from a thick root, erect, stout, glabrous; leaflets linear or oblong, narrowed at both ends, acute or obtuse, cuspidate, 2-4 cm. long; strongly veined, the veinlets usually protruding as slender teeth; stipules nearly as long as leaflets, acute, entire or nearly so; peduncles 5-10 cm. long; heads globose or oblong, 2-3 cm. long; flowers red, sessile, at length reflexed, 12-15 mm. long; calyx-tube strongly nerved, the subulate teeth twice as long, the lowest straight, the others twisted. Low meadows, common.

170. HOSACKIA.

Herbs or shrubs: leaves pinnate, 2-many-foliolate; stipules minute and gland-like; flowers yellow or reddish, solitary or in umbels; calyx-teeth nearly equal; petals free from the stamens; standard ovate or roundish; stamens diadelphous; pod linear, compressed or somewhat terete, sessile, several-seeded.

Flowers pinkish, solitary. H. purshiana.
Flowers yellow and white, umbel l ed. H. bicolor.

H. purshiana Benth. Annual, erect, usually branched, 30-60 cm. high; leaves 3-foliolate, or the upper 1-foliolate, nearly sessile; leaflets ovate or lanceolate, silky-pubescent, acuminate, stalked, 6-20 mm. long; peduncles as long as or longer than the leaves; flowers pink, 4-6 mm. long; calyx vil lous, the slender lobes twice as long as the tube, nearly equaling the corolla; pod linear, narrow, often reflexed, glabrous and shining, 2-3 cm. long. Sandy soil, common.

H. bicolor Doug l. Glabrous throughout, erect or decumbent, 30-50 cm. high, stout; leaflets 5-9, obovate, mostly obtuse, cuneate at base, 1.5-2 cm. long; peduncles exceeding the leaves; flowers nearly sessile, spreading, 3-7 in an umbel; calyx about 6 mm. long, the teeth shorter than the campanulate tube; corolla yellow, the wings white, 2-2.5 cm. long; pod linear, narrow, 4-6 cm. long. Wet places, rare.

171. PSORALEA.

Perennial herbs, usually glandular-punctate; leaves mostly 3-5-foliolate, with broad stipules; flowers usually in spikes or racemes; calyx-lobes equal or the lower longest, the two upper ones sometimes united; corolla truly papilionaceous; stamens 10, diadelphous or sometimes monadelphous; anthers of two kinds; ovary sessile or short-stalked, 1-ovuled; pod seldom larger than the calyx, thick, often wrinkled, indehiscent, 1-seeded.
P. lanceolata var. purshii Piper. n. comb. (P. purshii Vail.) Erect or ascending, 30–60 cm. high, sparsely puberulent, coarsely glandular-dotted throughout: leaflets 3, entire, narrowly or broadly oblanceolate, acute, obtuse or emarginate at apex, cuspidate, 2–3 cm. long; petioles as long as the leaflets; peduncles barely exceeding the leaves: racemes short, dense: flowers bluish-white, 5 mm. long, short-pedicelled: calyx-teeth shorter than the tube: pod subglobose, 5–6 mm. long, glandular and white-hairy. Sandy banks of Snake River.

172. ASTRAGALUS.

Chiefly perennial herbs, a few woody at the base: leaves odd-pinnate, with stipules: flowers in spikes or racemes: calyx with 5 nearly equal teeth: corolla and its slender-clawed petals usually narrow, spreading; equalling or exceeding the wings and blunt-keeled: stamens diadelphous; anthers all alike: ovary sessile or stipitate; ovules numerous: pod commonly turgid or inflated, 1–2-celled by false partitions; seeds few or many.

Densely white-hairy: flowers 8 mm. long. A. spaldingii.
Densely white hairy and woolly: flowers 20 mm. long. A. inflexus.
Not densely hairy.
   Flowers and pods reflexed. A. collinus.
   Flowers reflexed: pods erect. A. mortoni.
   Flowers and pods erect.
      Pods with dorsal suture turned inwards. A. arrectus.
      Pods turgid. A. reventus.

A. spaldingii Gray. Densely white-villous throughout: stem erect or decumbent, 30–50 cm. high: leaves 6–10 cm. long, short-petioled: leaflets 10–15 pairs, lanceolate, acute at each end, sessile, about 1 cm. long; pedicels longer than the leaves: flowers white, in dense spikes, 2–6 cm. long: calyx densely-villous, the linear lobes as long as the campanulate tube: corolla white, the keel purple-blotched, 7–8 mm. long: pod villous, ovoid, beaked, 1–2-seeded, as long as the calyx. Not rare, on hillsides.

A. inflexus Doug. Densely white-villous and tomentose throughout: stems prostrate or decumbent, 10–30 cm. long: leaves short-petioled; leaflets 10–15 pairs, ovate, acuminate, short-stalked, about 1 cm. long; peduncles shorter than the leaves: racemes rather densely few-flowered, the flowers purple or yellowish, short-pedicelled: calyx-teeth awl-shaped, much shorter than the cylindrical tube: corolla purple, rarely yellowish, about 20 mm. long: pod villous, stout-beaked, curved, 2–2.5 cm. long. Sandy bars of Snake River.

A. collinus Doug. (A. cyrtoides Gray.) Erect, 30–50 cm. high, hoary-pubescent throughout: leaves 5–10 cm. long; leaflets 5–10 pairs, oblong-truncate or retuse, cuneate at base, short-stalked, about 1 cm. long, smoother above: peduncles mostly terminal, longer than the leaves: flowers yellow, reflexed, in racemes, 5–12 cm. long: calyx-tube oblong, campanulate, gibbous at base, 1 cm. long, the teeth short, triangular, acute: corolla 12–15 mm. long: pods linear, acuminate, puberulent, 2–3 cm. long, 3 mm. wide, the stipitate base as long as the calyx. Bluffs of Snake River.
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A. mortoni Nutt. Erect. 30-80 cm. high, minutely appressed-pubescent but green: leaves 10-15 cm. long; leaflets 7-10 pairs, oblong or oblongate, truncate or notched at the apex, rounded or cuneate at the base, 1.5-2.5 cm. long; peduncles as long as or longer than the leaves, stout; spikes dense, 5-10 cm. long; flowers reflexed but the fruit erect; calyx campanulate, gibbous, 7-8 mm. long, the triangular acuminate teeth shorter than the tube: corolla greenish, 12-15 mm. long; pods sessile, densely crowded, linear, 10-15 mm. long, 3-4 mm. thick, with a slender, hooked beak. Open woods, Thatuna Hills, also along Snake River.

A. arrectus Gray. (A. palousensis Piper.) Erect, 30-60 cm. high, sparsely appressed-pubescent throughout: leaves erect or ascending, 10-20 cm. long; leaflets about 15 pairs, oblong, somewhat truncate, cuneate at base, glabrous above, pubescent beneath, 1-2 cm. long; peduncles stout, much longer than the leaves: flowers whitish, in rather dense erect racemes: calyx 5 mm. long, black-pubescent, the tube campanulate, twice as long as the short acute teeth: corolla 10-12 mm. long: pods linear, short-beaked, 12-16 mm. long, 5 mm. wide, thinly puberulent, slightly roughened, the dorsal suture pressed inwards, the stipitate base as long as the calyx. Grassy hillsides, not rare.

A. reventus Gray. Very similar to the preceding but with harsher appressed pubulence; pods transversely roughened, wrinkled, turgid, the dorsal suture not impressed, from narrowly ovoid to globose, stout-beaked, 1.5-2 cm. long. Bluffs of Snake River.

173. GLYCYPHRHIZA.

Perennial punctate-glandular herbs: roots long, thick, sweet: leaves odd-pinnate, with minute deciduous stipules: flowers white or bluish, in axillary spikes: calyx with the two upper lobes shorter or partly united: stamens monadelphous or diadelphous: anther-sacs confluent at the apex, the alternate ones smaller: pod prickly, ovate or oblong-linear, compressed, often curved, few-seeded.

G. lepidota Nutt. Erect, stout, 1.5-1 m. high, glandular-puberulent throughout: leaves 10-20 cm. long; leaflets 6-8 pairs, oblong-lanceolate, acuminate, mucronate, 3-5 cm. long, glandular-punctate; peduncles shorter than the leaves: spikes dense, 3-6 cm. long: flowers greenish-yellow, about 1 cm. long: calyx campanulate, 6-8 mm. long, the acute teeth about as long as the tube: pods 1.5 cm. long, thickly armed with long hooked prickles. Banks of Snake River.

174. VICIA.

Climbing or trailing herbaceous vines: leaves pinnate, tendril-bearing, with half-sagittate or entire stipules: flowers solitary or in loose peduncled axillary racemes: calyx 5-cleft or toothed, unequal, the two upper teeth often shorter or the lowest longer: wings adherent to the short keel: stamens diadelphous or nearly so: style filiform, the apex or the lower side hairy; ovary 2 many-ovuled: pod flat, 2-valved, 2-several-seeded.
V. americana Muil. Perennial, stout or slender, 30-100 cm. high, nearly glabrous: leaflets 4-8 pairs, very variable, usually elliptic or ovate, frequently linear, acute, obtuse or truncate, mucronulate, entire or toothed above, glabrous above, minutely puberulent beneath, about 2 cm. long; tendrils well developed; stipules deeply toothed: peduncles usually shorter than the leaves, 4-8-flowered: flowers purple-violet, 15-20 mm. long, short-pedicelled: calyx-tube campanulate with short broad unequal teeth, somewhat pubescent: pods glabrous, 2-4 cm. long, 6-8 mm. broad. Common in copses.

175. LATHYRUS.

Mostly smooth perennial herbaceous vines, rarely erect herbs: leaves pinnate, mostly tendril-bearing: flowers in racemes or sometimes solitary; peduncles usually equalling or exceeding the leaves and several-flowered: calyx-teeth nearly equal or the upper ones somewhat shorter than the lower: corolla rather larger than in Vicia: stamens diadelphous or monadelphous below: style dor-sally flattened near the top, hairy on the upper side; ovules generally numerous: pod flat or terete, 2-valved.

Leaflets 3-6 pairs, with tendrils. L. parvifolius.
Leaflets 1-2 pairs, without tendrils.

Flowers white, 1.5 cm. long. L. nevadensis.
Flowers purple, 1 cm. long. L. bijugatus.

L. parvifolius Wats. (L. panceflorus Fernald.) Glabrous throughout, 60-90 cm. high; stems angled: leaflets 3-6 pairs, oblong-elliptic, thickish, prominently veined, paler beneath, acute and cuspidate, rounded at base, 2-4 cm. long; stipules about half as long as the adjacent leaflets; tendrils simple or branched: peduncles exceeding the leaves, 3-5-flowered: flowers violet, about 2 cm. long: calyx-teeth slightly pubescent, about as long as the tube: pods smooth, 4-6 cm. long. Bluffs of Snake River.
var. tenuior Piper, n. var. Leaflets linear or linear-lanceolate, 3-6 cm. long, otherwise as in the species. The type is Elmer no. 52, from the Snake River Bluffs near Almota. It also occurs on Union Flat.

L. nevadensis Wats. Erect or decumbent, 12-25 cm. high; leaflets 1-2 pairs, elliptic or ovate, obtuse, cuspidate, thinly pubescent and paler beneath, 2-4 cm. long; stipules narrow, acuminate; tendrils none: peduncles exceeding the leaves, 2-4-flowered: flowers stout-pedicelled, white or ochroleucous, nearly 2 cm. long: calyx-teeth triangular-acute, shorter than the tube. Near Troy, Idaho.

L. bijugatus White. Erect, 10-15 cm. high, glabrous or sparsely pubescent: stems not winged: leaflets 1-2 pairs, oblong or elliptic, acute, cuspidate, about 2 cm. long: stipules sagittate, narrow, 5-10 mm. long; tendrils none, but the rachis prolonged into a slender tip: peduncles shorter than the leaves, 1-4-flowered: calyx-teeth triangular, acute, about as long as the tube: corolla purple, 8-10 mm. long.
var. sandbergii White. Leaflets linear or linear-lanceolate, 4-6 cm. long. The species and the variety occur together on stony hillsides.

Herbs: leaves basal, alternate or opposite, often with stipules: flowers solitary or clustered, perfect, regular or irregular, commonly symmetrical, the parts in fives rarely in threes: sepals equal or unequal: stamens mostly in two sets, those alternate with the petals sometimes sterile: ovary 1, 3–5-lobed and 3–5-celled; ovules 2 in each cavity: fruit a capsule: endosperm sparse or none.

Anthers 10, rarely 5; carpel tails not hairy inside.
Anthers 5; carpel-tails bearded inside.

176. Geranium.

Annual or perennial herbs: leaves palmately-lobed, cleft or divided, with stipules: flowers regular, on axillary 1–2-flowered peduncles: sepals 5; petals 5, hypogynous: stamens 10, rarely 5, generally 5 longer and 5 shorter: ovary 5-lobed, 5-celled, beaked with a compound style: capsule 5-celled, each 1-seeded, and long-tailed, at maturity separating from the long beak of the receptacle, splitting from below upward.

Perennial: flowers large.
Annual: flowers small.
   Seeds smooth.
   Seeds ridged or pitted.

G. incisum Nutt. Stout, perennial, 30–60 cm. high, villous and glandular throughout, somewhat branched above; leaves orbicular, 5–10 cm. broad, 5–7-cleft or parted; lobes cuneate, oblong, incisely-lobed or toothed; petioles of the radical leaves elongate, of the cauline short: flowers purple-red, 2–3 cm. broad; carpels glandular, 2–3 cm. long. Common on hillsides.

G. pusillum Burm. Annual spreading finely-pubescent, the weak stems 15–30 cm. long; leaves 1–3 cm. broad, 7–9-cleft into equal cuneate-oblong lobes, these 3-toothed at apex; peduncles scattered, 2-flowered: flowers pink or violet, 4–5 mm. broad; sepals acute, not awned; petals notched: anther-bearing stamens only 5: carpels small, including the tails about 1 cm. long; seeds smooth. A weed in lawns, along railroads, etc.

G. carolinianum L. Annual, erect, branched, 15–30 cm. high, pubescent throughout and somewhat glandular: leaves orbicular, 3–6 cm. broad, deeply 5–9-cleft; lobes cuneate-oblong, acutely and incisely toothed or lobed; petioles slender: peduncles short, 2-flowered, the inflorescence rather compact: flowers rose-colored, 8–10 mm. broad; sepals ovate, acuminate, short-awned, ciliate; carpels hispid, the beaks 2 cm. long; seeds reticulated. Sandy soil along Snake River.

177. Erodium.

Herbs, generally with jointed nodes: leaves opposite or alternate, with stipules: flowers nearly regular, in axillary umbels: sepals 5; petals 5, hypogynous, the two upper slightly smaller: anthers 5.
the 5 shorter stamens sterile or wanting: ovary 5-lobed, 5-celled, beaked by the united styles: tails of the carpels bearded on the inner side, becoming twisted.

**E. cicutarium** L’Her. Branched and spreading from the base, hairy-pubescent, the weak stems 10-60 cm. long; leaves pinnate, 3-15 cm. long, the leaflets pinnatifid into narrow acute lobes; peduncles generally longer than the leaves, bearing 2-10 pink flowers: sepals acute, nearly as long as the entire petals, these 4 mm. long; carpels puberulent, the tails 5-7 cm. long, spirally-twisted when ripe. Introduced and becoming common.

**Family 40. LINACEAE.**

Herbs or shrubs: leaves all simple and entire, mostly alternate; stipules mostly small or none: flowers perfect, regular, nearly symmetrical, in axillary or terminal cymes, racemes or panicles: sepals 5, rarely 4; petals as many as and alternate with the sepals: stamens of the same number and alternate with the petals: pistil 1; styles 2-5; ovary 2-5-celled: fruit usually a capsule, often 4-10-celled by false partitions; endosperm fleshy or none.

178. **LINUM.**

Annual or perennial herbs: bark tough and fibrous: leaves alternate or opposite, sessile, entire, without stipules: flowers perfect, in cymes or panicles: sepals, petals, stamens and styles 5, regularly alternate with each other; pistil of 5 united carpels, 5-celled, with 2 seeds in each cell; each cell divided in fruit by a false partition making a 10-celled pod.

Flowers blue, 2.5-3 cm. broad.  
Flowers yellow, very small.  

**L. lewisii** Pursh. Perennial, with a woody base, the erect branches 30-40 cm. high, glabrous throughout: leaves alternate, numerous, linear or narrow, mostly very acute, 1-3 cm. long; stipules none: flowers few, in a corymb: sepals ovate, acuminate, the inner margin scarious, usually entire, 4-6 mm. long; petals blue, 15-20 mm. long, obovate, without appendages: filaments with slender appendages: capsules ovoid, longer than the calyx, incompletely 10-celled and 10-valved. Common in low ground.

**L. digynum** Gray. Annual, glabrous and glaucous, much branched, 10-15 cm. high: stems slender, striate: leaves opposite, elliptic, 5-10 mm. long, the lower entire and obtuse, the upper acute and serrate; stipules none: flowers in loose leafy racemes or corymbus, short-pedicelled: sepals ovate, unequal, glandular, serrate or lacerate: petals yellow, 3 mm. long, without appendages. Rare near Pullman, in springy gravelly places.

**Family 41. EUPHORBIAEACEAE.**

Herb (in ours), with milky juice: leaves opposite, alternate or whorled, entire or toothed, sessile or petioled; stipules present or wanting: flowers monoecious or dioecious, often much reduced
and subtended by an involucre which resembles a calyx; parts of
flowers various, often different in stamine and pistillate flowers:
calyx none or minute: petals often wanting: stamens 1-many, free
or united: pistil usually 3-celled: fruit a 3-lobed capsule: endos-
perm copious.

179. EUPHORBIA.

Perennial or annual herbs: flowers monoecious, included in a
cup-shaped 4-5-lobed involucre resembling a calyx or corolla and
usually bearing large thick glands at its sinuses; glands rounded
or often petal-like or crescent-shaped: stamine flowers numerous,
of a single naked stamen, jointed upon a short pedicel which usu-
ally has a minute bract at its base: pistillate flowers solitary in the
center of the involucre, pedicelled, and soon exserted: calyx
minute or none: styles 3, 2-cleft; ovary 3-celled, 3-ovuled.

Glands of the involucre with petal-like appendages: leaves opposite.

Seeds with prominent regular transverse ridges. E. Glyptosperma.
Seeds faintly ridged and pitted. E. Serpillifolia.

Glands of the involucre naked: leaves alternate.
Leaves serrulate. E. Arkansana.
Leaves entire. E. Cyparissias.

E. glyptosperma Engelm. Annual, glabrous, prostrate or decumbent:
stems much branched from the base, 5-30 cm. long; leaves opposite, oblong,
obtuse, very oblique at the obtuse or subcordate base, serrulate, short-petioled.
4-12 cm. long; stipules whitish, fringed: involucres solitary-axillary, some-
what clustered near the tips of the branches, campanulate, 1 mm. long;
glands somewhat saucer-shaped, with narrow crenate or lobed appendages:
seeds whitish, with sharp transverse ridges, but not pitted. Banks of Snake
River.

E. serpillifolia Pers. Very similar to the above, always prostrate: leaves
narrowly obovate, usually cuneate at base: seeds slightly ridged and pitted.
In dried up ponds and stream margins.

E. arkansana var. missouriensis Norton. Annual, erect, glabrous
throughout, 15-30 cm. high, branched above: cauline leaves alternate, obo-
vate or oblanceolate, obtuse, serrate or nearly entire, narrowed into a sessile
base, 1-3 cm. long: floral leaves opposite, longer than broad, mucronate: in-
volucre about 1 mm. long, the rounded lobes sometimes ciliate: glands
transversely elliptical, yellow, about 1 mm. wide: stamens 5-15; styles split
only above the middle: capsules subglobose, warty; seeds ovoid, purplish,
with low reticulated ridges. Banks of Snake River, rare.

E. cyparissias L. Perennial, erect, branched above, 30-60 cm. high:
leaves numerous, linear, alternate, those at the base of the umbels whorled,
sessile, entire, 1-2 cm. long; lower leaves reduced to scales: inflorescence
terminal, a many-rayed umbel; bracts opposite, broadly ovate, sessile, 5-8
mm. long, yellowish; involucres campanulate, 2 mm. long: glands crescent-
shaped, without appendages: seeds smooth. Sparingly escaped from gar-
dens.
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**Family 42. CALLITRICHACEAE.**

Aquatic or rarely terrestrial herbs: leaves opposite, entire, spatulate or linear, without stipules; flowers minute, perfect or monoecious, axillary: perianth none: bracts two, sac-like or none: stamen 1: pistil 1; styles 2, filiform; ovary 4-celled; ovules 1 in each cell: fruit compressed, lobed, more or less winged, or keeled; endosperm fleshy.

180. CALLITRICHE.

Low slender usually tufted herbs: leaves spatulate or linear or both, entire: flowers monoecious or 2 or 3 in the axil of a leaf, with or without bracts: staminate flowers a single stamen: pistillate flower a single 4-celled ovary, sessile or pedicelled, with 2 distinct sessile stigmas: fruit nut-like, 4-lobed, 4-celled.

*C. palustris* L. Aquatic or growing in the mud: floating leaves obovate, obtuse or emarginate, the others linear or spatulate, 1-nerved, 1-2 cm. long; when terrestrial, leaves all linear: bracts 2, as long as or longer than the fruit or wanting: fruit oval, emarginate, 1 mm. long, the edges grooved and narrowly winged: styles erect, shorter than the fruit. Not rare, in ponds and pools.

**Family 43. ANACARDIACEAE.**

Trees or shrubs with resinous or milky acrid juice: leaves alternate, simple or compound, without stipules, not punctate: flowers regular, small, polygamo-dioecious or perfect: calyx 3-7-lobed: petals 3-7, rarely none; stamens as many or twice as many as the petals, rarely fewer or more: styles 3; ovary 1-celled; ovules one in each cell: fruit generally a small drupe: endosperm scant or none.

181. RHUS.

Trees or shrubs, some poisonous to the skin: flowers polygamous or dioecious, seldom truly perfect, small, greenish or rarely yellow or rose-color: calyx small, 5-parted: petals 5: stamens 5: ovule basal.

Leaves 9-31: fruit red.  
Leaves 3: fruit white.  

*R. glabra* L. Shrub or small tree, 2-5 m. high, with ridged bark, glabrous and somewhat glaucous except the inflorescence: leaflets 9-31, broadly lanceolate, acuminate, serrate, paler beneath, 5-8 cm. long: inflorescence a dense panicle, usually puberulent, 10-12 cm. long: flowers green or yellowish, polygamous: drupes red, 4-5 mm. in diameter, densely clustered, covered with short hairs. Common along Snake River.
R. toxicodendron L. Low shrubs, weak or decumbent, .5-1 m. high; leaflets 3, broadly ovate, acuminate, entire, or with a few tooth-like lobes, glabrous or pubescent beneath, 5-10 cm. long, the lateral ones with shorter stalks; petioles longer than the leaflets: panicles shorter than the petioles: flowers green: drupes globose, 4-6 mm. in diameter, shiny, whitish, longitudinally ribbed; stone striate. Along Snake River: very poisonous. Our form seldom or never climbs and has been considered a distinct species, R. rydbergii Small.

Family 44. Celastraceae.

Shrubs, often climbing; leaves simple and undivided, alternate or opposite; stipules none or small: flowers regular, usually perfect, small; pedicels commonly jointed: calyx 4-5-lobed, the lobes imbricated: petals 4-5, spreading: stamens 4-5, on the calyx-tube, alternate with the petals: ovary sessile, free from or confluent with the calyx-tube: fruit a somewhat fleshy dehiscent pod; seeds with arils; endosperm fleshy.

182. Pachystima.

Low evergreen shrubs: leaves opposite, smooth, serrulate, coriaceous: flowers perfect, very small, green, solitary or fascicled in the axils: calyx-lobes 4, broad: petals 4: stamens 4, on the edge of the calyx-tube: style very short: ovary free: pod small, oblong, 2-celled; seeds 1 or 2, enclosed in a white membranous many-cleft aril.

P. myrsinites Raf. Evergreen glabrous shrub, much branched, 30-60 cm. high: leaves oblong, lanceolate or obovate, acute or obtuse, cuneate at base, serrate or almost entire, nearly sessile, 1-3 cm. long, the margin somewhat revolute: flowers yellowish or purplish, 3 mm. broad: pedicules and pedicels short, 2-3 mm. long: capsule oblong, acute, 5-6 mm. long. In woods, Thatuna Hills.

Family 45. Sapindaceae.

Trees or shrubs: leaves simple or compound, opposite, without stipules (in ours): flowers polygamous or dioecious, regular (in ours): sepals 4-5: petals often none (in ours): stamens 5-10, inserted on the fleshy calyx-tube: ovary 2-celled and lobed (in ours), with 2 ovules in each cell (in ours): endosperm none.

Leaves opposite, palmately-lobed. 183. Acer.
Leaves alternate, entire. 184. Glossopetalon.

183. Acer.

Trees or shrubs: leaves opposite, palmately-lobed, without stipules: flowers small, polygamo-dioecious, in clusters: calyx colored, usually 5-lobed: petals 5 and equal or none: stamens 3-12:
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styles 2; ovary 2-lobed, 2-celled; ovules 2 in each cell: fruit a double samara, 2-winged above, separable at maturity, each 1-seeded.

A. glabrum var. douglasii Piper, n. comb. (A. douglasii Hook.) Small tree, 3-10 m. high, with smooth light-gray bark: leaves simple, rarely 3-foliolate, orbicular, acutish, 5-lobed, coarsely serrate, truncate or subcordate at base, glabrous, dark-green above, paler beneath, 5-10 cm. long; petiole slender: flowers polygamous, in small corymb: petals narrow, spatulate-oblong, veiny, about as long as the similar sepals: fruit glabrous, roughened, the wings diverging at less than a right angle, 2.5-3 cm. long. Thatuna Hills, along streams. Leaves larger and differently toothed from the true A. glabrum of the Rocky Mountains.

184. GLOSSOPETALON.

Low and rigid shrubs, with slender spinescent branches: leaves small, alternate, sessile, entire; stipules minute, setaceous-subulate: flowers small, perfect, solitary, terminating short axillary branches or spur-like fascicles: calyx deeply 4-5-cleft: petals 4 or 5: stamens 8 or 10: style short or none; ovary 1-celled, of a single ovoid carpel; ovules 2: fruit a coriaceous follicle, 1-2-seeded.

G. spinescens Gray. Low much branched shrubs, somewhat spiny, 1 m. or less' high: leaves numerous, ob lanceolate, acute, short-petioled, glabrous or puberulent, pale-green and glaucous, 6-16 mm. long; stipules minute, usually reddish: flowers on pedicels as long as the leaves, petals yellow, narrow, 6 mm. long; capsules ovoid, acutely beaked, striate, often curved. In basalt crevices, opposite Lewiston.

Family 46. RHAMNACEAE.

Erect or climbing shrubs or small trees: leaves simple with small stipules: flowers small and regular, sometimes polygamo-dioecious, often apetalous: disk fleshy: calyx 4-5-toothed: petals 4-5, on the calyx-tube, or none: stamens 4-5, perigynous, alternate with the sepals and opposite the petals: ovary sessile: fruit a drupe or pod, with 1 seed in each cell; endosperm sparingly fleshy.

Calyx and disk free from the ovary. 185. Rhamnus.
Calyx and disk adherent to the base of the ovary. 186. Ceanothus.

185. Rhamnus.

Shrubs or small trees: leaves alternate, petioled, pinnately-veined, with small deciduous stipules: flowers greenish, polygamous or dioecious, in axillary clusters: calyx 4-5-cleft; calyx-tube bell-shaped, lined with the disk; calyx and disk free from the ovary: petals 5, oblong, sessile, acute: stamens 4-5; ovary 2-4-celled: fruit a berry-like drupe, with 2-4 separate seed-like nutlets.

R. purshiana DC. Small tree, 3-12 m. high, with nearly smooth dark-gray bark: young twigs pubescent: leaves elliptic, obtuse or acuminate,
rounded at base, somewhat undulate, denticulate, pubescent, especially beneath, 5-15 cm. long; petioles 1-2 cm. long, downy; umbels stout-peduncled, 8-15-flowered; flowers 3-5 mm. long; sepals 5; petals minute, hood-shaped; fruit black, obovoid, as large as a pea, 3-seeded, insipid. Union Flat, very rare.

186. CEANOTHUS.

Shrubs or small trees, sometimes spinescent; leaves alternate, petioled; flowers perfect, in small umbel-like clusters, forming dense panicles or corymbs at the summits of naked branches; calyx 5-lobed; calyx and disk adherent to the ovary; petals hooded, spreading; stamens 5; ovary 3-lobed; fruit a 3-lobed drupe, dry and splitting into its 3 carpels when ripe.

Leaves thick, shiny and gummy. C. VELUTINUS.
Leaves thin, neither shiny nor gummy. C. SANGUINEUS.

C. velutinus Doug. Stout shrub, 1-2 m. high, much branched; branchlets puberulent; leaves oval, obtuse, subcordate at base, prominently 3-nerved, finely denticulate, thick and firm, glabrous and gummy above, puberulent beneath, 5-8 cm. long; petioles stout: flowers white, in terminal panicles 5-10 cm. long; peduncles stout, puberulent; pedicels slender; carpels subglobose, 3-lobed above, nearly smooth. Thatuna Hills, common.

C. sanguineus Pursh. Shrub, 1-3 m. high, with slender smooth usually reddish branchlets; leaves thin, elliptical or ovate, obtuse, rounded at base, finely serrate, glabrate above, paler and puberulent beneath, 5-8 cm. long; petioles slender; panicles lateral, 6-10 cm. long, their peduncles villous; flowers white; capsules smooth, 3-lobed. Thatuna Hills, common.

Family 47. MALVACEAE.

Herbs or shrubs; leaves alternate, palmately-veined, with stipules; flowers regular, showy; peduncles axillary, jointed; calyx valvate; sepals 5, united at base, often subtended by an involucre of numerous bractlets; corolla convolute; petals 5, their bases united with each other and with the stamen-column; stamens numerous, monadelphous in a column; pistils several, the ovaries united in a ring or forming a several-celled pod; endosperm scant.

Carpels 1-ovuled.  
Bractlets 3, distinct.  
Bractlets none.  
Carpels 2-ovuled.  

187. MALVA.

Pubescent or glabrous herbs; leaves dentate, lobed or dissected; flowers perfect, axillary or terminal, solitary or clustered; involucre 3-leaved; calyx 5-cleft; petals 5, obcordate; styles numerous, stigmatic down the inner side; fruit depressed, separating at maturity into as many 1-seeded indehiscent carpels as there are styles.
M. rotundifolia L. Annual or biennial, pubescent or glabrous: stems prostrate, branched near the base, 20-60 cm. long; leaves round-reniform, 5-7-lobed, crenate-dentate, 2-5 cm. broad; petioles long and slender: flowers pale blue, about 1 cm. broad, clustered in the axils; pedicels slender, 1-2 cm. long; carpels 12-15, puberulent, not reticulated. A weed sparingly introduced.

188. SIDALCEA.

Herbs: leaves rounded, mostly lobed or parted: flowers usually purple, in a narrow terminal raceme or spike: involucre none: stamen-column double, the filaments of the outer series united usually into 5 sets opposite the petals: styles filiform, stigmatic on the inner surface; carpels 5-9, 1-ovuled, separating at maturity from the short axis, indehiscent.

S. oregana Gray. Perennial, puberulent throughout: stems erect, about 1 m. high, branched above: lower leaves orbicular, about 9-cleft, the segments incised; upper leaves more deeply cleft or parted, the segments narrower; petioles mostly longer than the blades; stipules linear: racemes strict, 10-30 cm. long: calyx densely puberulent, 5-6 mm. long, the lobes deltoid, acuminate: petals pink, about 2 cm. long; carpels roughened on the back. Low ground, common.

189. SPHAERALCEA.

Herbs or shrubs: flowers in narrow panicle-like racemes: involucre of 3 bractlets which are distinct or united at the base: petals notched or entire: stamen-column anther-bearing at the summit: styles stigmatic at the apex: carpels 2-valved; seeds usually 2-3 in each cell.


S. munroana Spach. Perennial, hoary-pubescent throughout: stems prostrate or decumbent, rarely erect, 20-40 cm. long: leaves broadly ovate, crenulately toothed or lobed, 2-4 cm. long; petioles mostly as long as the blades; panicle narrow, 10-30 cm. long: flowers bright scarlet: petals about 1 cm. long: carpels reniform, oval, 3-4 mm. long. Sandy ground near Lewiston.

S. acerifolia Nutt. Stout. Stout, perennial, 1-1.5 mm. tall, green, sparsely pubescent: leaves large, palmately 5-7-lobed, the lobes acute, coarsely dentate; petioles stout, mostly as long as the blades; panicle narrow, erect, 15-60 cm. long: petals rose-colored, 2-3 cm. long: carpels very bristly, 2 cm. long. Common along Snake River, otherwise infrequent.

FAMILY 48. HYPERICACEAE.

Herbs or shrubs: leaves opposite, entire, truncate, with translucent or dark-colored glandular dots, without stipules: flowers perfect, regular: sepals 4-5: petals 4-5, hypogynous: stamens
commonly in three or more clusters: styles 2–5, usually distinct or nearly so: capsule 1-celled, with 2–5 parietal placentae: endosperm none.

190. HYPERICUM.


Erect, 30–60 cm. tall: stamens 60 or more. H. formosum.

H. formosum var. scouleri Coulter. Stems erect, simple or branched above, 15–60 cm. high: leaves oblong-ovate, obtuse, half-clasping at base, 2–3 cm. long, black-dotted on the margin: inflorescence caespitose, compact, in fascicles. Moist places, common.

H. anagalloides var. nevadense Greene. Stems weak, erect or ascending, 8–15 cm. high: leaves pale and glaucous, oblong, obtuse, with serrate margin, 2–3 cm. long: cymes peduncled, loose, the branches elongated: flowers small, not dotted, 6–8 mm. broad, dark-yellow: sepals unequal, lanceolate, acuminate, in fruit much longer than the capsule. Forming loose mats in springy places; not common.

FAMILY 49. ELATINACEAE.

Low annual herbs: leaves opposite, not punctate, with membranous stipules: flowers minute, axillary, regular, symmetrical: sepals 2–5, free: petals 2–5, hypogynous: stamens as many or twice as many as the petals: ovary 2–5-celled, with a many-ovuled axile placenta: fruit a capsule.

191. BERGIA.

Herbs or somewhat shrubby plants, branching, nearly erect, often pubescent: leaves entire or serrate: flowers axillary, solitary or clustered: parts of the flower in fives: sepals acute with a prominent midrib: capsule crustaceous: ovoid, 5-valved: seeds numerous.

B. texana Seubert. Annual, branched from the base, 4–20 cm. high: stems erect or ascending, glandular-pubescent: leaves lanceolate, obtuse or spatulate, serrate, 1–2 cm. long, petiolate: flowers in small axillary fascicles: sepals acuminate, 3 mm. long, equaling the white or pinkish petals: stamens 5 or 10. Sandy banks of Snake River at Almota, very rare.

FAMILY 50. VIOLACEAE.

Herbs: leaves alternate or basal, with stipules: flowers perfect, axillary, nodding: sepals 5, hypogynous, somewhat irregular, 1-spurred, of 5 petals: stamens 5, hypogynous: ovary 1-celled,
with 3 parietal several-ovuled placentae: capsule 3-valved; endosperm copious.

192. VIOLA.

Mostly perennial herbs: leaves alternate, with foliaceous stipules: peduncles 1-flowered, axillary: flowers usually dimorphous, the earlier ones perfect and conspicuous, but often sterile, the later (near the ground in stemless species) with small and rudimentary petals, cleistogamous and producing numerous seeds: sepals unequal, more or less auricled: petals unequal, the lower spurred: the two lower stamens spurred.

Flowers violet, rarely white.  

V. canina var. adunca Gray. Stems leafy, short or at length elongated, from creeping rootstocks, nearly glabrous throughout: leaves ovate, obtuse, slightly cordate at base, crenate, 1-3 cm. long, on slender petioles, 5-8 cm. long; stipules foliaceous, lanceolate, fringe-toothed: flowers violet-purple, rarely white: petals 6-12 mm. long, the lateral ones bearded; spurs nearly straight, as long as the petals. Stony hillsides and copses. Common and variable.

V. glabella Nutt. Whole plant glabrous or nearly so; rootstock rather stout, creeping: stem leafy above, 10-20 cm. tall: radical leaves reniform, acuminate, crenate-serrate, 1-5 cm. broad, long-petioled; cauline similar, short-petioled; stipules thin, membranous, ovate or lanceolate; peduncles 2-6 cm. long; petals yellow, purple-veined, 10-12 mm. long: spur short and broad. Moist rich woods, Thatuna Hills.

V. nuttallii Pursh. Stems mostly very short from rather thick fleshy roots: leaves numerous, more or less pubescent: blades oblong or narrowly ovate, obtuse, cuneate or truncate at the base, crenate or entire, 2-4 cm. long: petioles margined, longer than the blades; stipules narrow, entire: flowers yellow, the peduncles usually shorter than the leaves: petals about 5-10 mm. long; spur short and blunt. Rather rare, in meadows. A very variable species. Our common form has been named V. linguaefolia Nutt. A noteworthy form or variety, V. flavovirens Poll., with flowers 2-2.5 cm. across, occurs near Troy.

V. orbiculata Geyer. Rootstock short, scaly: leaves orbicular, cordate, glabrous or nearly so, the deep sinus closed, obscurely crenate, 1-3 cm. broad; petiole slender, 5-10 cm. long: flowering scapes about as long as the leaves; petals yellow, 7-10 mm. long, the blunt spurs short. Coniferous woods, Thatuna Hills. Occasionally short stolons are formed which bear only cleistogamous flowers.

Family 51. LOASACEAE.

Herbs, with rough-barbed or stinging hairs: leaves alternate or opposite, without stipules: flowers perfect: calyx 4-5-lobed, adher-
ent to the ovary: stamens usually very numerous, rarely few, some of the outer occasionally petal-like: ovary 1-celled, with 2–3 parietal placentae: endosperm mostly scant or none.

193. MENTZELIA.

Annual or biennial erect herbs, more or less rough with rigid barbed hairs, the stems becoming white and shining; leaves alternate, mostly coarsely toothed or pinnatifid: flowers terminal, solitary or in cymose clusters: calyx cylindrical, 5-parted: petals 5 or 10, regular, spreading, perigynous: stamens perigynous: styles 3, more or less united into one: capsule few–many-seeded.

Flowers large, 6–8 cm. broad. M. laevicaulis.
Flowers small, 6–8 mm. broad. M. dispersa.

M. laevicaulis Torr & Gray. Biennial: stem stout, erect, 30–100 cm. high, hoary-pubescent throughout or glabrate, branched above: radical leaves lanceolate, acute, petioled, 10–15 cm. long, coarsely dentate or lobed, hoary-pubescent: cauline similar, sessile, gradually reduced upwards: flowers nearly sessile, terminal, mostly solitary: calyx-lobes lanceolate-attenuate, 2–3 cm. long: outer petals lanceolate, acute, tapering at the base, 3–6 cm. long: inner petals, when present, narrow: stamens numerous, as long as the style, shorter than the petals: capsule oblong, about 2 cm. long. Gravelly places near Colfax and along Snake River.

M. dispersa Wats. Annual, puberulent throughout: stem white, erect, rarely decumbent, sparingly branched, 10–40 cm. high: leaves oblong or lanceolate or the upper ovate, entire or sinuately pinnatifid, 2–6 cm. long, sessile: flowers yellow, sessile or nearly so, in leafy cymes, 6–10 mm. broad: calyx-lobes deltoid-lanceolate, shorter than the petals: capsule linear, 2–3 mm. long: seeds nearly cubical, smooth, grooved on the angles. Dry soil, Wawawai and Cedar Mountain.

Family 52. CACTACEAE.

Fleshy and thickened plants: stems flattened, terete, ridged or tubercled, continuous or jointed, leafless or with small leaves, generally spiny: spines from cushions of minute bristles: flowers solitary, sessile, perfect, regular, showy: sepals and petals numerous, in several rows, the bases adherent to the ovary: stamens numerous, on the calyx-tube: style 1; ovary 1-celled, with several parietal placentae: ovules numerous: fruit a 1-celled berry: endosperm scanty or copious.

194. OPUNTIA.

Jointed, much-branched plants: leaves small, terete, subulate, early deciduous, on young branches: flowers usually lateral, large: calyx-tube not prolonged beyond the ovary; lobes numerous, spreading: petals numerous, slightly united: stamens very numerous, in several rows: fruit a berry, often prickly.
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O. polyacantha Haw. Prostrate, frequently in large tufts; joints of the stem flattened, orbicular or oblong, 5-12 cm. long, pale green; leaves minute, 3-4 mm. long; cushions pale bristly; spines 4-8, whitish, usually red-tipped, 5-20 mm. long, mostly deflexed; flowers yellow, 4-5 cm. broad; fruit ovate, dry, 2.5 cm. long, with a shallow saucer-like apex. Rocky and sandy places, banks of Snake River. Our form is not typical.

Family 53. LYTHRACEAE.

Herbs: leaves mostly opposite and entire; flowers axillary or whorled, perfect: calyx enclosing but not united to the ovary: petals as many as the calyx-teeth, perigynous, or none: stamens 4-14, on the calyx: style 1; ovary 2-4-celled; ovules numerous, rarely few: fruit a membranous capsule; endosperm none.

Flowers mostly more than one in the axils: capsule bursting irregularly.

195. AMMANNIA. Flowers mostly solitary in the axils: capsule septicidally dehiscent.

196. ROTALA.

195. AMMANNIA.

Low and inconspicuous smooth herbs: leaves opposite, narrow; flowers small, 1-1 several in the axils: calyx bell-shaped, usually 4-angled, 4-toothed and with 4 intermediate short tooth-like appendages in the sinuses: petals 4, small, early deciduous, or wanting: stamens 4-8: capsule globular, enclosed in the calyx, mostly 4-celled, bursting irregularly.

A. coccinea Rothb. Erect or ascending, glabrous, 5-30 cm. high, branched below: leaves oblong-linear, acute or obtuse, auriculate-clasping at the sessile base, entire, 2-4 cm. long: flowers 1-5 in the axils, sessile or nearly so; petals broadly spatulate, truncate: style slender, about one-half as long as the capsule. Sandy banks of Snake River at Almota, very rare.

196. ROTALA.

Low annual mostly glabrous herbs: stems 4-angled: leaves opposite, sessile or sometimes petioled: flowers small, axillary, mostly solitary: calyx 4-lobed: petals 4: stamens 4, short: ovary free from the calyx, globose, 4-celled: capsule globose, enclosed by the membranous calyx, 4-celled, septicidally dehiscent.

R. ramosior Koehne. Annual, glabrous, simple or branched below, 5-15 cm. high, erect or ascending: leaves entire, oblong or spatulate, obtuse or acute, 1-2 cm. long, narrowed into a short petiole at base, not auricled: flowers mostly solitary in the axils: calyx 2-3 mm. long; petals minute: style very short. Banks of Snake River at Almota, rare.
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Family 54. Onagraceae.

Herbs or sometimes shrubby; leaves simple, alternate or opposite; stipules none; flowers perfect, symmetrical, the parts mostly in fours: calyx-tube adherent to the ovary; petals on the throat of the calyx or wanting; stamens as many or twice as many as the petals or calyx-lobes, on the calyx-tube; style single, slender; stigma-lobes as many as the cells of the ovary: fruit a capsule or small nut; endosperm none.

Fruit indehiscent, nut-like.
Fruit a many-seeded capsule.
Seeds with a tuft of silky hairs: lower leaves opposite.

197. Epilobium.

Mostly perennial herbs: leaves nearly sessile, denticulate or entire, alternate or opposite: flowers axillary or terminal, solitary or clustered: calyx-tube scarcely prolonged beyond the ovary, 4-cleft: petals 4, spreading or somewhat erect: stamens 8, the 4 alternate ones shorter; fruit a dehiscient capsule: seeds numerous, with a tuft of silky hairs at the end.

Calyx-tube not extending beyond the ovary: flowers large, 2-3 cm. broad:
leaves alternate.

E. spicatum

Calyx-tube extending beyond the ovary: leaves opposite.

Much branched: stigma 4-lobed.

E. paniculatum

Usually simple: stigma entire.

E. adenoacaulon

E. spicatum Lam. Perennial, erect, about 1 m. high, glabrous or puberulent: leaves numerous, lanceolate, acute, entire or denticulate, nearly sessile, 8-16 cm. long; lateral veins confluent at the margin: raceme erect, many-flowered, 20-40 cm. long; flowers rose-colored, 2-3 cm. broad; pedicels slender, exceeding the narrow bracts: petals obovate, entire, clawed: stigma 4-lobed: capsules spreading, linear, canescent, 5-10 cm. long. Not uncommon, sometimes a troublesome weed.

E. paniculatum Nutt. Annual, glabrous or minutely pubescent, much-branched above, 30-60 cm. high: bark becoming loose and papery at base:
leaves linear or linear-lanceolate, often curved and folded, acute, denticulate, 2-5 cm. long, attenuate to a short petiole: flowers pink or whitish, variable in size, usually 4-10 mm. broad, in loose racemes terminating the almost naked branches; petals notched: capsules lanceolate-linear, 1-1.5 cm. long, on pedicels about as long. Common and variable.

**E. adenocaulon** Haussk. Perennial by short stolons which produce fleshy rosettes in the fall: stems erect, 30-60 cm. high, usually simple, leafy, glabrous or puberulent, sometimes glandular above: leaves mostly opposite, lanceolate, acutish, closely denticulate, glabrous or puberulent, 5-7 cm. long, sessile; inflorescence terminal, becoming loose: petals notched, about 4 mm. long, pink; capsules linear, nearly sessile, 6-8 cm. long, usually puberulent; seeds minutely papillate. Low ground, common. Very variable.

198. **GAYOPHYTUM.**

Very slender caulescent branching annuals: leaves alternate, linear, entire: flowers axillary: calyx-tube not prolonged beyond the ovary, 4-parted: 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 the petals on shorter filaments and usually sterile: ovary 2-celled: fruit a dehiscent capsule, seeds few-many, naked, in one row.

Branched above: capsules slender-pedicelled. **G. ramosissimum**. Simple or branched at base: capsule sessile. **G. pumilum**.

**G. ramosissimum** Torr. & Gray. Erect, with usually many slender branches, glabrous below, puberulent above, 15-40 cm. high: leaves linear or linear-lanceolate, 1-4 cm. long, acute, attenuate at the sessile base: flowers pink, small, 2-4 mm. broad, pedicelled: capsules oblong or somewhat club-shaped, often torulose, 6-12 mm. long, spreading, on slender pedicels, sometimes deflexed; seeds not hairy. Dry soil, Thatuna Hills.

**G. pumilum** Wats. Erect, simple or branched at base, 5-15 cm. high, glabrous or minutely puberulent: leaves numerous, lanceolate, acute, attenuate to the sessile base, 1-2 cm. long: flowers minute: capsules stout, sessile, 10-22 mm. long, usually appressed to the stem; seeds smooth. Thatuna Hills, rare.

199. **CLARKIA.**

Annual, with erect brittle stems: leaves alternate on short slender petioles, the uppermost sessile: flowers showy, in terminal racemes: calyx-tube obconical above the ovary, 4-cleft: petals 4, with claws, lobed or entire, purple or violet: stamens 8; those opposite the petals often sterile: anthers attached at their bases, erect: ovary 4-celled: capsule linear, attenuate above, coriaceous, erect, somewhat 4-angled, 4-celled and 4-valved to the middle; seeds numerous.

Blade of the petals 3-lobed. **C. pulchella**.
Blade of the petals entire. **C. rhomboidea**.

**C. pulchella** Pursh. Stems erect, much branched above, 15-60 cm. high, puberulent: leaves linear or linear-lanceolate, entire, rather obtuse, short-
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petioled, glabrous or puberulent, 2–6 cm. long; flowers red, in corymb-like racemes: petals about 20 mm. long, the broad blades 3-lobed, the long claw with a slender tooth on each side; inner four anthers rudimentary: stigmas lobes much dilated: capsule oblong, truncate at apex, 2–3 cm. long, puberulent, stout-pedicelled. Everywhere common.

C. rhomboidea Doug. Slender, erect, usually simple, 15–60 cm. high, puberulent: leaves broadly lanceolate, acute at each end, entire, 1–4 cm. long, slender-petioled: flowers few, scattered: petals rhomboidal, entire, about 1 cm. long, the claw often toothed: stamens all perfect; filaments with hairy scales at base: capsules stout, 4-angled, acuminate, nearly sessile, 2–3 cm. long. Dry woods, Thatuna Hills.

200. BOISDUVALIA.

Erect leafy annual herbs: leaves alternate, sessile, simple: flowers small, in leafy simple or compound spikes: calyx-tube funnel-form above the ovary, 4-lobed: petals 4, 2-lobed, purple or white: stamens 8, those opposite the petals shorter; anthers attached near their bases, erect: ovary 4-celled, several-ovuled: capsule membranaceous, ovate-oblong to linear, nearly terete, acute, sessile, dehiscent to the base; seeds 3–8, in one row in each cell.

Leaves all alike, toothed, ovate-lanceolate. B. GLABELLA.
Leaves all alike, nearly entire, narrowly lanceolate. B. TORREYI.
Floral leaves broader than the lanceolate lower ones. B. DENSIFLORA.

B. glabella Walp. Erect and simple or more commonly branched at base and decumbent, 10–30 cm. high, leafy, densely villous to glabrous: leaves all alike, ovate-lanceolate, acute or acuminate, serrate or denticulate, 1–2 cm. long; flowers sessile in the upper axils, occasionally also in the lower ones, shorter than the leaves: corolla purplish, 2 mm. long, capsules fusiform, tapering from a broader base, 6–7 mm. long, the partitions adherent to the valves; seeds 4–6 in each cell, somewhat fusiform. Common in the bottoms of dried ponds. Puzzling intermediate forms occur between this and the next species.

B. torreyi Wats. Erect, simple or rarely branched below, villous throughout, 30–40 cm. high: leaves all alike, lanceolate, acute, entire or denticulate, 2–3 cm. long; flowers in the axils of the upper leaves and occasionally of the lower also: corolla 2–3 mm. long, purplish: capsules slender, acuminate, 8–10 mm. long; partitions adherent to the valves: seeds 6–8 in each cell. Growing with the preceding and in similar places.

B. densiflora Wats. Erect, simple or with a few branches below, hoary-puberulent throughout or nearly glabrous, 30–90 cm. high: lower leaves lanceolate, acuminate, denticulate, 2–6 cm. long; upper leaves gradually broader and shorter, ovate, acuminate, nearly entire, crowded: spikes dense: corolla 6–8 mm. broad, purplish: capsules oblong, 5–8 mm. long, the partitions not adherent to the valves in dehiscence; seeds 3–6 in each cell. Common in low ground, variable.

201. PACHYLOPHUS.

Perennial acaulescent or nearly acaulescent herbs; leaves basal, pinnatifid or pinnately-toothed, petioled: flowers basal, more or less tufted: calyx-tube linear-funnelform; segments narrow, one-
half to one-third the length of the tube: petals white or pink: stamens 8, the alternate ones longer; anthers attached near the middle, versatile: capsule 4-celled, pyramidal, its angles retuse or obtuse, transversely wrinkled; seeds sessile, in one or two rows.

**P. caespitosus** Raimann. Stemless or nearly so, with a thick tap-root, villous throughout or nearly glabrous: leaves all radical, lanceolate or oblanceolate, obtuse or acute, sinuately irregular-dentate or pinnatifid, 5-10 cm. long, narrowed into a petiole about as long; flowers barely exceeding the leaves, rose-colored, 4-6 cm. broad: calyx-tube narrow, 5-10 cm. long, much longer than the ovary, the lobes lanceolate, somewhat reflexed: capsule oblong-ovate, sessile or nearly so, 3-4 cm. long. Bluffs of Snake River, near Lewiston.

202. **ONAGRA.**

Annual or biennial caulescent herbs, with mostly erect stems: leaves alternate, wavy or toothed, sessile or short-petioled: buds erect: flowers yellow, in terminal spikes: calyx-tube elongate, terete; segments narrow: petals 4, spreading: stamens 8, equal in length; anthers attached near the middle, versatile: stigma deeply 4-cleft, its segments linear: capsule 4-celled, 4-angled, more or less tapering: seeds in two or more rows.

**O. biennis** var. **strigosa** Piper, n. comb. (*O. strigosa* Ryd.: *Onothera biennis* var. *canescens* Torr & Gray.) Annual or biennial, erect, 5-2 m. high, usually simple, appressed-canescens throughout: leaves numerous, lanceolate or oblanceolate, acute, denticulate, 3-12 cm. long, the lower narrowed at base into a petiole, the upper sessile: spikes terminal, elongate in fruit: flowers yellow, 2-4 cm. broad, opening in the evening: calyx-tube slender, 2-3 cm. long, much longer than the ovary or the spreading lobes: capsules oblong, narrowed above, sessile, 2-2.5 cm. long. Sandy banks of Snake River.

203. **SPHAEROSTIGMA.**

Annual or biennial caulescent herbs: flowers usually in spikes: calyx-tube obconical or shortly funnelform: stamens 8, equal in length; anthers attached near the middle, versatile: stigma entire: capsule 4-celled, terete or angled: seeds in one row in each cell.

**S. contorta** Walp. Slender annual, usually branched from the base, 10-15 cm. high, sparsely puberulent or glabrous: leaves narrowly linear, entire or denticulate, 2-3 cm. long, sessile: flowers sessile, in the axils, somewhat shorter than the leaves: petals reddish-yellow, 2 mm. long, as long as the reflexed calyx-lobes; capsules sessile, linear, somewhat 4-sided, usually twisted or bent at the base, 2-3 cm. long. Sandy soil, lila.

204. **GAURA.**

Annual biennial or perennial herbs, somewhat woody at base: leaves alternate, sessile: flowers white or rose-colored, in spikes or racemes: calyx-tube much prolonged beyond the ovary, 4-lobed, rarely 3-lobed: petals 4, with claws turned up: stamens mostly 8, turned down: fruit hard and nut-like, 3-4-ribbed or angled, indehiscent or nearly so, usually 1-celled and 1-4-seeded.
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**G. parviflora** Douglass. Annual, erect, 1-2 m. high, whitish-pubescent throughout, the stems villous: leaves numerous, ovate or lanceolate, acute, entire or denticulate, rounded at base, nearly sessile, silky-pubescent, somewhat villous-ciliate, 6-10 cm. long; flowers small, pink, 3-4 mm. broad, in erect spikes, 8-30 cm. long; bracts lanceolate, quickly deciduous: fruit sessile, fusiform, glabrous, 6-8 mm. long. Sandy banks of Snake River.

**Family 55. UMBELLIFERAE.**

Herbs: stems usually hollow: leaves compound or simple; petioles often dilated at the base: flowers small, in umbels or rarely in heads, the umbels often subtended by primary bracts (the involucre); in compound umbels, the secondary rays often subtended by secondary bracts (the involucels): calyx entirely adherent to the ovary: petals and stamens on the calyx-tube: base of the style (stylodium) often expanded: ovary 2-celled, 2-ovuled: fruit of 2 seed-like dry carpels with contiguous inner surfaces (the commissure), each carpel marked lengthwise with 5 primary ribs and often with 4 intermediate secondary ones, in the intervals between which oil-tubes are commonly found: carpels often separating from each other, supported on the summit of a slender axis (the carpophore). Mature fruits are absolutely necessary for accurate determinations in this family.

Flowers in dense heads.
Flowers not in heads, evidently umbellate.

Fruit bristly.
- Fruit narrow, elongated: bristles appressed.
- Fruit short, ovate: bristles spreading.
Fruit not bristly.
- Oil-tubes obsolete or obscure.
- Oil-tubes distinct.

Fruit strongly flattened dorsally, with lateral ribs more or less prominently winged.
- Oil-tubes solitary in the intervals.
- Stylopodium thick, conical: plants large.
- Stylopodium none: plants small or medium sized.
- Oil-tubes more than one in the intervals.
- Caulescent and branching.
- Acaulescent or nearly so.
Fruit not strongly flattened dorsally, usually more or less laterally flattened.
- Oil-tubes solitary in the intervals.
- Stylopodium conical.

Leaflets (at least the upper) linear to filiform.
- Leaflets broader.
- Stylopodium flat or wanting.
- Oil-tubes more than one in the intervals.
- Ribs conspicuously winged.
- Ribs not winged.
Mostly hispid annuals: leaves pinnately dissected, with very small segments: flowers white: calyx-teeth prominent: fruit short, ovate or oblong, flattened laterally: carpel with 5 filiform bristly primary ribs (bristles spreading) and 4 prominently winged secondary ones with barbed or hooked prickles: stylodarium thick, conical: oil-tubes solitary in the intervals.

C. microcarpa Hook. & Arn. Annual, erect, branched, 8-20 cm. tall, more or less hairy: leaves pinnately much dissected, the ultimate segments linear-oblong, 2.5 mm. long: umbels unequally 3-6-rayed: involucre of bracts which resemble the leaves: involucels usually entire: fruit oblong, armed with rows of hooked prickles. Sandy soil, banks of Snake River.

Stout perennial herbs: leaves ternate, then pinnate, rarely simply pinnate-compound: involucre scanty or none: involucels of small bractlets or none: flowers in large terminal umbels: calyx-teeth mostly obsolete: stylodarium conical: fruit flattened dorsally, ovate or oblong, glabrous or pubescent: calyx-tube prominent, crenulate: carpel with strong ribs, the lateral ribs usually broadly winged, distinct from those of the other carpels, forming a double-winged margin to the fruit: oil-tubes 1-several, in the intervals, or indefinite; 2-10 on the commissural side: seed face plane or somewhat concave.

A. lyallii Wats. Stout, 60-150 cm. tall, glabrous or the inflorescence sometimes puberulent: leaves ternate, thin, once or twice pinnate: leaflets ovate or lanceolate, acute, serrate or dentate, 2-10 cm. long: umbel many-rayed: involucre and involucels wanting: fruit oblong, 4-6 mm. long, the lateral wings about as broad as the body. Thatuna Hills, along streams.

Tall stout perennials: leaves large, ternately compound: involucres deciduous: involucels of numerous bractlets: flowers white, in large many-rayed umbels: calyx-teeth small or obsolete: petals obcordate, the outer ones often dilated and 2-cleft: stylodarium thick, conical: fruit broadly ovate, very much flattened dorsally, somewhat pubescent: carpel with dorsal and intermediate ribs filiform; the broad lateral wings contiguous to those of the other carpel, strongly nerved toward the outer margin: oil-tubes solitary in the intervals, conspicuous, about half as long as the carpel, 2-4 on the commissural side: seed very much flattened dorsally.
H. lanatum Michx. Very stout: 1-2 m. tall, pubescent throughout: leaves ternate or bipinnately-compound; petioles much dilated; leaflets round-cordate, 10-25 cm. broad, irregularly lobed and dentate; rays 5-15 cm. long: fruit obcordate, 8-12 mm. broad, the oil-tubes conspicuous. Abundant along streams.

208. LOMATIUM.

Acaulescent or short acaulescent dry ground perennials: roots fusiform or tuberous: leaves ternate to dissected (sometimes pinnate): involucres mostly present: flowers yellow, white or purple: calyx-teeth obsolete, very rarely evident: styo-locarp thin: oil-tubes 1-5-several in the intervals (rarely obsolete), 2-10 on the commissural side: seed dorsally flattened, with plane face (rarely slightly concave).

Flowers white.
Tubers globose: fruit puberulent.
Tubers globose: fruit glabrous.
Tubers fusiform: fruit glabrous.
Flowers yellow.
Tubers globose: fruit oblong, puberulent.
Tubers fusiform: fruit linear, glabrous.
Roots not tuberous, elongate.
Leaves much dissected: ill-scented.
Leaves 2-3-ternate.

L. gormanni C. & R. Glabrous, or nearly so, the proper stems short or none: peduncles 5-7 cm. tall, ascending or spreading: tubers globose, about 2 cm. in diameter, bearing numerous roots on the under side: leaves bipinnately-compound, the ultimate segments oblong or linear: umbel unequally 1-10-rayed: flowers white: anthers purple: fruit ovate, sessile, puberulent, 6 mm. long, Abundant in rocky places.

L. farinosum C. & R. Proper stems usually short: peduncles 10-30 cm. high: tubers globose, rarely 2 to 3 in a row: leaves once or twice palmate; leaflets linear, 1-8 cm. long, 3-5 together: umbel unequally 5-15-rayed, the rays 2-5 cm. long: flowers white: fruit pedicelled, linear-oblong, glabrous, 6-8 mm. long. Rock ledges on the bluffs of Snake River.

L. macrocarpum C. & R. Proper stems short, the peduncles 10-40 cm. high, white-pubescent throughout: tubers elongate, fusiform: leaves decomposed, the ultimate segments ovate or linear, short: umbels 3-20-rayed, the involucres conspicuous, lanceolate: flowers white: fruit oblong, glabrous, 6-20 mm. long. On basalt outcroppings, common.

L. cous C. & R. Proper stem none: peduncles 8-12 cm. tall: tuber subglobose or elongate: leaves glabrous, bipinnately-compound, the ultimate segments oblong, acute, mostly entire: umbel 3-12-rayed, the rays unequal, 1-4 cm. long: flowers yellow: fruit oblong, sparsely puberulent, short-ped-
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lcelled, 6-8 mm. long, with narrow wings: oil-tubes large, solitary between the ribs, 4-6 on the inner side. Bluffs of Snake River in stony soil. The commonest species; used as food by the Indians.

L. ambiguum C. & R. Glabrous, 10-16 cm. tall, the stems usually leafy: tubers globose or more commonly fusiform: leaves 1-2, pinnately compound, the ultimate segments linear, 1-5 cm. long: umbels unequally 8-18-rayed: flowers yellow: fruit linear, narrow, 6-8 mm. long, on pedicels about as long. Stony soil, common.

L. grayi C. & R. Glabrous and somewhat glaucous, the peduncles 8-40 cm. high: leaves decumbent, the ultimate segments very numerous, short, filiform: umbel 6-16-rayed: flowers yellow: fruit oblong, 8-16 mm. long, glabrous. Common in springy gravelly places. The whole plant is very ill-smelling.

L. triternatum C. & R. Peduncles 30-70 cm. tall: leaves bipinnate or triternate, puberulent: leaflets linear-lanceolate, 5-15 cm. long: umbel unequally 5-18-rayed, the rays 1-5 cm. long: fruit oblong, glabrous, 6-12 mm. long: oil-tubes large, solitary between the ribs; two on the inner side. Low meadows, common.

209. PTERYXIA.

Acaulescent or nearly so, clothed at the base by the persistent leaf-sheaths: leaves bright green or somewhat pale, clustered at the base, with main divisions ternate, then pinnately finely dissected into short linear segments: involucre mostly none: involucels of narrow bractlets: flowers yellow: calyx-teeth evident: fruit oblong to orbicular, glabrous: carpel usually strongly flattened dorsally, with wings: stylopodium wanting: oil-tubes several in the intervals: seed-face plane or with a shallow and broad cavity.

P. foeniculaceum Nutt. Rootstock much branched, bearing numerous stems 30-50 cm. tall: leaves pinnately decumbent, very finely dissected, glabrous, the ultimate segments linear, 2-4 mm. long: fruit oblong, 6-8 mm. long, the wings not as broad as the body, plane. In rock crevices on the banks of Snake River.

210. LEPTOTAENIA.

Usually tall or stout, glabrous, nearly acaulescent: roots thick, fusiform, often very large: leaves usually large, pinnately compound: involucre of few bracts or none: involucels of numerous small bractlets: flowers yellow or purple: calyx-teeth obsolete or sometimes evident: stylopodium wanting: fruit flattened dorsally, oblong-elliptical, glabrous: carpel with dorsal and intermediate ribs filiform or obscure: lateral wings very thick and corky: 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 commissural side, mostly small, sometimes obsolete: seeds very flat, with plane or slightly concave face.
Leaves puberulent.  
Leaves glabrous.  

**L. multifida** Nutt. Stout, 30–90 cm. tall: leaves ternately decompound, puberulent, the ultimate segments oblong-linear; umbel many-rayed; rays equal; flowers yellow; fruit elliptical, smooth, 8–12 mm. long; dorsal ribs very obscure; oil-tubes nearly obsolete. Common on hillsides.

**L. salmoniflora** C. & R. Stems 20–40 cm. high: leaves decompound, glabrous, very finely dissected, the ultimate segments filiform; umbel 4–10-rayed, the rays 2.5–4 cm. long; flowers yellow; fruit oblong, 10 mm. long, the dorsal ribs prominent; oil-tubes large. Common on basalt cliffs along Snake River.

211. **ERYNGIUM.**

Glabrous perennials: leaves often rigid, coriaceous, spinosely toothed, or divided: flowers white or blue, sessile, in dense bracteate heads; sepals very prominent, rigid and persistent; stylopodium wanting; styles short or long, often rigid: fruit ovoid, flattened laterally, covered with hyaline scales or tubercles: carpel with ribs obsolete: oil-tubes mostly 5, 3 dorsal and 2 commissural: seed face plane.

**E. articulatum** Hook. Erect, 30–70 cm. tall: branches dichotomous, usually with a peduncled head in the forks: lower leaves mostly reduced to long nodose petioles sometimes bearing a lanceolate entire or spinulose-serrate blade; upper leaves opposite, sessile, usually jagged near the base: heads globose, blue: bracts lanceolate, spiny-toothed, exceeding the head: calyx-lobes lanceolate, cuspidate, 4–5 mm. long: style shorter than the calyx-lobes. Wet places, not common.

212. **OSMORRHIZA.**

Glabrous to hirsute perennials, 30–90 cm. high: roots thick, aromatic: leaves ternately decompound: leaflets broad, ovate to lanceolate, variously toothed; involucre and involucels few-leaved or wanting: flowers white or purple, in few-rayed and few-fruited umbels: calyx-teeth obsolete: stylopodium conical, sometimes depressed: styles mostly short: fruit linear to linear-oblong, more or less attenuate at base, obtuse, acute or beaked at apex, glabrous or bristly on the ribs: carpels slightly flattened dorsally or not at all, often tapering into a long tail-like attenuation at the base, nearly pentagonal in section, with equal ribs and thin pericarp: oil-tubes obsolete in the mature fruit (often numerous in young fruit): seed face from slightly concave to deeply sulcate.

Fruit bristly-hairy: carpels conspicuously attenuated at base.  
Fruit smooth: carpels obtuse at base.  

**O. divaricata.**  
**O. occidentalis.**
**O. divaricata** Piper, n. comb. (*Washingtonia divaricata* Britton.) Glabrous or nearly so, 30-60 cm. tall; leaves bi-ternate; leaflets ovate or lanceolate, acute or acuminate, thin, coarsely serrate and more or less incised; umbels 2-9-rayed; pedicels mostly 1-2 cm. long; involucels none, fruit 16-20 mm. long, bristly-hairy on the ribs, the carpels distinctly beaked, much narrowed at the base. Rich woods, Thatuna Hills.

**O. occidentalis** Torr. Stout, more or less puberulent, 40-80 cm. tall; leaves 2-3-ternate; leaflets ovate-oblong, acute, serrate, 4-10 cm. long; umbel 5-12-rayed; involucels few or none; fruit 12-16 mm. long, obtuse at base, glabrous, shining, beaked, the ribs prominent and sharp. Cedar Mountain, on moist slopes.

312. **SIUM.**

Perennial, growing in water or in wet places; leaflets serrate or pinnatifid; involucre and involucels of numerous narrow bracts: flowers white: calyx-teeth minute: stylopodium depressed: styles short: fruit flattened laterally, ovate to oblong, glabrous: carpel with prominent coryck nearly equal ribs: oil-tubes 1-3, in the intervals, never solitary in all the intervals, 2-7 on the commissural side: seed subangular, with plane face.

**S. cicutaefolium** Gmel. Stout, 60-80 cm. tall: leaves pinnate, with 7-17 linear or lanceolate serrate acuminate leaflets, these 5-12 cm. long: umbel many-rayed, the rays 2.5-4 cm. long: fruit 3 mm. long, with prominent ribs. Margins of ponds, infrequent.

214. **ZIZIA.**

Smooth perennials, 30-90 cm. high: leaves simple to ternately compound: involucre none; involucels of small bractlets: flowers yellow, calyx-teeth prominent: stylopodium wanting: styles long: fruit flattened laterally, ovate to oblong, glabrous: central fruit of each umbellet sessile: carpel with filiform ribs: oil-tubes large and solitary in the broad intervals, 2 on the commissural side and a small one in each rib: seed terete, longitudinally grooved beneath the oil tubes.

**Z. cordata** Koch. Glabrous, 30-80 cm. tall: lower leaves simple, cordate, crenately toothed, 2-8 cm. long, sometimes lobed or even ternate, mostly long-petioled; upper leaves short-petioled, palmately compound, of 3-5 leaflets, ovate or lanceolate, incised and serrate: fruit ovate, 3 mm. long. Common in copses.

215. **CARUM.**

Smooth erect slender herbs: roots fascicled, tuberous or fusiform: leaves pinnate, with few linear leaflets: involucels of few to many bracts: flowers white: calyx-teeth prominent for the size of the fruit: stylopodium conical: fruit flattened laterally, orbicular to oblong, glabrous: carpels with filiform or inconspicuous ribs: oil-
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C. gairdneri Gray. Stems erect, slender, 30-100 cm. tall, simple or branched above; roots fusiform, clustered: leaves few, mostly pinnate, with 3-7 linear leaflets, 5-15 cm. long, the lowermost rarely bipinnate, the upper simple: umbels 6-15-rayed, the rays 2-4 cm. long: involucels linear, acuminate: fruit subglobose, flattened, 1-2 mm. long, with small calyx-teeth. Common in low meadows. Roots edible.

C. occidentalis Greene. Stout, 60-90 cm. high, glabrous or nearly so: rootstock short and thick: leaves twice-pinnate: the leaflets lanceolate, sharply serrate, acute, short-petioled, thickish, conspicuously veined: fruit oblong, 3-4 mm. long. Moist places, not rare.

Family 56. Cornaceae.

Trees or shrubs, rarely herbs: leaves simple, alternate, opposite or whorled: flowers regular, perfect, polygamous or dioecious, in cymes heads or spikes: calyx-tube coherent with the ovary: petals and stamens 4, on the margin of an hypogynous disk in the perfect flowers: style 1; ovary 1-2-celled, with one ovule in each cell: fruit a 1-2-seeded drupe or berry; endosperm hard.

C. canadensis. Perennial herb, 10-20 cm. high, the rootstocks woody: stems scaly below, bearing a false whorl of 4-6 leaves above and sometimes a pair near the middle: leaves ovate or oblong, acute or acuminate, narrow-
ed at base, sessile, entire, sparsely puberulent, 2-4 cm. long; peduncle solitary, 4-5 cm. long; involucral bracts 4-6, white, ovate, 8-16 mm. long; flowers greenish, small, in dense heads; fruit bright-red, globular, 4 mm. in diameter. Thatuna Hills, in rich woods.

C. stolonifera Michx. Shrub, 1-3 m. high, with bright red twigs, these usually puberulent when young; leaves opposite, entire, ovate or oval, acuminate or acute, cuneate at base, appressed-puberulent or glabrous beneath, 4-8 cm. long; petiole 1-2 cm. long; cymes short-peduncled, 2-6 cm. broad, usually puberulent; flowers white, 6-8 mm. broad; fruit globose, blue; stone somewhat flattened, usually broader than long. Common along streams.

**Family 57. Ericaceae.**

Perennial herbs or shrubs: leaves simple, commonly alternate, articulated to the stem, without stipules: flowers regular, or nearly so: corolla generally gamopetalous, 4-5-lobed: stamens as many or twice as many as the corolla lobes, hypogynous: style single: ovary with as many cells as the corolla-lobes, or rarely less: seeds small; endosperm fleshy.

Calyx adherent to the ovary. 224. Vaccinium.
Calyx free from the ovary. Green foliage lacking. 221. Pterospora.
Fruit a berry-like drupe. 223. Arctostaphylos.
Flowers solitary on a scape. 219. Moneys.
Flowers in a corymb or umbel on a leafy stem. 220. Chimaephila.

218. Pyrola.

Low and smooth perennial herbs: leaves rounded, petioled, evergreen, basal: flowers nodding, in a simple raceme, on a more or less scaly-bracted scape: corolla of 5 concave more or less converging petals: stamens 10; ovary superior, 4-5-celled; ovules very numerous: fruit a depressed globose 5-lobed 5-celled capsule.

Style straight: raceme one-sided. P. secunda.
Style deflexed: leaves mottled. P. picta.
Style deflexed: leaves not mottled. P. rotundifolia.

P. secunda L. Rootstocks slender, usually much branched: stems erect or ascending: leaves somewhat clustered at the base, ovate, obtuse or acute, crenate, 1-3 cm. long, on slender petioles 1 cm. long; cymes 10-25 cm. high, with few scale-like bracts, which also occur between the leaves; raceme one-sided, 3-8 cm. long; flowers white, on short pedicles, soon nodding: corolla regular; petals oblanceolate, 4 mm. long, each with a pair of tubercles at base: anthers obtuse: styles straight; stigmas large, 5-lobed. Deep woods, Cedar Mountain.
P. picta Smith. Rootstocks creeping; leaves tufted at base, oblong, ovate or orbicular, obtuse or acute, mucronate, obscurely denticulate or entire, green, variegated with white along the veins, often purple beneath, 2-6 cm. long; petioles margined, 1-3 cm. long; scape erect, 15-30 cm. high, with few bracts, 10-20-flowered: calyx-lobes short, ovate, about one-fourth as long as the petals; corolla irregular; petals white, 6-7 mm. long, anthers constricted at the apex: style deflexed; stigma with a projecting collar. Coniferous woods, Thatuna Hills.

P. rotundifolia var. bracteata Gray. Leaves all basal, green, orbicular, sometimes ovate and acute, or obovate, rounded at base, denticulate, crenulate or entire, 3-6 cm. long; petioles margined, as long as the blades: scape 20-40 cm. high, with several brownish scarios lanceolate bracts; racemes many-flowered: calyx-lobes triangular-lanceolate, about half as long as the petals; corolla irregular; petals white, 6-7 mm. broad; anthers slightly constricted at apex: style declined; stigma with a collar-like ridge. Deep woods, Thatuna Hills.

219. MONESES.

Low perennial glabrous herbs: flowers solitary on a slender scape, drooping, white or pink: petals 5, widely spreading, orbicular: stamens 10; filaments not enlarged in the middle, naked: style exserted; stigma large, peltate, with 5 short radiating lobes; ovary globose, 4-5-celled; ovules numerous capsule subglobose, 4-5-lobed, 4-5-celled, 4-5-valved: seeds numerous, minute.

M. grandiflora S. F. Gray. Perennial, with slender rootstock, the short upright stem bearing 2-4 pairs or whorls of leaves: leaves obovate or orbicular, obtuse, finely crenate or dentate, 8-20 mm. long, narrowed at the base, with a shorter petiole: scape 5-12 cm. high, 1-flowered, usually bearing a solitary bract: flowers white, nodding, 12-20 mm. broad; capsule erect, 6-8 mm. broad. Coniferous woods, Thatuna Hills, rare.

220. CHIMAPHILA.

Low nearly herbaceous perennials: leaves irregularly opposite or whorled or scattered, coriaceous, short-petioled, serrate: flowers in corymbs or umbels, on a leafy stem: petals 5, widely spreading, orbicular; anthers 2-horned: stigma large, peltate, with 5 narrow and conspicuous radiating lobes: valves of the capsule naked.

C. corymbosa Pursh. Stems 15-30 cm. high, erect, from horizontal rootstocks: leaves evergreen, leathery, oblanceolate, acute, serrate, 2-4 cm. long, short-petioled, glabrous or minutely puberulent: flowers pink, about 1 cm. broad, in terminal corymbs: filaments bearded on the margins: capsule 6-8 mm. broad. Deep coniferous woods, Thatuna Hills.

221. PTEROSPORA.

Stout simple purplish-brown clammy-pubescent root-parasitic herbs: stem wand-like, with scattered lanceolate scales toward the base, in place of leaves: flowers many, nodding, white, in a long
bracted raceme: corolla ovate, urn-shaped, 5-toothed: stamens 10; anthers 2-celled, awned on the back: stigma 5-lobed: capsule globose, depressed, 5-lobed, 5-celled: seeds very numerous.

**P. andromedea** Nutt. A reddish purple glandular-hairy herb, with straight simple flowering stems, 30-90 cm. high: roots coral-like, much branched: scale-like leaves brownish, scariosus, attenuate-lanceolate, largest and most numerous below, 1-3 cm. long: raceme elongated, the flowers nodding, on pedicels 1-2 cm. long, bracts small, narrow: flowers white or pinkish, 4-5 mm. broad: capsules flattened, globose, 1 cm. wide. Coniferous woods, Thatuna Hills. The plants die after blooming.

222. **MENZIESIA.**

Low shrubs: leaves alternate, hairy, deciduous: flowers small, nodding, greenish-purple, in terminal corymbs or umbels, developed with the leaves: calyx small or minute, flattish, 4-toothed or lobed: corolla cylindrical to urn-shaped, 4-lobed: stamens 8: capsule ovoid, woody, 4-celled, 4-valved, many-seeded.

**M. glabella** Gray. Erect shrub, 1-2 m. high, the branches inclined to be falsely whorled, the young branchlets puberulent: leaves thin, oblong or obovate, obtuse, short-mucronate, cuneate at base, serrulate and ciliate, minutely puberulent, paler beneath, 2-5 cm. long; petioles short: pedicels slender, 2-4 cm. long, glandular-puberulent: corolla oblong or ovoid-campanulate, reddish-yellow, 7-9 mm. long: filaments pubescent below: capsules oblong or obovoid, mostly glabrous; seeds tailed at each end. Deep woods, Thatuna Hills. None of the characters which are supposed to distinguish this from *M. ferruginea* Smith hold good.

223. **ARCTOSTAPHYLOS.**

Low shrubs (in ours): leaves alternate, coriaceous, persistent, entire or with a few irregular teeth: flowers small, nodding, pink or white, in terminal racemes or clusters: corolla ovate and urn-shaped, with 5 short teeth: stamens 10; anthers with two reflexed awns on the back: drupe berry-like with 5-10 seed-like nutlets.

**A. uva-ursi** Spreng. Prostrate or trailing shrub with red bark, the much branched stems 20-80 cm. long, forming dense mats, glabrous throughout or minutely puberulent: leaves evergreen, leathery, spatulate-ovobate, obtuse or notched, cuneate at base, 1-3 cm. long, short-petioled: flowers in short racemes: corolla pink, ovate, 4-5 mm. long: filaments hairy: fruit bright-red, glabrous, 5-8 mm. in diameter. Dry pine woods, common.

224. **VACCININUM.**

Branching shrubs: leaves alternate, often coriaceous: flowers small, solitary or in racemes or clusters: corolla various in shape, epigynous, 4-5-cleft: stamens 8 or 10; anthers sometimes 2-awned on the back: fruit a 4-5-celled or sometimes 8-10-celled berry: seeds numerous.
Low shrub, 10–30 cm. high. V. caespitosum.  
Large shrub, 1–2 m. high. V. membranaceum.

V. caespitosum Michx. Low bushy shrub, 10–30 cm. high, glabrous or minutely puberulent: leaves obovate, obtuse or acute, crenulate-serulate, cuneate at base, very short-petioled, 1–2 cm. long; flowers solitary in the axils, longer than the drooping pedicels; calyx-lobes very short; corolla pink, ovoid, 5–6 mm. long; berry blue, with a bloom, sweet, 3–5 mm. in diameter. North hillsides, common.

V. membranaceum Dougl. Shrub, 1–2 m. high, glabrous throughout or nearly so: leaves oval or ovate, acute, rarely obtuse, cuneate at base, finely serrate, paler beneath, 1–4 cm. long, short-petioled; pedicels slender; calyx-limb entire; corolla nearly globose, yellowish, 4–5 mm. long; fruiting pedicels erect; fruit without a bloom, dark-wine-color or nearly black. Open pine woods, common.

**Family 58. PRIMULACEAE.**

Herbs: leaves simple, mostly entire, alternate, opposite or clustered, without stipules: flowers regular, perfect: corolla gamopetalous, 4–8 usually 5-lobed or cleft: stamens as many as and opposite the corolla-lobes, epipetalous: ovary superior, 1-celled, with a free central placenta rising from the base: fruit a capsule; seeds several or many; endosperm fleshy.

Stems present, leafy.  
Stemless: leaves all radical.  

225. STEIRONEMA.  

226. DODECATHEON.


S. ciliatum Raf. Stems erect, usually simple, 30–90 cm. high, puberulent above or wholly glabrous: leaves opposite, or the upper whorled, ovate, acuminate, rounded or cordate at base, the margin ciliate, 2–4 cm. long; pedioles broad, coarsely ciliate, 1–2 cm. long; pedicels exceeding the leaves: flowers yellow, 1.5–2 cm. broad; calyx-lobes lanceolate, acuminate, shorter than the petals. Along streams and ponds, common.

226. DODECATHEON.

Perennial smooth or glandular stemless herbs: leaves all in a radical cluster, oblong or spatulate: flowers showy, nodding, in an umbel, on a scape, with an involucre: calyx deeply 5-cleft: corolla with a very short tube, 5-parted, purple or white: capsule ovoid or oblong, many seeded: filaments distinct and short or united into a tube.
Stamineal tube half as long as the anthers.  
Plant glabrous.  
Plant viscid-puberulent.  
Stamineal tube very short.  

D. integrifolium Hook. Glabrous throughout, 15-45 cm. high; leaves spatulate-oblong-lanceolate, obtuse, entire or rarely denticulate, 5-10 cm. long, narrowed into a winged petiole as long; umbels 5-20-flowered: bracts of the involucre triangular-lanceolate, acute, 6-20 mm. long; pedicels 1-6 cm. long; calyx-lobes broadly lanceolate, acute or acuminate, not much longer than the tube; petals purple, 1 cm. long; staminal tube yellow, half as long as the purple anthers; capsules ovoid, 6-9 mm. long, splitting into 5 teeth at the apex when mature. Wet meadows rare.  

D. cusickii Greene. (D. puberulentum Heller.) Resembling the preceding very closely, but viscid-puberulent throughout: leaves usually smaller; scape 10-30 cm. high. Stony hillsides, common.  

D. conjugens Greene. Glabrous throughout, 10-30 cm. high; leaves 2-3, rarely more, oblong-lanceolate, obtuse, entire, 5-10 cm. long, narrowed at base into a short petiole; flowers usually solitary, less commonly 2, 3 or more; calyx-lobes oblong-lanceolate, acute, twice as long as the tube; petals 1.5-2 cm. long, dark-purple; capsules oblong, 10-12 mm. long, circumscissile near the top, then deeply splitting into truncate teeth. Low copses, rare.  

Family 59. GENTIANACEAE.  

Mostly herbs: leaves entire, opposite, sessile, without stipules: flowers perfect, regular, solitary or clustered; corolla gamopetalous, 4-12-parted: stamens as many as the corolla-lobes and alternate with them, epipetalous; ovary 1-celled, with 2 parietal placentae; fruit a capsule, usually 2-valved; seeds numerous; endosperm copious.  

Style filiform, usually deciduous; anthers oblong to linear, mostly twisting or curving with age.  

227. ERYTHRÆA.  

Style stout and persistent or none: anthers remaining straight.  
Corolla funnelform or bell-shaped, without glands. 228. GENTIANA.  
Corolla rotate, with a fringed glandular spot on each lobe.  
229. FRÆSERA.  

227. ERYTHRÆA.  

Low branching annual herbs: leaves sessile or clasping: flowers white or reddish: calyx 4-5-parted: corolla funnelform or salver-form, 4-5-parted, the tube slender: anthers exserted, erect, oblong to linear, twisting spirally with age; style filiform, usually deciduous; stigmas capitulate or 2-lipped.  

E. muhlenbergii Griseb. Annual, erect, simple or with many erect branches, 10-20 cm. high, glabrous, flowering almost from the base: leaves oblong or ovate, obtuse: flowers white, rarely pink, about 1 cm. long, mostly sessile, in leafy cymes: corolla-tube longer than the calyx, its spreading lobes short, obtuse. Springy places, rare. Our form is not typical.
228. GENTIANA.

Herbs: leaves opposite: flowers solitary or in cymes. showy, in late summer or autumn: calyx 4-5-cleft: corolla funnelform or bell-shaped, 4-5-lobed, regular, without glands; usually with intermediate plaited folds which bear appendages at the sinuses, anthers remaining straight with age: style stout, persistent or none; stigmas 2.

Flowers small: annual.
Flowers large: perennial.

G. amarella var. acuta Hook. f. Annual, erect, simple, or with few erect branches, glabrous, 5-40 cm. high: leaves rather few, the basal spatulate-oblanceolate, obtuse, petioled: cauline oblong-lanceolate, acute or obtuse, sessile, .5-3 cm. long: peduncles from the axils of most of the leaves, 1-4 cm. long: calyx cleft below the middle, the lobes acute, usually very unequal: corolla 5-15 mm. long, without folds in the sinuses, the acutish lobes with a fringe of bristles on their bases within. Open woods, Thatuna Hills.

S. oregana Engelm. Perennial, pale green, the stems erect, 15-50 cm. high: leaves in numerous pairs, ovate, sessile, acuminate or obtuse, 2-4 cm. long, the margins minutely scabrous: flowers few in a terminal cluster or often many in racemose clusters: bracts oblong-lanceolate, short-petioled: calyx-lobes lanceolate, a little longer than the tube: corolla deep blue, 2.5-3.5 cm. long, the plaits extended into somewhat cleft appendages shorter than the acute or acuminate lobes. Low or moist places, rather common.

229. FRASERA.

Tall, erect herbs, with mostly simple stems: leaves opposite or whorled: flowers rather large, numerous, in open cymes arranged in an elongated panicle: calyx deeply 4-parted: corolla 4-parted, rotate, each lobe with a glandular and fringed pit on its face: anthers oblong, remaining straight with age: stigma 2-lobed.

Leaves narrow, opposite.
Leaves broad, whorled.

F. albicaulis Dougl. Minutely puberulent throughout, pale-green: stems erect, 15-15 cm. high: leaves opposite, mostly clustered at base, oblong-lanceolate, obtuse, 3-nerved, with a white hard margin, 5-10 cm. long, the basal ones narrowed into margined petioles; panicle narrow, its branches erect, 5-15 cm. long: calyx-lobes lanceolate, 6-10 mm. long; corolla blue, somewhat exceeding the calyx: glands oblong, coarsely fringed, sacc-like at base: scales between the filaments cleft into thread-like lobes: pods flat, twice as long as the calyx, tipped by the persistent style: seeds dark, flat, rough. Hillsides, not common.

F. thryrsiflora Hook. Glabrous throughout: stems stout, 1-1.5 m. high: leaves marginless, the basal ones spatulate-oblanceolate, abruptly acuminate or obtuse, 15-40 cm. long, narrowed at base into a margined petiole: cauline in whorls of 3, sessile, 8-20 cm. long: panicle terminal, 10-30 cm. long, rather dense; bracts lanceolate or subulate: sepals attenuate-lanceolate, about
8-10 mm. long; corolla blue-purple, longer than the calyx; glands round, a single one near the base of each lobe; styles very short; capsules ovate, much flattened; seeds flat, thin-margined, minutely pitted. Common in open woods, Kamiack Butte and Thatuna Hills.

**Family 60. APOCYNACEAE.**

Herbs (in ours), with acrid milky juice: leaves entire, opposite, without stipules; flowers regular: corolla gamopetalous, 5-lobed: stamens 5, alternate with the corolla-lobes, epipetalous: pistils of two carpels, the ovaries separate, the styles or stigmas united: fruit a pair of follicles; seeds many, often downy-tufted at the apices; endosperm not copious.

230. APOCUNUM.

Perennial herbs: leaves opposite, mucronate-pointed: flowers small, in cymes, on short pedicels: calyx 5-parted, the lobes acute: corolla bell-shaped, 5-cleft, bearing 5 triangular appendages below the throat, opposite the lobes: stamens 5, on the very base of the corolla: fruit of two long and slender follicles: seed with a tuft of long silky down at the apex.

Corolla-tube not longer than the calyx, with erect lobes. **A. CANNABINUM.**
Corolla-tube longer than the calyx, with revolute lobes. **A. PUMILUM.**

**A. cannabina** L. Glabrous throughout or sometimes puberulent, pale green: stems erect, branched above, 60-100 cm. high; leaves oblong-elliptic or somewhat lanceolate, cuspidate-acuminate, rounded or cuneate at base, the margin slightly revolute, 2-6 cm. long; petioles 5-8 mm. long; calyx-lobes lanceolate-acuminate, 2-3 times as long as the tube: corolla white, 3-5 mm. long, the lobes erect: pods reflexed, linear, tapering at each end, 6-8 cm. long. At least three forms or possibly closely allied species are included in the above description: one from near Wawawai, glabrous, with flowers 3 mm. long, in small cymes: a second from Guy, glabrous, with loose cymes and flowers 5 mm. long: a third from Wawawai, puberulent throughout, very floriferous, the corollas 4 mm. long, with ciliate lobes.

**A. pumilum** Greene. Much branched from the base, 30-40 cm. high: branches erect or ascending, glabrous throughout or rarely puberulent, usually very floriferous: leaves ovate or oblong, cuspidate, 1-4 cm. long, dark-green above, pale beneath, short-petioled: flowers rose-colored: calyx-lobes about equalling the tube: corolla 5-6 mm. long, the lobes reflexed; pod 6-8 cm. long, spreading or reflexed. Common on hills, difficult to eradicate and sometimes a troublesome weed. A puberulent prostrate form which may be distinct occurs in open pine woods in the Thatuna Hills.

**Family. 61. ASCLEPIADACEAE.**

Herbs with milky juice: leaves entire, opposite, whorled or rarely alternate, without stipules: flowers regular, 5-merous, usually in simple umbels: corolla gamopetalous, 5-lobed: stamens attached
to the stigma; all the pollen of each anther-cell in one waxy mass: pistils of 2 carpels with two distinct ovaries, but a common stigma: fruit a pair of follicles; seed with a coma of silky down; endosperm scant.

231. ASCLEPIAS.

Perennial herbs, with copious milky juice: leaves opposite: flowers numerous, in umbels, subtended by a whorl of small bracts, the involucre: calyx and corolla deeply 5-parted: stamens on the very base of the corolla, monadelphous, short, crowned behind each anther with a hood-like appendage from the cavity of which rises a horn; anthers adherent to the solid stigma: ovaries with short styles: follicles ovate or lanceolate; seeds numerous each with a long tuft of down, the coma.

Leaves ovate or oblong, pubescent. Leaves lanceolate, glabrous.
A. SPECIOSA.
A. MEXICANA.

A. speciosa Torr. Stems stout, erect, simple, 80-90 cm. high, thinly white-tomentose throughout: leaves opposite, oblong-ovate, cuspiddately acute, rounded at base, 10-15 cm. long, short-petioled: peduncles stout, longer than the very woolly pedicels: corolla dark-purple, 1 cm. long, the lobes oblong-obtuse: hoods yellowish, spreading, much longer than the stamens and stigma, abruptly narrowed above the dilated base, 12-15 mm. long; horn projecting from near the base: capsules narrowly ovoid, tapering above, white-woolly and with numerous soft spines, 8 mm. long. Abundant along Snake River; elsewhere local and infrequent.

A. mexicana Cav. Glabrous below the inflorescence: stems simple, erect, 40-60 cm. high: leaves mostly in whorls of 3-6, the lowermost opposite, linear or lanceolate, rarely oblong, acute or obtuse, 5-8 cm. long, short-petioled: inflorescence puberulent: peduncles longer than the pedicels: flowers small, 5-6 mm. broad, whitish or purplish: hoods ovate, entire, shorter than the stamens, each exceeded by the incurved subulate horn. Snake River canyon, rare.

Family 62. CONVOLVULACEAE.

Mostly twining or trailing herbs, often with milky juice: leaves alternate: flowers regular, perfect, mostly showy: calyx 5-lobed: corolla gamopetalous, 5-plaited or lobed, convolute or twisted in the bud: ovary 2-celled: ovules 2 in each cell, the cells sometimes becoming 4 in the fruit by false partitions: fruit a globular, 2-6-seeded capsule; endosperm mucilaginous.

232. CONVOLVULUS.

Herbs or somewhat woody plants, twining, erect or prostrate: flowers 1 or 2 in the axils of the leaves: corolla funnelform to campanulate: stamens included: style undivided, or 2-cleft only at
the apex: capsules globose, 2-celled, or imperfectly 4-celled by false partitions between the two seeds or by abortion 1-celled.

Calyx with two large bracts at base. **C. sepium.**
Calyx not bracted. **C. arvensis.**

**C. sepium** L. Usually glabrous, climbing over shrubs to a height of 2–3 m.; leaves sagittate or somewhat hastate, acuminate, 2–5 cm. long; basal lobes entire or angularly 2-lobed; peduncles nearly as long as the leaves; calyx enclosed by two large ovate bracts; corolla white, sometimes pink, 4–6 cm. long; stigmas capitate, oval or oblong. Banks of Snake River.

**C. arvensis** L. Stems prostrate, trailing, 30–120 cm. long; whole plant pubescent; leaves oblong or ovate, obtuse or acute, 1–4 cm. long, sagittate or hastate or auricled at base; petioles 1–2 cm. long; peduncles longer than the leaves, mostly 1–2-flowered; pedicels each with two small bracts: corolla pinkish, 1–2 cm. long; stigmas thread-like. A troublesome weed, as yet sparingly introduced.

**Family 63. POLEMONIACEAE.**

Herbs: leaves alternate or opposite, simple or divided, without stipules: flowers regular, perfect, 5-merous, except the pistils; corolla gamopetalous, convolute in the bud; lobes not plaited: stamens epipetalous, alternate with the corolla-lobes, distinct: style 3-lobed: ovary 3-celled: capsule 3-celled, 3-valved, the valves usually breaking away from the triangular central column: seeds few–many; seed-coats when wetted commonly becoming mucilaginous and developing spiracles; endosperm fleshy.

Leaves opposite, entire: corolla salverform; limb widely spreading. **233. PHLOX.**
Leaves alternate, or rarely opposite, entire or finely divided: corolla funnel-form or tubular; limb little spreading. **234. GILIA.**
Leaves alternate, pinnate or pinnately divided: corolla rotate. **235. POLEMONIUM.**

**233. PHLOX.**

Perennial herbs or suffrutescent plants: leaves opposite, sessile, entire: flowers in cymes, terminal or in the upper axils, mostly bracted: calyx narrow, 5-cleft: corolla salverform with a long tube, a narrow opening and broad or rounded lobes: stamens included, very unequally inserted on the upper part of the corolla-tube: ovules 1 or sometimes 2: capsules ovoid, with but one seed in each cell.

Style slender, nearly as long as the corolla-tube. **P. linearifolia.**
Style short, not as long as the ovary. **P. speciosa.**

**P. linearifolia** Gray. Perennial, woody and loosely branched at base, the branches erect or nearly so, 10–30 cm. high, glabrous or puberulent:
leaves narrowly-linear, sharp-pointed, 2-3 cm. long: flowers in loose cymes, erect; pedicels 1-3 cm. long; calyx-tube somewhat angled, exceeded by the subulate teeth; corolla pink-purple, the tube longer than the calyx; lobes obovate, entire, 8-12 mm. long: style slender, as long as the corolla-tube. Bluffs of Snake River, variable.

P. speciosa Dougl. Perennial, woody at base, the erect branches 10-40 cm. high, glabrous or nearly so, glandular-pubescent above: leaves linear, alternate from the base, 2-5 cm. long, the margins white, thickened: cymes loose, the pedicels 1-3 cm. long: calyx-lobes subulate, not as long as the tube: corolla pink, its tube exceeding the calyx; lobes obovate, 8-14 mm. long; style very short, not longer than the ovary or stigmas.

var. sabitinii Gray. Corolla-lobes entire. Common in moist ground, the variety rather rare.

234. GILIA.

Herbs or suffrutescent plants: leaves alternate or opposite: calyx narrow, the lobes acute, the tube scarious below the sinuses: corolla tubular-funnelform, the limb little spreading (in ours): stamens equally or unequally inserted: capsule with 1-many seeds.

Leaves entire: flowers in heads.
Flowers pink.

Leaves entire: flowers solitary or in loose leafy cymes.
Stems simple below: flowers 8-10 cm. long. G. gracilis.
Stems branched from the base: flowers 5-7 cm. long. G. microsteris.
Leaves opposite, 3-7-palmately parted into linear lobes. G. harknessii.
Leaves alternate, pinnately parted into narrow lobes.

Flowers very small, bluish.
Flowers large, scarlet. G. intertexta, G. aggregata.

G. grandiflora Gray. Erect, usually simple, 30-40 cm. high, viscid-glandular below: leaves sessile, all alternate, lanceolate or linear, the upper broader, all entire, 2-6 cm. long: flowers crowded in a terminal head-like cluster: calyx obconical, the lobes obtuse, shorter than the tube: corolla salmon-color, narrowly funnelform, 1.5-2.5 cm. long: stamens unequally inserted: ovules and seeds solitary in the cells, the seed-coats developing spiracles when wetted.

var. diffusa Mulford. Usually taller, 40-60 cm. high, the flowers in several to many racemously arranged smaller heads. The variety is very common in stony soil, but the species is rare in our limits.

G. linearis Nutt. Erect, simple or branched above, 10-30 cm. high, pubescent throughout, or glabrous below, glandular above: leaves sessile, alternate, linear or lanceolate, acute, entire, 2-6 cm. long: flowers crowded in head-like clusters: calyx-lobes triangular, acute, as long as the obconic tube: corolla pink, 8-10 mm. long, slender-tubular, the lobes small: stamens unequally inserted: ovules and seeds solitary in each cell: seed-coats with spiracles. Low ground, quite common.

G. gracilis Hook. Erect, usually simple, 10-30 cm. high, branched above, glabrous below, pubescent and glandular above: leaves sessile, entire,
the lower opposite, oblong or obovate, 1-2 cm. long, the upper alternate, lanceolate, acute, 2-4 cm. long; flowers solitary in the forks or axils, short-pedicelled, somewhat cymose through the reduction of the leaves: calyx-lobes subulate, mucronate, twice as long as the campanulate tube; this at length splitting to the base: corolla tubular-salverform, 8-10 mm. long, the tube yellow, not longer than the calyx-lobes, the limb purple-pink; stamens unequally inserted: ovules and seeds solitary in each cell; seed-coats without spicles. Very common everywhere.

**G. microsteris** Piper, new name (*Microsteris humilis* Greene). Annual, usually branched from the base, the branches ascending, minutely pubescent throughout, 5-15 cm. high; lower leaves opposite, oblong or oblanceolate, obluse; upper alternate, linear, 1-2 cm. long; calyx-lobes subulate, twice as long as the tube, at length splitting to the base and spreading; pedicels unequal: corolla-tube yellow, 4-10 mm. long, scarcely longer than the calyx, the limb purple, 3 mm. broad; ovules and seeds solitary in each cell, not developing spicles. Common on hillsides. It is possible that this plant is *Collonia humilis* Doug., but the description of that is too brief while its source would indicate it to be rather a form of *G. gracilis*.

**G. harknessii** Curran. Very slender, simple or branched above, 5-15 cm. high, glabrous: leaves sessile, all palmately parted into 3-9 thread-like lobes, 5-10 mm. long, the uppermost alternate, the others opposite: flowers on slender spreading pedicels, 1-4 cm. long; calyx-lobes unequal, shorter than the tube: corolla white, 3 mm. long, barely exceeding the calyx: stamens unequally inserted: ovules and seeds solitary in each cell; seed-coats becoming mucilaginous when wetted. Stony soil, Kamiack Butte and summit of Cedar Mountain.

**G. intertexta** Steud. Stems erect and simple below or more commonly much branched and spreading, 5-15 cm. high, pubescent: leaves all alternate, once or twice pinnately cleft into linear spinescent lobes, glabrous or nearly so: flowers crowded in head-like clusters, the bracts and calyx-tube villous with white hairs: calyx-lobes more or less cleft into spinose divisions: corolla tubular, funnelform, pale blue, equalling the calyx-lobes, 5-6 mm. long: ovules and seeds 3-4 in each cell; seed-coats developing spicles. Common in low ground.

**G. aggregata** Spreng. Biennial, loosely pubescent throughout or rarely puberulent-viscid above, 30-80 cm. high, simple or sparingly branched: leaves 4-6 cm. long, pinnately parted into many linear mucronate lobes, 1-2 cm. long; panicle narrow, loose or interrupted: calyx glandular, the subulate lobes twice as long as the tube: corolla showy scarlet, tubular-funnelform, much exceeding the calyx, 3 cm. long, the lobes spreading or recurved, ovate-lanceolate, acute or acuminate, about 1 cm. long: stamens unequally inserted: seeds numerous in each cell, the coats developing spicles when wetted. Common on stony hillsides.

**235. POLEMONIUM.**

Annual or perennial herbs: leaves alternate, pinnate or pinnately-parted: flowers in corymbs, nearly bractless: calyx bell-shaped or short funnelform, the tube very short: stamens equally inserted at the summit of the corolla-tube: capsule few- several-seeded.
P. micranthum Benth. Annual, branched from the base, spreading, 6-20 cm. high, somewhat viscidly-pubescent throughout: leaves mostly petioled, 1-4 cm. long; leaflets 5-13, ovate or lanceolate, acute or obtuse, 3-8 mm. long; peduncles solitary, opposite the leaves; calyx-lobes triangular, as long as the broadly campanulate tube; corolla white, rotate, not equalling the calyx; ovules 2-3 in each cell. Sandy soil, infrequent.

Family 64. Hydrophyllaceae.

Herbs, commonly hairy: leaves mostly alternate: flowers perfect, regular, in dense one-sided cymes or false racemes: calyx 5-parted or of 5 sepals: corolla gamopetalous, deeply 5-lobed: stamens on the corolla-tube, alternate with its lobes: style 2-cleft, or 2 and separate; ovary entire, 1-celled, with 2 parietal placentae or 2-celled by the union of the placentae: fruit a 2-valved, 4-many-seeded capsule; endosperm copious.

Leaves all radical.
Leaves cauline and radical.

Ovary with narrow parietal placentae.
Ovary lined with dilated and fleshy placentae.
Stamens and style longer than the corolla: flowers in clusters.

Stamens and style shorter than the corolla: flowers solitary, axillary.

236. Hydrophyllum.

Perennial herbs: leaves long-petioled, mostly pinnately-parted: flowers white or violet, in cymose dense clusters: calyx 5-parted into narrow divisions: corolla bell-shaped, a nectariferous grooved appendage opposite each lobe: stamens and style exserted beyond the corolla-lobes: ovary lined with dilated and fleshy placentae; ovules 4: capsule 2-valved, 1-4-seeded.

Flowers blue, in dense clusters.
Flowers whitish, in loose clusters.

H. capitatum Doug. Rootstock short, with long fascicled fleshy roots; stems exceeded by the leaves, 10-30 cm. high: leaves ovate, 5-10 cm. long, soft-hairy, pinnately parted or divided into 5-7 lobes or divisions, these cuneate, obovate, entire or coarsely toothed or cleft; pedioles 6-12 cm. long, generally longer than the blades; peduncles shorter than the pedioles: inflorescence a dense round cyme, 2-4 cm. broad: calyx hispid, the divisions lanceolate; no appendages in the sinuses: corolla blue. Moist stony places, common.

H. fendleri Heller. (H. albifrons Heller.) Roots densely fascicled: stems 30-40 cm. high, exceeded by the leaves, sparingly hairy; leaves 10-20 cm. long, pinnately 5-7-divided; divisions ovate, incisely and coarsely cleft and toothed, 3-6 cm. long; lower pedioles elongated: inflorescence a rather dense cyme, exceeding the leaves; calyx soft-hispid, deeply 5-parted into lanceolate divisions without appendages in the sinuses: corolla whitish. In low copses, common.
237. NEMOPHILA.

Diffuse and tender annual herbs: leaves opposite or partly alternate, pinnatifid or lobed: peduncles terminal or lateral, 1-flowered, slender: calyx enlacing more or less in fruit, 5-parted, with a reflexed appendage at each sinus: corolla rotate or nearly campanulate, deeply 5-lobed, the throat appendaged more or less with 10 internal scales or plates: stamens and style shorter than the corolla: ovules 4 or many: capsule similar to the preceding, ripening 1–16 seeds.

N. breviflora Gray. Whole plant sparsely hissute, erect when young, later prostrate: stems 5–40 cm. long: leaves alternate, 1–2 cm. long pinnately 3–5-parted, the divisions oblong-lanceolate, acute, entire: peduncles about equaling the petioles: calyx appendages much smaller than the proper lobes, both ciliate: corolla campanulate, white, shorter than the calyx lobes; internal appendages cuneate, fringed at the summit: ovules four; seed solitary nearly filling the capsule. Summit of Cedar Mountain.

238. PHACELIA.

Perennial or mostly annual herbs: leaves simple, lobed or divided, alternate, or the lowest opposite: flowers in one-sided raceme-like cymes: calyx deeply 5-parted, the lobes usually narrow and similar: corolla from almost rotate to narrow-funnelform, commonly with appendages inside of the tube, consisting of 10 vertical plates in pairs between the bases of the filaments: stamens equally inserted low down or at the base of the corolla: ovary with narrow parietal placenta; ovules and seeds 4–numerous.

Corolla violet: ovules 12–16. P. MENZIESII.
Corolla white: ovules 4. P. CIRCINATA.

P. menziesii Torr. Annual, 10–50 cm. high, simple below the inflorescence; whole plant rough-hairy, usually with some shorter white pubescence: leaves sessile, linear or lanceolate, entire or cleft into 2–5 narrow lobes: inflorescence usually branched, consisting of spike-like racemes; pedicels short: calyx-lobes linear, hispid-ciliate: corolla violet-blue, nearly rotate, 12–15 mm. broad; appendages 10, narrow, free from the filaments: stamens equaling the corolla; filaments sparsely hairy: style 2-cleft; capsule shorter than the calyx; ovules 12–16; seeds pitted-reticulate. Stony soil, common in Snake River canyon.

P. cirsinata Jacq. f. Biennial, erect, 5–1.5 m. high, rough-hairy and canescent throughout: leaves lanceolate, acute, simple or with 1–2 pairs of small lateral leaflets, the lower petiolate, the upper nearly sessile: inflorescence compound, of racemose-arranged spikes, much coiled when in bud: calyx-lobes linear or lanceolate, very hispid: corolla white or whitish, 5-lobed, exceeding the calyx: appendages 10, broad, united at base to the filaments: stamens much exserted, the filaments sparsely hairy: capsule ovate, acute; ovules 4; seed-coats pitted and honey-comb-like. Very variable. Our form has been named P. heterophylla Pursh.
239. **HESPEROCHIRON.**

Stemless perennials, pubescent: leaves spatulate or oblong, entire, on margined petioles: flowers purplish or nearly white, on naked 1-flowered scapes: calyx 5-parted, rarely 6–7-parted, the lanceolate or linear lobes sometimes unequal: corolla campanulate or rotate, 5-cleft, rarely 6–7-cleft: stamens on the base of the corolla-tube, unequal, included: ovary partly 1-celled, tapering into a short style, barely 2-cleft at the tip; ovules numerous on dilated placentaes.

Corolla rotate, the lobes longer than the tube. **H. PUMILUS.**

Corolla campanulate, the lobes shorter than the tube. **H. CALIFORNICUS.**

**H. PUMILUS** Porter. Rootstock slender: low, 5–8 cm. high, appressed-puberulent: leaves few, spatulate, obtuse, 1–3 cm. long, the petiole as long or shorter: peduncle not exceeding the leaves: corolla white, with purple veins, rotate, about 1 cm. broad, the lobes longer than the tube. Moist hillsides, rare.

**H. CALIFORNICUS** Wats. Very similar to the last but larger in every way: rootstocks stouter: leaves spatulate or oblong, obtuse, more pubescent, 2–4 cm. long, the petioles mostly as long: corolla campanulate, the lobes shorter than the tube. Moist places near Moscow.

**FAMILY 65. BORRAGINACEAE.**

Mostly rough-hairy herbs: leaves alternate, entire, without stipules: flowers regular, perfect: calyx 5-parted: corolla 5-lobed, sometimes with projecting appendages (fornices) in the throat: stamens 5, inserted on the corolla-tube: style 1; ovary usually deeply 4-lobed, forming in fruit 4 seed-like nutlets, or separating into two 2-seeded nutlets; nutlets attached by the base or inner angle or face to the receptacle, which is sometimes elongated (the gynobase); endosperm none. Mature fruits are necessary for accurate determinations in this family.

Nutlets fixed by their very base to a flat receptacle.

Flowers leafy-bracted: corolla-lobes imbricated in the bud.

Flowers not leafy-bracted: corolla-lobes convolute in the bud. 247. **LITHOSPERMUM.**

246. **MYOSOTIS.**

Nutlets fixed by some part of the inner angle or face to the gynobase.

Nutlets armed with backwardly barbed prickles. 240. **LAPPIA.**

Nutlets not armed with barbed prickles.

Flowers blue. 244. **MERTENSIA.**

Flowers yellow. 245. **AMSINCKIA.**

Flowers white.

Nutlets attached only at the inside of the base to a slightly elevated gynobase. 241. **ALLOCARVA.**

Nutlets attached by the middle of the somewhat concave inner face to a hemispherical or globular gynobase. 243. **PLAGIOBOTRYS.**

Nutlets attached for one-third or more of their length by the ventral face or angle to a slender mostly subulate gynobase. 242. **CRYPTANTHE.**
Annual biennial or perennial rough-hairy herbs: flowers small, in racemes or spikes; calyx 5-parted, reflexed or open in fruit; corolla short-salverform or somewhat funnelform, white or blue, the throat closed with prominent appendages (fornices); nutlets attached by some part of the inner angle or face to the gynobase, armed either along a distinct margin or more or less over the whole back with backwardly-barbed prickles.

*L. texana* Scheele. (*L. redowski* var. *cupulata* Gray.) Annual, erect, loosely branched, 15-50 cm. high, hispid-pubescent throughout; leaves all sessile, linear, obtuse, 1-3 cm. long; racemes becoming very loose and elongated, leafy-bracteate; pedicels stout, shorter than the calyx; corolla very small, white or blue, its tube barely as long as the calyx; nutlets convex on the back, granular-roughened, the margins with a border of united prickles, thus forming a shallow cup; ventral face convex, covered with whitish tubercles; scar long and narrow, nearly as long as the nutlet. Along Snake River.

241. **ALLOCARYA.**

Annuals or perennials: flowers small, white; calyx 5-parted, erect or little spreading in fruit; corolla white, usually with appendages (fornices) at the throat; nutlets not armed with barbed prickles, attached only at the inside of the base to a slightly elevated gynobase.

*A. hispidula* Greene. Annual, much branched from the base, spreading or ascending, 10-30 cm. high, sparingly hairy; leaves few, linear, obtuse, 1-3 cm. long; spikes slender, elongate, leafy-bracteate near the base; corolla white, small; fruiting calyx 2 mm. long, hispid; nutlets ovate-oblong, obliquely rough-ridged on the three faces, keeled the whole length on the ventral face; scar nearly basal. In dried up ponds and similar places, common.

242. **CRYPTANTHE.**

Very similar to Allocarya, but the nutlets attached for one-third or more of their length by the ventral face or angle to a slender mostly subulate gynobase.

Nutlets smooth.
Only one maturing.
All four usually maturing.
Ventral groove simple.
Ventral groove forked at base.

Nutlets papillate, roughened.
Fruiting calyx 6-8 mm. long.
Fruiting calyx 4 mm. long.

C. *flaccida.*
C. *affinis.*
C. *torrevana.*
C. *ambigua.*
C. *muriculata.*
C. flaccida Greene. Erect, 20-40 cm. high, branched, minutely strigose and canescent throughout; leaves linear, narrow, 1-3 cm. long; flowers in slender bractless spikes, loose and elongated in fruit; fruiting calyx 4-5 mm. long, appressed to the stem, the sepals linear, very bristly especially at base: corolla white, 2-3 mm. long; nutlets solitary, smooth and shining, pear-shaped, acuminate, shorter than the sepals, with a groove on the ventral side, extending the whole length and somewhat widened at the base. Rocky places, banks of Snake River.

C. affinis Greene. Slender, branched from the base, erect or ascending, 10-30 cm. high, rather soft-hairy; leaves oblong-linear, obtuse, 1-2 cm. long; spikes loose, bractless, 2-6 cm. long; fruiting calyx 3 mm. long, hispid: nutlets all four maturing, dark, smooth, ovate-oblong, acute, 1.5 mm. long; ventral groove simple, continuing the whole length of the nutlet. Open pine woods, Kamiack Butte and Thatuna Hills.

C. torreyana Greene. Erect or ascending, commonly branched from the base, 15-30 cm. high, long-hairy and hispid throughout; leaves oblong-linear, obtuse, 2-5 cm. long; spikes bractless, solitary or in pairs, 1-8 cm. long; fruiting calyx 5 mm. long, very bristly, the lobes linear: corolla white: nutlets narrowly pear-shaped, acute, smooth and shiny, 2 mm. long; ventral groove forked near the base, but no depression between the forks. Common and abundant.

C. ambiguia Greene. Slender, 15-30 cm. high, short, hispid; leaves oblong-linear, 1-2 cm. long; spike bractless, rather few-flowered: fruiting calyx 6-8 mm. long, with rather small bristles, the lobes linear: nutlets all four maturing, ovate, acute, rough, with papillae of two sizes; ventral groove forked at the very base. Pine woods, Thatuna Hills.

C. muriculata Greene. (Allocarya hendersoni A. Nelson.) Annual, erect, branched from the base, 10-20 cm. high, hispid throughout; leaves oblong or linear, 1-3 cm. long; spikes often in pairs or 3-5 in a cluster, bractless: fruiting calyx 5 mm. long, short-bristly, with linear lobes, twice as long as the fruit: corolla 5-6 mm. broad, with prominent appendages in the throat: nutlets 2 mm. long, usually all four wanting, ovate-triangular, obtuse, roughened, with minute papillae and some larger ones on the back and usually on the ventral faces; ventral groove extending from the apex to near the base where it widens out into a triangular depression. Pullman and Palouse City, infrequent.

243. PLAGIOBOTHrys.

Very similar to Allocarya and Cryptanthus but the radical leaves in a rosette and the nutlets attached by the middle of the somewhat concave inner face to a hemispherical or globular gynobase.

P. tenellus Gray. Annual, with usually many stems from the base, 5-20 cm. high, rather soft-hairy throughout: radical leaves in a rosette, oblong-linear or lanceolate, 5-2 cm. long; cauline few, lanceolate, ½-1 cm. long; spikes loose, leafy at base: fruiting calyx 3 mm. long, hispid with yellow hairs, the lobes lanceolate: nutlets pale greenish, shining, prominently keeled and papillate, somewhat cross-shaped because of the constrictions at the base and apex, incurved, hollowed on the ventral face, with a projecting process which attaches it to the gynobase. Sandy soil along Snake River.
244. MERTENSIA.

Perennial, often smooth and glabrous: flowers blue or rarely white, mostly bractless: calyx deeply 5-cleft or parted: corolla tubular-funnelform or trumpet-shaped to almost campanulate, the open throat bearing obvious or obsolete transverse folds for crests: filaments flattened or nearly filiform: style filiform: stigma entire: nutlets from somewhat fleshy to membranaceous, not armed with barbed prickles.

Low plant: corolla 20 mm. long.  
M. oblongifolia.  
Tall plant: corolla 10-14 mm. long.  
M. paniculata.

M. oblongifolia Don.  (*M. longijora* Greene.)  
Stems simple, 10-20 cm. high, glabrous or nearly so: leaves sessile, oblong, oblongifolius, obtuse or acute, 2-6 cm. long, glabrous above, minutely hispid beneath: flowers in a dense cluster, nodding: calyx deeply 5-cleft, the lobes linear-lanceolate, acute, minutely hispid-ciliate: corolla 2 cm. long, the tube two to three times as long as the calyx; limb campanulate, 5-6 mm. long.  Moist hillsides, not plentiful.

M. paniculata Don.  
Tall, erect, branched above, 30-120 cm. high, the stems sparsely hairy; leaves ovate or ovate-lanceolate, acuminate, rounded or cuneate at base, sparsely hispid on both sides, 3-10 cm. long: lower petioles slender, nearly as long as the blades; upper short: racemes few-flowered, loosely panicled: pedicels slender: calyx-tube hairy, the lobes lanceolate: corolla blue, 8-14 mm. long, its tube twice as long as the calyx, little longer than the limb.  Rich woods, Cedar Mountain.

245. AMSINCKIA.

Rough-hispid annuals: leaves oblong or linear: corolla salverform or tubular-funnelform with a slender tube and open throat, the limb sometimes plaited at the sinuses, yellow: style filiform: stigma capitate or 2-parted: nutlets crustaceous or coriaceous, unappendaged, ovate-triangular, attached below the middle to an oblong-pyramidal gynobase.

A. intermedia Fischer & Meyer.  
Erect, usually simple, 30-60 cm. high, the bristly hairs mostly white: leaves lanceolate or linear, 5-12 cm. long, the upper somewhat broader at base: raceme becoming much elongated in fruit: calyx-lobes linear, acute, very bristly in fruit, 6-8 mm. long: corolla yellow, 5-6 mm. long: nutlets dark-colored, the back convex and somewhat keeled, obliquely ridged and roughened with tubercles.  A troublesome weed, most common along Snake River.

246. MYOSOTIS.

Low spreading herbs, usually soft-hairy: cauline leaves sessile: flowers mostly blue, in at length elongated racemes, without bracts: corolla short-salverform or almost rotate, its throat contracted by transverse crests, the rounded lobes convolute in the
bud: anthers ovate or oblong: nutlets small, ovoid, smooth and shining, thin-crustaceous; scar small.

**M. verna** Nutt. Annual, erect, rough-hairy throughout, 10-40 cm. tall, branched above or simple: leaves oblong-linear or oblanceolate, obtuse, sessile, 1-2 cm. long; racemes elongated and loose in fruit, leafy at the base; pedicels shorter than the calyx; fruiting calyx 4-5 mm. long, deeply 5-cleft, the lobes lanceolate, unequal, hispid with hooked hairs; corolla small, white; nutlets oval, biconvex with a narrow margin, very smooth and shiny, 1.5 mm. long; scar minute. Moist ground, rather rare.

247. LITHOSPERMUM.

Mostly herbs, with reddish roots: leaves sessile: flowers leafy-bracted, axillary or subaxillary: calyx 5-parted: corolla salverform, funnelform, or sometimes approaching campanulate, either naked or with pubescent lines or intruded gibbous projections or low transverse crests at the throat: filaments mostly very short; anthers short, included: style slender; stigma mostly truncate, capitulate or 2-lobed: nutlets ovoid, bony, either polished and white or dull and rough.

**L. pilosum** Nutt. Perennial, tufted, the stems simple, 15-30 cm. high, pubescent with long and short hairs: leaves numerous, lanceolate, rarely linear, attenuate-acute, sessile, 5-10 cm. long, minutely soft-hispid: flowers in a dense leafy cluster: corolla greenish-yellow, campanulate-funnelform, pubescent inside, nearly naked in the throat, 10-12 mm. long: style slender: nutlets light-colored, ovate, acute, hard and smooth, 3-4 mm. long. Common on hillsides.

**Family 66. VERBENACEAE.**

Herbs or shrubs, not aromatic: leaves opposite or whorled, rarely alternate: flowers perfect, regular or irregular: corolla either 2-lipped or irregular: stamens 4, didynamous: style single, terminal: stigma entire or 2-lobed: ovary not lobed: fruit 2-4-celled, dry or drupaceous, usually splitting when ripe into as many 1-seeded indehiscent nutlets; endosperm scant or none.

248. VERBENA.

Herbs: flowers sessile, in single or panicked spikes, bracted: calyx tubular, 5-toothed, one tooth often shorter: corolla salverform, more or less unequally 5-cleft: stamens included, the upper pair occasionally without anthers: style slender; stigma mostly 2-lobed: fruit splitting into 4 seed-like nutlets.

Spikes narrow, dense: bracts short. **V. hastata.**

Spikes loose: bracts exceeding the flowers. **V. bracteosa.**

**V. hastata** L. Perennial, erect, 30-90 cm. high, simple below the inflorescence, rough-puberulent throughout: stems 4-sided: leaves oblong or
broadly lanceolate, acute or acuminate, coarsely serrate, 6–12 cm. long, short-petioled: spikes numerous, clustered at the summit of the stem, slender, 5–15 cm. long: bracts shorter than the calyx: corolla blue, 3 mm. broad. Along Snake River, rare.

**V. bracteosa** Michx. Branches prostrate or spreading, 15–30 cm. long, rough-hairy throughout, the root often becoming woody: leaves oblong or obovate, cuneate at base, pinnately 3-cleft, coarsely dentate, 1–3 cm. long; petiole short, margined: spikes terminal, 1–10 cm. long; upper bracts entire, lanceolate, acuminate, becoming rigid; the lower somewhat cleft, all exceeding the flowers: corolla blue, 4 mm. long: anthers without appendages. Common along Snake River and spreading elsewhere.

**Family 67. Labiatae.**

Mostly aromatic herbs: stems 4-sided: leaves simple, opposite: corolla more or less 2-lipped, the upper lip 2-lobed or sometimes entire, the lower 3-lobed: stamens on the corolla-tube, didynamous or diandrous: style 2-lobed at the apex; ovary deeply 4-lobed: fruit of 4 seed-like nutlets or akenes, each with one erect seed; endosperm mostly none.

**Corolla nearly regular.**

Anther-bearing stamens 2. 258. **Lycopus.**
Anther-bearing stamens 4. 249. **Trichostema.**

Lobes of corolla 5. 259. **Mentha.**
Lobes of corolla 4. 257.

**Corolla irregular, distinctly 2-lipped.**

Upper pair of stamens longer than the lower.
Stamens short, included in the corolla-tube. 251. **Marrubium.**
Stamens ascending under upper corolla-lip. 253. **Nepeta.**
Stamens exserted from the corolla. 252. **Lophanthus.**

Upper pair of stamens shorter than the lower.
Calyx with a protuberance on the upper side. 250. **Scutellaria.**
Calyx not gibbous on the upper side.
Upper corolla-lip flattish, neither concave nor hooded. 255. **Micromeria.**
Upper corolla-lip hooded or at least concave.
Calyx distinctly 2-lipped. 254. **Prunella.**
Calyx not distinctly 2-lipped.
Corolla-tube longer than the calyx. 256. **Stachys.**

**249. Trichostema.**

Low annual branched herbs, or somewhat woody plants: leaves entire: calyx bell-shaped, oblique, deeply 5-cleft, the 3 upper teeth elongated and partly united, the 2 lower very short: corolla small, almost equally 5-parted, the 3 lower lobes more or less united: stamens 4, much exserted; anther-cells divergent and at length confluent.
T. oblongum Benth. Annual, erect, branched, 10–30 cm. high, the stem soft-hairy: leaves oblong or oval, acute, entire, 1–3 cm. long, canescently pubescent, narrowed at base, with a short petiole: flowers in nearly sessile axillary dense cymes; pedicels short: calyx campanulate, hairy, equally 5-cleft, the narrow lobes much longer than the teeth, equalling the corolla-tube: corolla violet. Springy places, rare and local. Rather unpleasantly scented.

250. SCUTELLARIA.

Annual or perennial bitter herbs, sometimes woody, not aromatic: flowers solitary in the axils of leaves or bracts: calyx bell-shaped in flower, 2-lipped, with a gibbous protuberance on the upper side, splitting to the base at maturity, the upper lip at length usually falling away: corolla with an elongated curved ascending tube, dilated at the throat, 2-lipped, the upper lip erect, arched or galeate: stamens 4, ascending under the upper corolla-lip, the lower pair longer.

S. angustifolia Pursh. Perennial, with rather stout somewhat moniliiform rootstocks, 15–20 cm. high, puberulent or glabrous: stems simple or little branched: cauline leaves broadly linear or oblong, obtuse, entire, narrowed at base, sessile or nearly so, 1–2 cm. long; radical ovate, on longer petioles, sometimes toothed: flowers solitary in the axils; pedicels as long as the calyx: corolla-violet-blue, 2.5 cm. long, puberulent outside; lower lip villous within: nutlets minutely granulate. Moist soil, especially in stony places, common.

251. MARRUBIUM.

Bitter-aromatic whitish-woolly perennials, branched at the base: leaves wrinkled: flowers small, much crowded in axillary whorls: calyx tubular, 5–10-nerved, nearly equally 5–10-toothed, the teeth more or less spiny-pointed: corolla 2-lipped, the upper lip erect, notched; the lower spreading, 3-cleft, the middle lobe broadest: stamens 4, short, included in the corolla-tube, the upper pair longer.

M. vulgar L. Stems tufted, erect, simple, about 30 cm. high, densely white woolly, especially below: leaves broadly ovate, obtuse, coarsely crenate, thickish, rounded or cuneate at base, rough, woolly beneath, 1–3 cm. long, on petioles nearly as long: flower clusters dense, axillary: calyx-teeth 10, subulate, hooked at the apex, hardened in fruit: corolla white. Abundantly introduced.

252. LOPHANTHUS.

Tall perennial herbs: leaves ovate, serrate, petioled: flowers small, in terminal spikes: calyx tubular-bell-shaped, 15-nerved, oblique, 5-toothed, the upper teeth rather longer: corolla 2-lipped, the tube not longer than the calyx, upper lip nearly erect, 2-lobed,
the lower somewhat spreading, 3-cleft: stamens 4, exserted from the corolla.

**L. urticifolius** Benth. Glabrous or nearly so, the erect usually simple stems 0.5-1.5 m. tall, tufted: leaves ovate, cordate, obtuse or acute, coarsely dentate, green on both sides, 3-6 cm. long, short-petioled; spikes terminal, stout, densely puberulent, 6-10 cm. long or sometimes with smaller ones from the upper axils: calyx tubular-campanulate, the teeth lanceolate, acuminate, purple-tinged: corolla violet-purple. Whole plant pleasantly scented. Low ground, not rare.

253. **NEPETA.**

Perennial herbs: calyx tubular, often incurved, obliquely 5-toothed: corolla 2-lipped, dilated in the throat; the upper lip erect, rather concave, notched or 2-cleft; the lower spreading, 3-cleft, the middle lobe largest, notched or entire: stamens 4, ascending under the upper corolla-lip, the upper pair longer.

**N. cataria** L. Perennial, erect, 30-90 cm. high, finely canescent throughout: leaves ovate or oblong, acute, dentate, somewhat cordate at base, 2-6 cm. long, petioled, densely canescent; spike stout, dense, 2-10 cm. long: calyx-teeth subulate, the longest one-half as long as the tube: corolla white or purplish, with dark dots, 10-12 mm. long, its tube exceeding the calyx. Sparingly introduced.

254. **PRUNELLA.**

Low perennials: flowers in terminal or axillary heads or spikes: calyx tubular-bell-shaped, about 10-nerved, 2-lipped, not gibbous on the upper side, closed in fruit; upper lip broad and flat, truncate, with 3 short teeth, the lower 2-cleft: corolla 2-lipped, slightly contracted at the throat and dilated at the lower side just beneath it; upper lip arched, erect, entire; the lower reflexed-spread:ing, 3-cleft: stamens 4, ascending under the upper lip, the lower pair longer.

**P. vulgaris** L. Glabrous or nearly so, erect or ascending, 15-40 cm. high: leaves ovate-oblong or oblong-lanceolate, acute or obtuse, rounded or cuneate at base, entire or crenate, 2-6 cm. long; petioles slender, about half as long as the blades: spikes terminal, very dense, 2-5 cm. long; bracts very broad, ovate or orbicular, cuspidate-acuminate, ciliate: calyx-teeth somewhat ciliate: corolla violet, 8-12 mm. long, hardly twice as long as the purplish calyx. Moist ground, not common.

255. **LAMIUM.**

Decumbent herbs: calyx tubular-bell-shaped, about 5-nerved, with 5 nearly equal awl-pointed teeth: corolla 2-lipped, dilated at the throat, the tube longer than the calyx; the upper lip arched, narrowed at the base; the middle lobe of the spreading lower lip
broad, notched at the apex, contracted at the base; the lateral lobes small, at the margin of the throat; stamens 4, ascending under the upper lip; the lower pair longer.

**L. amplexicaule** L. Biennial, branched from the base, sparingly pubescent: stems simple, erect, 15-20 cm. high; lower leaves orbicular, coarsely crenate, truncate orcordate at base, 1-2 cm. long, on petioles as long or longer; upper sessile, half-clasping, rather distant; flowers sessile in axillary and terminal clusters; calyx pubescent, the sharp teeth nearly as long as the tube; corolla purple, the lower lip spotted, 12-15 mm. long. Sparingly introduced along Snake River.

256. **STACHYS.**

Herbs, rarely undershrubs, not aromatic: calyx tubular-bell-shaped, 5-10-nerved, equally 5-toothed or the upper teeth united to form an upper lip; corolla not dilated at the throat, 2-lipped, the tube about equaling the calyx; the upper lip concave, often arched, erect or rather spreading, entire or nearly so; the lower usually longer and spreading, 3-lobed, the middle lobe largest and nearly entire; stamens 4, ascending under the upper lip, the lower pair longer.

**S. palustris** L. Perennial, erect, 30-60 cm. high, soft-pubescent throughout or the stem short-hairy; leaves oblong or ovate-lanceolate, mostly obtuse, crenate-serrate, rounded or cordate at the nearly sessile base, 5-10 cm. long; spikes short-peduncled, the clusters rather close together, the lower with leafy bracts; upper bracts lanceolate: calyx hairy, the tube campanulate, little longer than the subulate teeth: corolla pink-purple, 1 cm. long; the upper lip pubescent; the tube equaling the calyx. Moist ground, rare in our limits.

257. **MICROMERIA.**

Low sweet-odorous plants: flowers small, in the axils of the leaves: calyx oblong or tubular, about 10-nerved, terete, not gibbous, about equally 5-toothed: corolla short, distinctly 2-lipped; upper lip flattish, neither concave nor hooded, entire or notched; the lower spreading, 3-parted; stamens 4, the lower pair longer.

**M. douglasii** Benth. Perennial, somewhat pubescent, with slender trailing stems, 30-60 cm. long; leaves orbicular or ovate, obtuse, rounded or subcordate at base, coarsely dentate, or subentire, 6-25 mm. long; petioles short; flowers solitary, axillary; pedicels slender, 2-bracted near the base; calyx 3-4 mm. long, the teeth triangular: corolla white or purplish, 8 mm. long, its tube exceeding the calyx. Open woods, Thatuna Hills. Odor balsamic.

258. **LYCOPUS.**

Low perennial herbs, glabrous or puberulent, not aromatic: leaves sharply-toothed or pinnatifid: flowers small, mostly white, in dense axillary whorls: calyx bell-shaped, scarcely longer than
the calyx, nearly equally 4-lobed: anther-bearing stamens 2, distant; the upper pair either sterile or wanting.

**L. americanus** Muhl. Glabrous or puberulent: stems erect, simple or little branched, 30-60 cm. high, from creeping rootstocks: leaves lanceolate or ovate-lanceolate, acuminate or acute, cuneate at base, coarsely serrate or sinuately incised, 2-5 cm. long; petioles short: flowers sessile, in dense axillary whorl-like clusters: calyx-teeth triangular-acuminate, stiff, nearly as long as the small white corolla, exceeding the nutlets: sterile stamens slender, with thickened tips. Low ground.

259. **MENTHA.**

Aromatic fragrant perennial herbs: flowers very small, in dense clusters, forming false whorls in the axils or in terminal spikes: calyx bell-shaped or tubular, 5-toothed, equal or nearly so: corolla with a short included tube, almost equally 4-cleft, the upper lobe broadest, entire or notched: anther-bearing stamens 4, equal, erect, distant.

Plants glabrous, at least below. Plants pubescent.

**M. viridis** L. Green and glabrous throughout, the stems 30-60 cm. high, simple below the inflorescence: leaves oblong-lanceolate, acute or acuminate, serrate, narrowed to a sessile or short-petioled base, 2-5 cm. long: spikes terminal, narrow, the flowers in interrupted whorls: bracts lanceolate, usually ciliate: calyx hairy, the tube campanulate, little longer than the subulate teeth: corolla purple, its tube exceeding the calyx. Sparingly introduced.

**M. canadensis** L. Erect, simple or branched, 20-40 cm. high, puberulent or sometimes soft-pubescent: leaves ovate or broadly lanceolate, mostly acute, rounded or cuneate at base, sharply serrate, short-petioled: flowers in dense sessile axillary clusters: calyx 2-3 mm. long, the triangular acute teeth short: corolla pale-violet, rarely white, 5 mm. long, its lobes rounded, its tube exceeding the calyx. Low ground, common and variable.

**Family 68. SOLANACEAE.**

Herbs or shrubs, commonly rank-scented, with colorless juice: leaves alternate, without stipules: flowers regular, 5-merous, solitary or in cymes, on bractless pedicels: calyx mostly 5-lobed: corolla gamopetalous, mostly 5-lobed, usually plaited in the bud: stamens as many as the corolla-lobes and alternate with them: style 1; ovary entire, superior, 2-celled, becoming a many-seeded capsule or berry; endosperm fleshy.

Corolla rotate. Corolla funnelform to salverform. Flowers solitary. Flowers in racemes or panicles.

260. **SOLANUM.**

261. **DATURA.**

262. **NICOTIANA.**
260. **SOLANUM.**

Herbs or shrubs: calyx and rotate corolla 5-parted or cleft, the latter plaited in the bud: stamens epipetalous, exserted; filaments very short; anthers converging; styles elongated; ovary 2-celled, rarely more: fruit a berry.

Annual herbs: flowers white. 
Climbing shrub: flowers violet.

**S. nigrum** L. Annual, glabrous or somewhat pubescent, usually branched, 15-30 cm. high: leaves ovate or triangular, acute or obtuse, cuneate at base, sinuately toothed or rarely entire, 1-4 cm. long; petioles shorter than the blades: flowers in lateral peduncled small cymes: calyx-lobes obtuse: corolla white, deeply 5-cleft, the lobes spreading: berries globose, black. In cultivated soil, along Snake River.

**S. dulcamara** L. Perennial, half-shrubby, with climbing or spreading branches, sometimes 1 m. or more long, pubescent or glabrate: leaves ovate, acuminate, cordate, simple, 2-6 cm. long, or many of them with 3 lobes or 3-divided at base, the lateral segments smaller; petiole slender, shorter than the blades: cymes loose: flowers usually purple, 10-12 mm. broad: corolla-lobes spreading, triangular, acuminate: berries subglobose, red. Sparingly introduced.

261. **DATURA.**

Rank narcotic-poisonous annual or perennial weeds, erect, tall, branching: leaves alternate, petioled, ovate: flowers large, showy, solitary, on short peduncles, in the forks of the stems: calyx prismatic, 5-toothed, deciduous; corolla funnelform, with a 5-10-toothed plaited border: fruit a globular prickly 4-valved 2-celled capsule: seeds rather large, flat.

Flowers white. 
Flowers pale-violet.

**D. stramonium** L. Annual, glabrous or nearly so, green, 30-90 cm. high: leaves ovate, acuminate or acute, coarsely toothed or lobed, usually narrowed at base, petioled, 6-20 cm. long: calyx-tube 5-angled, not half as long as the white corolla, this 6-10 cm. long: capsule ovoid, densely prickly, the lower prickles usually shorter. Sparingly introduced.

**D. tatula** L. Much like the preceding, but the stem purplish, the corolla pale-violet and the prickles of the fruit nearly equal in length. Introduced in a few places.

262. **NICOTIANA.**

Rank acrid-narcotic herbs: leaves mostly entire: flowers in racemes or panicles, sometimes showy: calyx bell-shaped or oblong, 5-toothed or lobed, persistent; corolla commonly funnelform or salverform, the plaited border 5-lobed: stigma capitulate, somewhat 2-lobed: fruit a smooth 2-4-valved 2-celled capsule: seeds numerous, small.
N. attenuata Torrey. Annual, erect and slender, 30-60 cm. high, glandular-pubescent, especially above: leaves entire, petioled, the upper lanceolate or linear, attenuate-acuminate, the lower oblong or ovate, 3-10 cm. long: panicle loose, bracteate only below: calyx 6-8 mm. long, the teeth lanceolate or subulate, subequal, much shorter than the tube: corolla white, tubular-salverform, 2.5-3 cm. long, the limb ascending, 5-lobed, 8-12 mm. broad: capsule as long as the calyx-tube. Sandy soil along Snake River.

Family 69. SCROPHULARIACEÆ.

Herbs, sometimes shrubs: leaves alternate or opposite, without stipules: flowers perfect, mostly complete and irregular: corolla irregular, more or less 2-lipped, the upper lip 2-lobed, the lower 3-lobed: stamens on the corolla-tube, 4 and didynamous or only 2, rarely all 5 present and fertile: style single; stigma entire or 2-lobed, fruit a 2-celled usually many-seeded capsule, with axile placenta: seeds mostly small; endosperm copious.

Anther-bearing stamens 5: leaves alternate. 263. VERBASCUM.
Anther-bearing stamens 2 or 4: leaves alternate, opposite or whorled.

Fifth sterile stamen present.
Sterile stamen a gland or scale adherent to the upper side of the corolla.
Peduncles several-flowered. 264. SCROPHULARIA.
Peduncles 1-flowered.
Corolla conspicuously 2-lipped. 266. COLLINSIA.
Corolla obscurely if at all 2-lipped. 267. TONELLA.
Sterile stamen elongated, about equalling the others. 265. PENTSTEMON.

Fifth sterile stamen not present.
Stamens 4, 2 anther-bearing and 2 sterile.
Sterile filaments simple and included or none. 269. GRATIOLA.
Sterile filaments unequally 2-forked, exserted. 270. ILYSANTHES.

Stamens 2, anther-bearing.
Calyx 5-parted. 269. GRATIOLA.
Calyx 4-parted.
Leaves alternate. 272. SYNTHYRIS.
Leaves, at least the lower, opposite or whorled. 273. VERONICA.

Stamens 4, all anther-bearing.
Corolla nearly regular. 271. LIMOSELLA.
Corolla 2-lipped.

Stamens not enclosed in the upper corolla-lip. 268. MIMULUS.
Stamens enclosed in the upper corolla-lip.
Anthers equally 2-celled. 276. PEDICULARIS.
Anthers unequally 2-celled.
Upper lip much longer than the lower. 274. CASTILLEIA.
Upper lip scarcely longer than the lower. 275. ORTHOCARPUS.
263. **VERBASCUM.**

Tall and usually woolly biennial herbs: leaves alternate; cauline sessile or decurrent; flowers in large terminal spikes or racemes; calyx 5-parted; corolla 5-lobed, rotate, the lobes slightly unequal; stamens 5, all anther-bearing; style flattened at the apex; capsule globular, many-seeded.

Plant densely woolly.  
Plant glabrous or sparsely glandular.

**V. thapsus** L. Densely woolly throughout, the stout erect stems 1-2 m. high, somewhat wing-angled by the decurrent bases of the leaves; leaves thick, oblong, acute, entire or obscurely dentate, narrowed toward the base, 10-30 cm. long, gradually reduced upwards; flowers yellow, 16-20 mm. broad, in a dense long spike; stamens unequal, the two lower and longer glabrous, the others with hairy filaments. Introduced as a weed.

**V. blattaria** L. Stems slender, erect, 30-60 cm. high, not angled, glabrous below, glandular-pubescent above; leaves oblong, obtuse or the upper acute, crenate-dentate or cut-lobed, all but the lower sessile and partly clasping, 6-8 cm. long; raceme loose; pedicels spreading; calyx glandular; corolla yellow or white, 2-2.5 cm. broad; stamens all with hairy filaments; capsules subglobose, 6-7 mm. long. Sparingly introduced.

264. **SCROPHULARIA.**

Perennial herbs: leaves opposite: flowers small, in loose cymes in a narrow terminal panicle: calyx deeply 5-cleft: corolla 5-lobed, the 4 upper lobes erect, the lower spreading; stamens 4; the fifth sterile one a scale-like rudiment at the summit of the corolla-tube: capsule many-seeded.

**S. californica** Cham. Puberulent: stems stout, simple, about 1 m. high, somewhat 4-sided: leaves triangular-ovate, acute, coarsely and unevenly toothed or cleft, 5-12 cm. long, on petioles about half as long; panicle narrow, 20-40 cm. long, somewhat glandular: bracts lanceolate-attenuate: flowers dull-purple or green: calyx-lobes rounded, as long as the tube: corolla 6-8 mm. long: rudimentary stamen broad, spatulate: capsules conical, glandular. Low ground, not uncommon. Our form is not typical.

265. **PENTSTEMON.**

Perennial herbs: leaves opposite, the upper sessile or partly clasping, the floral reduced to bracts: flowers showy, in a racemose panicle: calyx 5-parted: corolla tubular, more or less inflated or bell-shaped, either decidedly or slightly 2-lipped; the upper lip 2-lobed, the lower 3-cleft: anther-bearing stamens 4; the sterile fifth filament about equalling the others: style long; stigma entire: capsule many-seeded.
Anther-cells deliscents for their whole length or nearly so.

Anthers woolly.  
P. crassifolius.

Anthers not woolly; sterile filaments beardless.  
P. deustus.

Anthers not woolly; sterile filaments bearded.

Leaves serrate or dentate.  
P. ovatus.

Leaves entire: flowers 8-12 mm. long.  
P. confertus.

Leaves entire: flowers 16-18 mm. long.  
P. attenuatus.

Anther-cells deliscents only at the apex, the base sac-like.

Glabular: flowers large, 2-3 cm. long.  
P. glandulosus.

Glabrous: flowers small.  
P. triphyllus.

P. crassifolius Lindl. (P. douglasii Hook.) Stems simple, ascending from a branched woody base, 15-40 cm. high: leaves coriaceous, glabrous, lanceolate, oblanceolate or ovate, mostly acute, entire or with a few teeth, narrow at base, the lower short-petioled, 1-4 cm. long: inflorescence a raceme, rarely a panicle, 2-11-flowered, viscid-pubescent: bracts much reduced: sepals ovate-lanceolate, attenuate-acuminate, 9-12 mm. long: corolla tubular-funnelform, dull-purple, somewhat 2-lipped, 3-4 cm. long: anthers very woolly, deliscents their whole length; sterile filament bearded. In rock crevices, Cedar Mountain.

P. deustus Dougl. Wholly glabrous below the inflorescence: stems leafy, erect, tufted, 20-40 cm. high, from a woody base: lowest leaves oblanceolate, petioled, the cauline lanceolate, acute, irregularly dentate, sessile by broad bases, 2-5 cm. long: panicle narrow, leafy below, 8-20 cm. long: peduncles mostly short, several-many-flowered: sepals lanceolate-ovate, acuminate, slightly margined, sparsely glandular: corolla white or yellowish, minutely viscid-glandular, 1-1.5 cm. long, narrowly funnelform, 2-lipped: anthers deliscents their whole length; sterile filament naked. Rocky places in Snake River canyon.

P. ovatus var. pinetorum Piper, n. var. Tall, 60-100 cm. high, with several stems from horizontal rootstocks: stems usually glabrous or nearly so: radical leaves ovate or elliptic, mostly entire, acute, glabrous, thickish and evergreen; the blades 1-7 cm. long, attenuate into a petiole as long or longer; cauline leaves 3-5 pairs, the lower pairs oblong or broadly spatulate, the upper decidedly ovate, all sessile, obtuse or acute, more or less dentate: inflorescence a more or less glandular-viscid, panicle of 4-8 whorled clusters: calyx-lobes ovate, acuminate, usually decidedly glandular: corolla bright blue, varying to pink and pale yellow.

This extremely ambiguous plant is exactly intermediate between P. ovatus Doug. and P. attenuatus Doug. From the former it differs in its taller habit, entire radial leaves, glabrous stems, and glandular calyx-lobes. From the latter it differs only in leaf characters. Besides being referred to the above two species, the plant has been called P. confertus Doug. and P. procerus Doug. and it forms the bulk of P. pruinosis of the Synoptic Flora. As a matter of fact, the plant here described might justly be considered as proving all the above named plants mere varieties of one polymorphous species. The type is Piper No. 1662 from Cedar Mountain.

P. confertus Doug. Glabrous throughout: stems erect, commonly 30-40 cm. high: leaves all entire; radical oblong, lanceolate or oblanceolate, acute or obtuse, 3-6 cm. long, attenuate at base into a petiole; cauline similar, sessile, the upper often ovate, acuminate: panicle strict, narrow, leafy below, 14-40 cm. long, of 2-8 whorl-like clusters: sepals glabrous, the scarious mar-
gin irregularly dentate or erose, about as long as the capsule; corolla yellow or nearly white, 2-lipped, 8–12 mm. long; lower lip bearded; anthers dehiscing their whole length; sterile filament bearded. Common at Pullman.


P. attenuatus Doug. Differs from the preceding only in its larger corolla, 18 mm. long, usually yellow, sometimes blue. Kamiack Butte.

P. glandulosus Lindl. Pubescent and glandular throughout: stems 5–1 m. high; radical leaves ovate-lanceolate, acute, dentate, narrowed at base into a petiole, 10–15 cm. long; cauline similar but sessile, the upper cordate-clasping; panicle interrupted, leafy below; lower peduncles 2–4 cm. long, the upper ones short; sepals ovate, acuminate, 6–8 mm. long; corolla dull-purple, funnelform, dilated in the throat, shortly 2-lipped, 2.5–3 cm. long, pubescent outside; anthers dehiscing at apex, the base sac-like; sterile filament glabrous. Snake River bluffs near Lewiston.

P. triphyllus Doug. Puberulent; stems slender from a branched woody base, 30–50 cm. high; leaves in whorls of 3, or the uppermost alternate, linear or lanceolate, entire or few-toothed, sessile, 1–2 cm. long; panicle loose, narrow; peduncles 2–5-flowered; pedicels short; calyx glandular, 3–4 mm. long; corolla 2-lipped, purple, 1.5 cm. long, minutely viscid-glandular; anthers dehiscing only at apex, the base sac-like; sterile filament densely bearded. Rock crevices near Guy and along Snake River.

266. COLLINSIA.

Annuals or biennials: leaves simple, opposite, sessile or the lowest peltate and the upper whorled: flowers solitary or clustered in the upper axils: calyx deeply 5-cleft: corolla with the tube saccate at the base on the upper side, deeply 2-lipped; the upper lip 2-cleft, the lower 3-cleft, the middle lobe keeled and sac-like: anther-bearing stamens 4; sterile stamen a gland-like structure: capsule 4 many seeded.

C. parviflora Doug. Glabrous or minutely puberulent, branched from the base, erect or spreading, 10–20 cm. high: lower leaves oblong or orbicular, peltate, often toothed; the upper nearly sessile, oblance or linear, acuminate, 1–2 cm. long, often in whorls of 3–5; flowers slender-pedicelled, solitary in the axils, even of the lower leaves: calyx-lobes lanceolate, acute, longer than the tube, not equalling the corolla: corolla violet or blue, 6–7 mm. long, 2-lipped for half its length. Common everywhere.

267. TONELLA.

Very similar to Collinsia but the cauline leaves mainly ternately divided or 3-parted: corolla obscurely 2-lipped, the 5 more or less unequal lobes somewhat rotately spreading, the tube somewhat gibbous above: ovules and seeds 1–4 in each cell.

T. floribunda Gray. Stems slender, usually branched, 10–50 cm. high: basal leaves simple, ovate, entire or few-toothed, 5–10 mm. long, slender-petioled; cauline all 3-parted or divided, short-petioled or sessile; divisions
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oblong, linear or lanceolate, obtuse, short-stalked, 1-3 cm. long, bearing a few short stiff hairs on the back and margin; inflorescence sparsely pubescent with stalked glands; flowers slender-pedicelled, in whorls, from the axils of the reduced upper leaves: calyx-lobes linear; corolla blue, with darker lines within, nearly rotate, 1 cm. broad, the lobes of the lower lip smaller than those of the 2-cleft upper lip. A charming little plant, common along streams in Snake River canyon.

268. MIMULUS.

Herbs, rarely shrubs: leaves mostly simple, opposite; flowers axillary, on simple peduncles: calyx prismatic, or rarely campanulate, 5-angled, 5-toothed, the upper tooth usually the largest: corolla irregular, 2-lipped; upper lip erect or reflexed, 2-lobed, the lower spreading, 3-lobed: stamens 4, all anther-bearing: stigma 2-lobed: seeds numerous.

Flowers red. M. CLIVICOLA.
Flowers yellow: calyx not prismatic, deeply 5-cleft. M. EXILIS.
Flowers yellow: calyx prismatic, 5-toothed.
Flowers rather large: plants nearly or quite glabrous.
   Perennial: lip of corolla spotted. M. LANGSDORFII.
   Annual: lip of corolla with a large blotch. M. NASUTUS.
Flowers small: plants pubescent.
   Plant prostrate. M. FLORIBUNDUS.
   Plant erect: leaves petioled. M. PEDUNCULARIS.
   Plant erect: leaves nearly sessile. M. BREVIIFLORUS.

M. clivicola Greenman. Annual, simple or branched from the base, 2-15 cm. high, glandular-pubescent throughout: leaves ovate-oblong or oblanceolate, 3-nerved, entire or denticulate, 5-20 mm. long: flowers axillary, slender-pedicelled: calyx 6-10 mm. long, nearly equally 5-toothed; the teeth acute, 2 mm. long: corolla red-purple, often spotted in the pubescent throat, somewhat 2-lobed, 1-2 cm. long: capsule linear-oblong, a little longer than the calyx. Gravelly hillsides, Thatuna Hills, rare.

M. exilis Durand. Annual, erect, usually much branched, villous throughout with soft somewhat viscid hairs, 10-30 cm. high: leaves oblong or lanceolate, acute, entire, sessile, 1-3 cm. long: pedicels about equalling the leaves: calyx campanulate, not at all angled, deeply 5-cleft, oblique at the orifice: corolla yellow, shortly 2-lipped, 6-8 mm. long, the lobes nearly equal. Sandy banks of Snake River, rare.

M. langsdorffii Don. Perennial by short stolons, erect or decumbent, glabrous or puberulent, 15-60 cm. high, or depauperate plants much smaller and dying after blooming: leaves several-nerved from the base, ovate, obtuse or acute, rounded or subcordate at base, the lower long-petioled and often with ragged lobes at base, the upper short-petioled or sessile: floral leaves often cuneate: flowers in a raceme, the pedicels as long as or shorter than the flowers: calyx in fruit 5-angled and inflated, the upper lobe longest, the others turn toward it, all much shorter than the tube: corolla yellow, hairy and often spotted in the throat, usually 2-3 cm. long, the tube exceeding the calyx. Springy places, not common in our limits.
M. nasutus Greene. Much like the preceding but strictly annual, the leaves usually orbicular: corolla 1-1.5 cm. long, pale-yellow, the tube barely as long as the calyx, the lower lip usually with a large purple blotch. Springy places on the bluffs of Snake River.

M. floribundus Doug. Annual, erect when young, soon spreading or prostrate, villous-pubescent throughout with slimy-viscid hairs: stems often 30-50 cm. long; leaves ovate, somewhat cordate, acute, dentate, 4-40 mm. long; petioles shorter than the blades: flowers opposite, in the axils: pedicels barely exceeding the leaves: fruiting-calyx 7 mm. long, campanulate, the 5 triangular teeth equal, one-fourth as long as the tube: corolla pale-yellow, 1 cm. long, the limb little spreading. Moist banks, Snake River bluffs.

M. peduncularis Doug. Much like the last, but more slender, erect, puberulent, not villous: leaves 5-25 mm. long, slender-petioled: pedicels slender, as long as or longer than the leaves: calyx-teeth very short. Banks of Snake River, rare.

M. breviflorus Piper. Annual, the slender stem simple, or more commonly branched from the base, erect, 4-20 cm. high, minutely puberulent throughout or nearly glabrous above: leaves lanceolate, rarely oblanceolate or ovate, acute or inconspicuously few-toothed, narrowed at base into a short petiole or subsessile, usually shorter than the internodes, gradually reduced above, mostly about 1 cm. long; flowers solitary in the axils, on slender pedicels which about equal the leaves: calyx narrowly campanulate, somewhat constricted above, 2-3 mm. long in flower, 6-8 mm. in fruit, the short acute triangular teeth nearly equal: corolla pale-yellow, tubular, 4-5 mm. long, the lobes short and rounded: stigma scarcely protruding beyond the calyx. Moist ground, local and not common.

269. GRATIOLA.

Low mostly perennial branching herbs: leaves opposite, sessile: peduncles axillary, 1-flowered: calyx 5-parted, the narrow divisions usually equal: upper lip of corolla entire or 2-cleft, the lower 3-cleft: anther-bearing stamens 2: sterile filaments 2, simple and included, or none: style dilated or 2-lipped at the apex: capsule 4-valved, many-seeded.

G. virginiana L. Annual: stems erect, branched below, viscid-puberulent or pubescent above, nearly glabrous at base, 10-30 cm. high: leaves sessile, oblanceolate, acute, entire or toothed, usually narrowed at base, 1-2 cm. long, glabrous or nearly so: pedicels slender, equalling the leaves: calyx enclosed at base by 2 foliaceous bracts which equal the lobes: corolla 8-10 mm. long, its yellow tube nearly twice as long as the calyx: lobes whitish, the two upper notched. Wet places, rather common.

270. ILYSANTHES.

Small and smooth annual herbs: leaves opposite, sessile: peduncles axillary, 1-flowered, the upper becoming racemose: calyx becoming 5-parted, the divisions becoming narrow and nearly equal: upper lip of corolla short, erect, 2-lobed, the lower
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I. gratioloides Benth. Glabrous, simple or branched from the base, 5-12 cm. high: leaves sessile, ovate, acute or with a few teeth, 1-2 cm. long, the upper ones reduced: pedicels slender, twice as long as the leaves, spreading in fruit: flowers 6-8 mm. long: calyx-lobes linear, as long as the purple corolla: capsule ovoid-oblong, 4-6 mm long. Sandy banks of Snake River, rare.

271. LIMOSELLA.


L. aquatica L. Tufted: leaves spatulate, obtuse, 2-5 cm. long, the blade usually much shorter than the petiole: peduncles shorter than the leaves: corolla white or pinkish, 2 mm. broad, hardly longer than the calyx: capsules globose, obtuse, 2-2.5 mm. long. Reported from near Moscow by Professor Henderson.

272. SYNTHYRIS.

Perennial herbs: leaves alternate, crenate, the radical roundish or cordate: flowers small, purplish or green, in a spike or raceme: calyx 4-parted: corolla campanulate, with 4 more or less unequal lobes, or sometimes none: stamens 2, from just below the upper sinuses, or in one apetalous species on the hypogynous disk, exserted: stigmas simple: capsule many-seeded.


S. reniformis var. major Hook. Glabrous below the inflorescence: stems 10-30 cm. high: leaves all basal, orbicular, 2-5 cm. broad, reniform at base, with many short lobes, these coarsely crenate: petioles much longer than the blades: scapes erect, the raceme spike-like; a few bracts below the inflorescence: calyx-lobes oblong, obtuse: corolla blue: capsule flattened, notched at apex, 5-7 mm. long. Kamiack Butte, near the summit.

S. rubra Benth. Erect, 30-50 cm. high, whitish-pubescent throughout: basal leaves ovate, obtuse, somewhat cordate and cuneate at base, crenate, 2-6 cm. long, long-petioled; cauline smaller, sessile: spike densely flowered: calyx greenish or reddish, the sepals oblong, viscid-pubescent, 4 mm. long: corolla none: stamens much exserted, inserted on the hypogynous disk: capsule globose, somewhat flattened, rounded at apex, longer than the sepals. Common on grassy hillsides.
273. VERONICA.

Chiefly herbs: leaves opposite or whorled, or the upper alternate; flowers small, in racemes or spikes or sometimes solitary in the axils: calyx 4-parted: corolla rotate, 4-parted, the lower lobes and sometimes the lateral ones narrower: stamens 2, exserted: style entire; stigma single: capsule flattened, few-many-seeded.

Flowers in terminal racemes, blue. V. SERPYLLIFOLIA.
Flowers solitary, axillary, white. V. PEREGRINA.
Flowers in axillary racemes.
Leaves oblong or ovate.
Leaves linear-lanceolate. V. AMERICANA.
V. SCUTELLATA.

V. serpyllifolia L. Perennial, glabrous or puberulent: stems erect or decumbent, 10-15 cm. high: leaves opposite, oval, ovate or orbicular, crenate-dentate or subentire, short-petioled, about 1 cm. long: racemes terminal: bracts oblong, alternate; pedicels erect, equalling or exceeding the calyx: corolla blue, dark-striped, 4 mm. broad: capsule orbicular, notched at apex, as long as the calyx. Moist places, rather common.

V. peregrina L. Annual, erect, branched from the base, glabrous or puberulent and glandular, 8-40 cm. high: lower leaves opposite, petioled, oblong, obtuse, dentate; upper alternate, linear, obtuse or acute, entire or nearly so, 1-2 cm. long: flowers white, solitary in the axils; pedicels very short, not as long as the flowers: corolla 1-2 mm. broad: capsules orbicular, notched, nearly as long as the calyx. Common in moist places, variable.

V. americana Schwein. Perennial, glabrous throughout, rooting at the lower nodes: stems decumbent, usually branched, 30-60 cm. long: leaves all opposite, oblong, ovate or lanceolate, obtuse, serrate, rounded at the base, short-petioled: racemes opposite, in the upper axils, exceeding the leaves: pedicels spreading, longer than the bracts and flowers: flower blue with darker stripes, 4 mm. broad: capsule notched at apex, 4-5 mm. broad. Wet places, infrequent.

V. scutellata L. Perennial, glabrous or nearly so, rooting at the lower joints: stems 15-30 cm. high: leaves all sessile, lanceolate or nearly linear, mostly denticulate or entire, attenuate-acute, 3-5 cm. long: racemes axillary from alternate axes, slender, few-flowered, as long as or exceeding the leaves: pedicels slender, spreading: corolla blue, 4-5 mm. broad: capsule notched both at apex and base. Wet places, not common.

274. CASTILLEIA.

Perennial herbs (in ours), sometimes woody at base: leaves alternate, entire or cut-lobed; the floral ones usually dilated, colored and more showy than the yellow or purplish spiked flowers: calyx tubular, flattened, 2 or 4-lobed: corolla-tube included; upper lip (galea) much longer than the lower, narrow, arched and keeled, enclosing the 4 unequal stamens; lower lip short, 3-lobed: stamens 4: anthers unequally 2-celled: capsule many-seeded.
Flowers scarlet, rarely yellow.  
Leaves entire.  
C. miniata.  
C. angustifolia.  
Flowers whitish.  
Soft-pubescent: leaves mostly lobed.  
Harshly pubescent: leaves mostly entire.  
C. lutea.  
C. lutescens.

C. miniata Doug. Glabrous below the inflorescence: stems erect, simple or nearly so, 30-100 cm. high; leaves lanceolate or linear-lanceolate, acute or acuminate, entire, sessile, 3-5 cm. long: spikes dense, pubescent; bracts broad, mostly 3-5-toothed or cleft, scarlet-tipped, shorter than the flowers; calyx about equally cleft before and behind, the divisions 2-cleft: corolla yellowish, 3 cm. long, the upper lip straight and slender, longer than the tube; lower lip very short; pod ovoid, 10-12 mm. long, enclosed in the calyx. Low ground, common.

C. angustifolia Don. Stems usually clustered from a woody base, erect, 20-50 cm. high, more or less pubescent throughout, somewhat pilose: leaves pubescent, the lower linear or linear-lanceolate, mostly entire, the upper broader, cleft to about the middle into 3-5 narrow lobes: inflorescence short and dense, becoming elongate in fruit; bracts like the leaves, but broader and more deeply cleft, pilose below, the tips scarlet, rarely yellow: calyx 2-3 cm. long, with lanceolate lobes: corolla 2 cm. long, the upper lip hardly as long as the tube, much longer than the short 3-lobed lower lip. Thatuna Hills, Kamiack Butte and Snake River bluffs: very variable.

C. lutea Heller. (C. pallida var. camporum Greenman.) Perennial, with soft-pilose somewhat viscid pubescence, erect, 15-50 cm. high: leaves lanceolate, a few of the lower entire, the upper cleft into 3-7 narrow lobes: inflorescence pale, greenish-yellow, elongated in fruit: calyx 2-2.5 cm. long, equally cleft before and behind, the lateral divisions 2-lobed or rarely entire, obtuse at apex: corolla longer than the calyx; upper lip nearly twice as long as the prominently 3-lobed lower lip. Low meadows, rare.

C. lutescens Piper, n. comb. (C. pallida var. lutescens Greenman.) Erect from a woody base, 30-50 cm. high, harshly short-pubescent throughout: stems simple or branched above: leaves lanceolate-linear, attenuate, all but the upper entire, 3-5 cm. long; upper leaves and bracts broader, 3-5-lobed, the bracts yellowish: calyx equally cleft before and behind, the divisions 2-cleft: corolla yellowish, exceeding the calyx; upper lip twice as long as the prominently 3-lobed lower lip. Dry hillsides, common.

275. ORTHOCARPUS.

Low annuals, very similar to the preceding genus: calyx 4-cleft: corolla tubular; the upper lip (galea) scarcely longer and usually much narrower than the inflated 1-3-saccate lower ones: anthers unequally 2-celled, or the smaller anther-cell rarely wanting.

Bracts broad, purple-tipped.  
Bracts not colored, little different from the leaves.  
O. tenuifolius.  
O. hispidus.

O. tenuifolius Benth. Annual, erect, branched above, 10-20 cm. high, sparsely hairy: leaves narrow, 2-4 cm. long, entire or pinnately cleft into 3-
5 linear lobes: spikes dense, 1-6 cm. long, 2 cm. broad; bracts broad, obtuse, purple-tipped, the upper entire, the lower with 1-2 small lobes on each side, coarsely ciliate; calyx half as long as the corolla, 2-lipped, each lip bearing 2 subulate teeth; corolla yellow, narrow, exceeding the bracts, 1.5 cm. long, the small hooked galea surpassing the sac-like lip. Low ground, common.

O. hispidus Benth. Annual, slender, erect, simple or with few erect branches, rough-hairy throughout, 10-40 cm. high; leaves linear or lanceolate, attenuate, entire or pinnately cleft into 3-5 linear lobes, 2-6 cm. long; spikes dense, narrow; bracts like the leaves, but shorter and broader; calyx-teeth subulate, shorter than the corolla-tube; corolla white, slender, 12-14 mm. long, lobed with 3 sac-like swellings: galea straight, pointed. Low ground, not common.

276. PEDICULARIS.

Perennial herbs: leaves toothed or pinnatifid, the floral bract-like: flowers rather large, in a spike: calyx 2-5-toothed, irregular: corolla strongly 2-lipped, the upper lip (galea) arched, laterally compressed, sometimes beaked; the lower 3-lobed: stamens 4, enclosed by the upper lip: anthers equally 2-celled: capsule several-seeded.

Leaves finely divided. P. bracteosa.
Leaves not divided. P. racemosa.

P. bracteosa Benth. Glabrous below, sparsely pubescent above: stem stout, erect, 30-100 cm. high, with tuber-like roots: leaves ovate or oblong in outline, 5-12 cm. long, the basal petioled, the cauline nearly sessile, pinnately parted or divided into narrow lanceolate or linear, serrate or incised divisions, 1-5 cm. long: inflorescence an erect dense spike, 10-50 cm. long: bracts ovate, acuminate, entire or nearly so, exceeded by the flowers: calyx 5-cleft, with narrow triangular lobes: corolla whitish, 2 cm. long: galea longer than the lip, curved, hooded at the apex, the orifice entire. In woods, Thatuna Hills.

P. racemosa Dougl. Ascending or spreading, glabrous throughout or puberulent above, the stems simple or somewhat branched, 30-40 cm. long: leaves alternate, lanceolate, obtuse, doubly crenulate, 5-10 cm. long; petioles short: flowers short-pedicelled, in racemes, with gradually reduced leaves or bracts: calyx 2-cleft in front, 2-toothed behind: corolla white or reddish, the galea much incurved, nearly reaching the apex of the broad lip. In woods, Thatuna Hills.

Family 70. OROBANCHACEAE.

Root-parasitic herbs, destitute of foliage and green color, yellowish or brownish throughout: leaves reduced to alternate scales: flowers solitary or in spikes: calyx 4-5-toothed or parted: corolla gamopetalous, tubular, more or less 2-lipped, hypogynous: stamens 4, didynamous, epipetalous: style long; stigma large; ovary 1-celled, with 2 or 4 parietal placentae: capsule 1-celled, 2-valved; seeds very numerous, minute.
277. OROBANCHE.

Reddish yellowish violet or nearly white herbs, parasitic on the roots of various plants: scales scattering; flowers solitary or in spikes or racemes; calyx 4 or 5-cleft; corolla 2-lipped; upper lip erect, mostly 2-lobed or emarginate, the lower spreading; stamens included.

Flowers solitary, terminating long peduncles.
Calyx-lobes subulate, longer than the tube.  O. UNIFLORA.
Calyx-lobes triangular, shorter than the tube.  O. FASCICULATA.
Flowers spicate.  O. LUDOVICIANA.

O. uniflora L. (Thalesia purpurea Heller.) Stem stout, 1-4 cm. long, mostly subterranean, with a few ovate obtuse scales and bearing 1-5 or more 1-flowered glandular-puberulent peduncles 8-12 cm. high: calyx glandular, the obconic or campanulate tube exceeded by the narrow subulate lobes; corolla violet or yellowish, 1-2.5 cm. long, glandular-puberulent without. Parasitic mainly on Tellima and Eriogonum. Not rare.

O. fasciculata Nutt. Stems elongated, 2-12 cm. long, bearing a cluster of 2-30 very glandular 1-flowered peduncles, 5-10 cm. high: calyx-tube campanulate, about as long as the broad triangular lobes: corolla yellowish, 1-2 cm. long. Sandy soil along Snake River. On the roots of various plants.

O. ludoviciana Nutt. Whole plant reddish-yellow, viscid-pubescent: stems stout, erect, simple or with erect branches, scaly, 15-25 cm. long; flowers 2-bracted at the base of the calyx, in dense spikes, looser below: calyx unequally 5-cleft, the lobes linear-lanceolate: corolla yellowish, 12-15 mm. long, the lobes acute, hardly spreading. In the sand on the banks of Snake River on the roots of Artemisia dranunculoides and Chrysopsis villosa.

Family 71. PLANTAGINACEAE.

Mostly stemless herbs: flowers regular, 4-merous, in spikes: corolla gamopetalous, dry and membranaceous, veinless: stamens 4 or 2 on the corolla-tube, alternate with its lobes: ovary 2 or falsely 3-4 celled: ovules 1-several in each cavity.

278. PLANTAGO.

Mostly stemless herbs: leaves nerved or ribbed, radical: flowers small, in bracted spikes on naked scapes, perfect or sometimes more or less dioecious: calyx of 4 persistent sepals: corolla salverform or rotate, 4-parted: stamens 4, or rarely 2, in all or some flowers with long exserted filaments: ovary 2-celled; ovules 1-several in each cell: capsule 2-celled, 2-several-seeded.

Leaves broad, oval or ovate.  P. major.
Leaves lanceolate, white-villous.  P. purshii.
Leaves lanceolate, pubescent, green.  P. lanceolata.
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P. major L. Perennial, pubescent or glabrous, the erect scapes mostly 10-30 cm. high: leaves broadly ovate, 3-5-ribbed, obtuse or acute, rounded at base, entire or coarsely dentate, 5-20 cm. long, on stout channelled petioles: spikes 5-20 cm. long: flowers all alike, perfect: sepals ovate or oblong, obtuse, shorter than the acutish capsule: seeds 6-15. Introduced and spreading, or one form perhaps native.

P. purshii R. & S. Annual, 5-30 cm. high, white-hairy or woolly throughout: leaves 1-3-nerved, linear or lanceolate, acute, narrowed at base into a petiole, 5-10 cm. long; spikes dense, 1-10 cm. long; bracts subulate, exceeding the flowers, becoming rigid: flowers perfect but of two kinds on separate plants, in one the 4 stamens being long and exserted, in the other short and included: sepals oblong, obtuse, with broad scarious margins; corolla white, the spreading lobes ovate. Dry ground along Snake River.

P. lanceolata L. Perennial, with a stout tap-root, erect, 30-45 cm. high, more or less pubescent: leaves 3-5-ribbed, lanceolate, acute or acuminate, entire or denticulate, sparsely pubescent, woolly at the base of the broad petiole, 5-20 cm. long; spikes dense, 1-3 cm. long, a little thicker at the base; bracts and sepals scarious: flowers all alike, perfect: capsule oblong, obtuse, 2-seeded: seeds concave on the inner face. Introduced in lawns as a weed.

Family 72. RUBIACEAE.

Herbs (in ours): leaves opposite, entire, with intervening stipules or whorled without stipules: flowers generally perfect: calyx 4-5-lobed or toothed, coherent with the ovary; corolla gamopetalous, regular, 4-5-lobed or toothed: stamens on the corolla and alternate with its lobes: ovary inferior, 2-5-celled: endosperm hard, copious.

279. GALIUM.

Annual or perennial herbs with 4-angled stems: leaves whorled, without apparent stipules: flowers small, usually cymose: calyx-teeth obsolete: corolla rotate, 4-parted, rarely 3-parted: stamens as many as the corolla-lobes, short: styles 2, short: stigmas capitate: ovary 2-lobed, 2-celled: ovules solitary: fruit dry or fleshy, globular, separating when ripe into 2 closed 1-seeded carpels.

Leaves mostly in fours.

Leaves 3-nerved.
Leaves 1-nerved.

Leaves mostly in sixes.
Leaves in sixes or eights.

G. boreale L. Perennial, glabrous or nearly so: stems rather slender, but erect, 30-60 cm. high, leafy: leaves all in fours, 3-nerved, oblong-linear, lanceolate or linear, obtuse to acuminate, mostly 1-3 cm. long: flowers white, in small cymes which form a large terminal panicle; bract-like leaves much reduced and in pairs: fruit globose, small, hispid, but becoming glabrous. Common in moist meadows and on north hillsides.
**G. triñdum** L. Perennial, with slender rootstocks, ascending, the stems very weak and slender, 15-20 cm. high, retrosely scabrous on the angles: leaves in fours, linear, obtuse, 5-10 cm. long, scabrous on the margins and midribs: pedicules axillary or terminal, recurved, mostly 1-flowered: flowers very small, white, the parts often in threes: fruit glabrous. In swales, Pullman, rare.

**G. asperrimum** Gray. Perennial, the weak reclining stems 30-120 cm. long, retrosely-hispid on the angles: leaves in sixes or on the smaller branches in fives or fours, 1-nerved, narrowly oblong or lanceolate, cuspidate, shining above, retrosely hispid on the midribs and margins, 1-3 cm. long: cymes loosely few-flowered, forming very large leafy panicles: pedicels and pedicels very slender: corolla white: fruit about 2 mm. broad, roughened with short tubercles. Plentiful in moist copses.

**G. aparine** L. Annual, the stems weak and reclining, retrosely prickly on the angles, 30-120 cm. long: leaves in whorls of 6-8, linear or linear-spatulate, mostly cuspidate, more or less retrosely-hispid, especially on the margins and midribs, 5-8 cm. long: pedicels from the upper axils or terminal, bearing solitary flowers: fruit on erect pedicels, densely hispid with somewhat hooked bristles, 3-4 mm. broad.

var *vaillantii* Koch. Smaller in every way, the stems 10-30 cm. high, mostly erect: leaves 1-2 cm. long: flowers more numerous: fruit about 2 mm. broad.

The variety occurs in dry woods in the Thatuna Hills. The species is not common within our limits.

**FAMILY 73. CAPRIFOLIACEAE.**

Shrubs or rarely herbs: leaves opposite, without genuine stipules: flowers perfect, generally in cymes: calyx-tube adherent to the ovary: corolla gamopetalous, tubular or rotate, 4-5-cleft, sometimes irregular: stamens distinct, as many as the corolla-lobes, rarely fewer: ovary 2-5-celled, or not rarely 1-celled; ovules solitary or several: endosperm fleshy.

Corolla rotate or urn-shaped, regular.

- Leaves pinnate.
- Leaves simple.

Corolla tubular or bell-shaped, often irregular, sometimes 2-lipped.

Herbs.

- Shrubs or woody vines.
  - Corolla regular or nearly so.
  - Corolla more or less irregular, commonly 2-lipped.

280. **SAMBUCUS**.

281. **VIBURNUM**.

282. **LINNAEA**.

283. **SYMPHORICARPOS**.

284. **LONICERA**.

Shrubs or trees: leaves opposite, pinnate; leaflets serrate or laciniate: flowers small, white, numerous, in compound cymes: calyx-lobes minute or obsolete: corolla gamopetalous, open urn-shaped, 5-cleft; lobes broadly spreading: stamens 5, distinct: stigmas 3: fruits of berry-like drupes with 3-5 nutlets, each with one seed.
Cymes flat-topped.  
Cymes pyramidal.  

**S. glauca** Nutt. Shrub, 2-5 m. high, glabrous throughout, somewhat glaucous; young pith white; leaves pinnate; leaflets 5-9, thickish, obovate or ovate-lanceolate, acuminate, sharply serrate; short-stalked, paler beneath, 8-12 cm. long; lower leaflets sometimes more or less divided; subulate stipels occasionally present; cymes usually 5-rayed, large, flat-topped; flowers white, 4-5 mm. broad; fruit black, very glaucous; nutlets rugose. Common along streams.

**S. melanocarpa** Gray. Shrub, 2-3 m. high: young pith brown; leaflets 5-9, obovate or narrowly ovate, long-acuminate, sharply and evenly serrate, cuneate at base, puberulent but glabrate, 4-6 cm. long; inflorescence broadly pyramidal; flowers white, 3 mm. broad, turning brown when dried; fruit black, without a bloom; nutlets rugose. Thatuna Hills, rare.

281. **VIBURNUM.**

Shrubs or small trees: leaves simple, commonly toothed, sometimes deeply lobed; flowers white, in flat compound cymes: calyx 5-toothed; corolla spreading, deeply 5-lobed; stamens 5, exserted; stigmas 1-3; fruit a 1-celled 1-seeded drupe with soft pulp and a thin crustaceous stone.

**V. pauciflorum** Pylaie. Shrub, 1-2 m. high, the branchlets glabrous; leaves orbicular or ovate, mostly 3-lobed, truncate or subcordate at base, pubescent beneath; petioles 4-8 cm. broad; cymes peduncled, on short 2-leaved branches, small, 1-2 cm. broad; flowers white, all perfect; drupes globose, red. Along streams, Thatuna Hills, rare.

282. **LINNAEA.**

Creeping and trailing small evergreen herbs: leaves ovate or orbicular, opposite, petioled; flowers in pairs, on the summit of elongated terminal peduncles: calyx-teeth 5, awl-shaped, deciduous; corolla funnelform, almost equally 5-lobed, purple and whitish, hairy inside: stamens 4, two shorter, all included and inserted near the base of the corolla: ovary and the small dry pod 3-celled, but one seed ripening, the other ovules abortive.

**L. borealis** var. **longiflora** Torr. Stem perennial, trailing, slender, pubescent, 30-100 cm. long; leaves obovate or orbicular, obtuse, crenate above the middle, mostly cuneate at base, sparingly pubescent, 1-2.5 cm. long, short-petioled; flowering branches erect, 8-10 cm. high, leafy below, forked above into two, very rarely more, glandular pedicels, each bearing a single nodding flower: calyx-lobes lanceolate, about twice as long as the very glandular tube: corolla pink, hairy inside, 1-1.5 cm. long. In woods, Thatuna Hills.

283. **SYMPHORICARPOS.**

Low and branching shrubs: leaves oval or oblong, short-petioled, entire or wavy-margined; flowers 2-bracteolate, in axillary and terminal spikes or clusters, rarely solitary: calyx-teeth 5 or 4,
short, persistent: corolla regular or nearly so, bell-shaped to salverform, white or pink, 5 or 4-lobed; stamens as many as the corolla-lobes, epipetalous: ovary 4-celled, two of these being 1-ovuled and fertile, the two alternate several-ovuled and sterile: fruit globular and berry-like, containing 2 bony seed-like nutlets.

**S. racemosus** Michx. Erect much branched shrub, 30–90 cm. high; leaves ovate or oval, acute or obtuse, rounded or cuneate at base, entire or on vigorous shoots minutely-toothed or lobed, slightly pubescent beneath, short-petioled, 1–4 cm. long; flowers in terminal and axillary racemes: corolla pink, campanulate, 5–6 mm. long, villous on the lobes within, these obtuse, shorter than the tube: stamens and style included: berries white. Common almost everywhere in our limits.

284. **LONICERA.**

Erect or climbing shrubs: leaves opposite, mostly entire; flowers in spikes or pairs: calyx minutely 5-toothed: corolla tubular or funnelform, often gibbous at the base, more or less irregularly 5-lobed, commonly 2-lipped: stamens 5, epipetalous: ovary 2–3-celled, with numerous ovules in each cell: berry several-seeded.

Stems twining: flowers orange.  
Stems not twining: flowers yellow.  
Stems not twining: flowers white.

**L. ciliosa** Poir. Stems slender, twining to a height of 3–7 m.; the young parts glaucous: leaves oval, obtuse, glaucous beneath, ciliate, 2–6 cm. long, short-petioled; uppermost pairs on the flowering branches connate into oval or orbicular disks: peduncles terminal, rarely in the axils of the penultimate pair of leaves: flowers sessile, in whorls: corolla yellow or orange, sparsely hairy; tube narrow, gibbous near the base, 2–2.5 cm. long; limb spreading, slightly 2-lipped: berries orange-red. Thatuna Hills, not rare.

**L. involucrata** Banks. Shrub, 1–3 m. tall, not twining: leaves oblong, ovate or obovate, mostly acuminate, rounded or cuneate at base, sparsely pubescent beneath or glabrate, 5–15 cm. long, short-petioled; peduncles axillary, shorter than the leaves: flowers yellow, a single pair, surrounded at base by an involucre of 4–6 bracts, the inner ones of which are united at base and become purple in fruit: corolla tubular with short lobes, glandular-puberulent, 1–1.5 cm. long; berries black, not united. Along streams, Thatuna Hills.

**L. ciliata** L. Much branched shrubs, 1–2 m. high, not twining: leaves oblong, oval or ovate, obtuse, pubescent beneath, and somewhat ciliate, 1–5 cm. long, short-petioled: flowers white or nearly so, in a pair at the apex of the peduncles, 1–2 cm. long, with 2 small bracts at the base of ovary: corolla oblong-funnelform, 2 cm. long, the 5 lobes nearly equal, the tube with a sac-like projection at base: berries red, not united. Deep woods, Cedar Mountain. Our form is not typical and has been described as a distinct species under the name **L. ebractulata** Ryd.

**Family 74. VALERIANACEÆ.**

Herbs: leaves opposite, without stipules: flowers perfect or dio-
ecious, in panicked or clustered cymes: calyx-tube coherent with the ovary: corolla gamopetalous, tubular or funnelform, often irregular, 3-5-cleft: stamens distinct, 1-3, fewer than the corolla-lobes, epipetalous: ovary inferior, with one fertile 1-ovuled cell and two abortive or empty ones: fruit indehiscent: endosperm none.

Tall perennial herbs.
Low annual herbs.

285. VALERIANA.

Tall perennial herbs, with strong-scented thickened roots: leaves simple or pinnate: calyx-lobes of several plumose bristles (pappus) which are rolled inward in flower but which unroll as the fruit matures: corolla commonly gibbous near the base, 5-lobed, nearly regular: stamens 3: abortive cell of the ovary small or obscure, obliterated in the akene-like fruit which is therefore 1-celled.

V. edulis Nutt. Perennial from a stout tap-root: stems erect, smooth, 40-90 cm. high: basal leaves tufted, petioled, spatulate or oblanceolate, entire or pinnately parted into 3-5 narrow lobes, puberulent or glabrous, usually finely ciliate, 10-40 cm. long; cauline 1-3 pairs, sessile or nearly so, pinnately parted into linear or lanceolate segments, the upper much reduced: flowers greenish-yellow, polygamo-dioecious, sessile, in small cymes which are arranged in large loose panicles: fruit ovate, puberulent or glabrous, 2-3 mm. long. Low ground, common, rank-smelling.

286. VALERIANELLA.

Low annual dichotomously branched herbs: leaves tender, rather succulent: flowers small, bracted, whitish, cymosely clustered: calyx merely toothed or teeth obsolete: corolla funnelform, manifestly or obscurely 2-lipped: stamens 3, rarely 2: fruit 1-celled, 1-seeded.

V. macrocera Gray. Annual, erect, simple or loosely branched, 10-30 cm. high, wholly glabrous: leaves only a few pairs, sessile, oblong or oblong-obovate, entire, 1-3 cm. long: flowers pink, in a terminal globose or oblong head or in several whorled clusters: corolla 4 mm. long, the spur one-half as long as the tube or longer, frequently adnate to it; lobes nearly equal, rounded: fruit glabrous or puberulent, deep-saucer-shaped, 2 mm. long. Stony hillsides, common.

FAMILY 75. CAMPANULACEAE.

Herbs, with milky juice: leaves alternate, without stipules: flowers regular, generally blue, showy, scattered: calyx adherent to the ovary: corolla regular, 5-lobed, bell-shaped: stamens 5, usually free from the corolla and distinct: style 1, the upper portion provided with pollen-collecting hairs; stigmas 2 or more: ovary 2-5-
celled, with axile placenta; capsule 2–several-celled, many-seeded; endosperm fleshy.

Ovary and capsule long and narrow.

Capsule opening at the top by a hole left by the falling away of the base of the style; flowers all alike. 287. GITHOPSIS.

Capsule opening on the sides by 2 or 3 little valves which leave small round perforations; flowers of two kinds.

Ovary and capsule short and broad or globular.

Calyx-lobes broad: flowers of two kinds. 288. SPECULARIA.

Calyx-lobes narrow: flowers all alike. 289. HETEROCODON.

287. GITHOPSIS.

Low annual herbs: flowers all alike: calyx with a 10-ribbed tube and 5 long and narrow foliaceous lobes: corolla tubular-campanulate, 5-lobed: filaments short, dilated at the base: stigmas 3; ovary 3-celled: capsule strongly ribbed, crowned with the rigid calyx-lobes about as long or longer, opening by a round orifice left by the falling away of the base of the style; seeds very numerous.

G. speculativeaids Nutt. Annual, erect, simple or branched from the base, hirsute-pubescent throughout, 5–20 cm. high: leaves sessile, linear or oblong, coarsely dentate, 3–12 mm. long; flowers terminal on the stem or on axillary stout peduncles, erect: calyx-lobes linear, acuminate, glabrous above, 1-nerved, rigid, erect, as long as the narrowly-obconic tube: corolla blue, barely exceeding the calyx-lobes. Very rare, bluffs of Snake River, near Alnota.

288. SPECULARIA.

Annuals: caudinal leaves sessile or clasping; flowers blue or purple, terminal or axillary, of two kinds, the earlier smaller, close-fertilized, with a rudimentary corolla which never opens, with mostly 3–4 calyx-lobes; the later with 5 calyx-lobes: corolla rotate, 5-lobed: ovary 3 or sometimes 2-celled: capsule more or less elongated, opening by 2–3 small lateral valves which leave round or oval perforations, usually over partitions.

S. perfoliata A. DC. Stems slender, erect, leafy, 20–40 cm. high, rough-hairy on the angles: leaves orbicular, cordate, crenate, clasping at base, 1–2 cm. long, scabrous on the margins and veins: flowers of 2 sorts, the earlier close-fertilized and with only rudimentary corollas, the later with showy violet corollas 4–10 mm. broad, solitary or 2–3 in the axils: calyx of the close-fertilized flowers with 3–4 short lobes; of the corolla-bearing flowers with subulate lobes slightly longer than the tube: capsule top-shaped, opening near the middle. Dry ground along Snake River.

289. HETEROCODON.

A very delicate little annual: flowers of two sorts, the lower and earlier ones with merely rudimentary corollas and self-fertilized in
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the bud: calyx with an obovate or inversely pyramidal tube much shorter than the foliaceous lobes, these broadly ovate, sharply toothed, veiny, 3–4 in the earlier, 5 in the later flowers: corolla short-campanulate, 5-lobed: stamens and style as in Campanula: capsule 3-celled, 3-angled, bursting on the side; seeds numerous.

**H. rariflorum** Nutt. Annual, the slender stems simple or branched below, 8–20 cm. high, sparingly hairy: leaves ovate or orbicular, sessile and partly clasping, coarsely dentate, somewhat scabrous-ciliate, 3–10 mm. long; earlier flowers without corolla, the later ones with blue corollas, barely exceeding the calyx: calyx 5–8 mm. long, more or less hispid, the ovate acuminate usually toothed lobes a little longer than the tube. Rare in moist places.

290. **CAMPANULA.**

Chiefly perennial herbs: flowers all alike, showy: calyx-lobes narrow: corolla campanulate or nearly so, 5-lobed or cleft: stamens 5; filaments dilated at base: capsule short, 3–5-celled, opening on the side or near the base by 3–5 small uplifted valves, leaving round perforations: many-seeded.

**C. rotundifolia** L. Perennial, glabrous, erect, branched at the very base, 10–40 cm. high: basal and lower leaves broadly ovate or orbicular, cordate, dentate or entire, petioled; caudine linear, the lower somewhat spatulate, acute, sessile, 2–7 cm. long; flowers solitary or racemose, erect, pedicels slender, nodding in the fruit: calyx-lobes subulate, longer than the tube, one-half or one-third as long as the corolla: corolla campanulate, blue, 12–20 mm. long: capsule openings near the base. Dry woods, Thatuna Hills.

**FAMILY 76. LOBELIACEAE.**

Herbs, mostly with milky juices, leaves alternate, simple: flowers perfect, scattered or in racemes: calyx-tube adherent to the whole or the lower half of the ovary: corolla gamopetalous, irregular, 5-lobed: stamens 5, free from the corolla, united into a tube commonly by their filaments and always by their anthers: style 1; stigma often fringed: ovary 2-celled with axile, or 1-celled with parietal placentae: fruit a many-seeded capsule; endosperm fleshy.

291. **DOWNINGIA.**

Low and spreading glabrous annuals, rather succulent and tender: leaves sessile, narrow, entire, the upper reduced to bracts: flowers axillary, sessile: calyx-tube adherent to the ovary, very long and slender, 3-sided, usually twisted: corolla 2-lipped, with a very short tube: filaments and anthers both united into a tube: capsule long and slender, early becoming 1-celled.

**D. elegans** Torr. Stems erect, simple or branched near the base, 10–30 cm. high, glabrous throughout or very minutely puberulent: leaves sessile,
ovate or lanceolate, acute, 8–20 mm. long; flowers blue, in a rather loose spike; bracts like the leaves but broader; calyx-tube very narrow, becoming 3–4 cm. long and appearing like a pedicel; calyx-lobes narrow, unequal: lower lip of the corolla sharply 3-lobed, 8–10 mm. long and broad, blue with a large white and yellow center; divisions of the upper lip lanceolate. Common on the margins of ponds.

Family 77. DIPSACEAE.

Herbs: leaves opposite or whorled, without stipules: flowers in dense heads, surrounded by an involucre as in the Compositae: calyx-tube adherent to the ovary: corolla epigynous, 2–5-lobed: stamens 2–4, distinct, on the corolla-tube and alternate with its lobes: ovary inferior, 1-celled; ovule 1: fruit an akene with persistent calyx-lobes; endosperm fleshy.

292. DIPSACUS.

D. sylvestris Huds. Biennial, 1–2 m. high, the stems and midribs armed with stout prickles: lower leaves lanceolate, obtuse, crenate, rarely cleft at base, 15–30 cm. long; upper leaves sessile, often cuneate, acuminate, entire: heads ovoid, becoming cylindric, 5–10 cm. long; involucre of linear cup-shaped prickly bracts, some of which are longer than the head: bracts of the receptacle ovate, armed with long straight awns: flowers lilac. Sparingly introduced on Union Flat.

Family 78. COMPOSITAE.

Annual biennial or perennial herbs or undershrubs (in ours): leaves without stipules: flowers in a close head on a common receptacle, surrounded by one or more rows of bracts (the involucre); heads 1–many, discoid when all the flowers bear tubular corollas, ligulate when the corollas are all strap-shaped, radiate when the outer corollas are strap-shaped and the inner tubular, in which case the outer are ray-flowers and the inner disk-flowers: receptacle often covered with bracts or scales (chaff) each subtending a flower: calyx gamosepalous, its tube wholly adherent to the ovary, its limb (pappus) none or cup-shaped or developed into teeth, scales, awns or capillary bristles: corollas alike in all the flowers of the head or dissimilar, either tubular or strap-shaped (ligulate), gamopetalous, epigynous: stamens 5, epipetalous, their authors united into a tube (syngenesious): style 2-cleft at the apex or in sterile
flowers usually entire; ovary bicarpellary, inferior, i-celled, i-ovuled, with basal placenta; fruit an akene sometimes surmounted by the pappus, often compressed at right angles to the subtending chaff (lateral compression) or compressed parallel to the chaff (obcompressed).

Corollas ligulate in all the flowers of the head: plants with milky juice.

Tribe 1. CICHORIEAE.

Corollas tubular in all the flowers or ligulate in only the marginal ones: plants without milky juice.

Style-branches of perfect flowers flat and tipped with a distinct flat appendage: anthers without tails: leaves all alternate.

Tribe 3. ASTEROIDEAE.

Style-branches of perfect flowers neither truncate nor tipped with any appendage: anthers with tails: head with two kinds of flowers: receptacle not long-bristly: corollas not deeply cleft.

Tribe 4. INULOIDEAE.

Style-branches of perfect flowers truncate-capitate or tipped with an appendage: anthers without tails: leaves or some of them often opposite.

Receptacle chaffy, at least next the margin: involucre not scarios: pappus not capillary.

Stamens free from each other or nearly so.

Tribe 2. AMBROSIEAE.

Stamens united into a ring around the style.

Receptacle not chaffy: involucre not of imbricated scarious scales: pappus not capillary.

Tribe 5. HELIANTHOIDEAE.

Receptacle not chaffy, or rarely so: involucre of imbricated partly scarious scales: pappus a short crown or none.

Tribe 6. HELENOIDEAE.

Receptacle not chaffy: pappus capillary and copious.

Style-branches without tips or appendages, more or less grown together to or near the apex; corollas all tubular and very deeply sometimes irregularly 5-cleft into long linear lobes: receptacle densely bristly: anthers sagittate or with tails.

Tribe 7. ANTHEMIDEAE.

Tribe 8. SENECIONIDEAE.

Style-branches without tips or appendages, more or less grown together to or near the apex; corollas all tubular and very deeply sometimes irregularly 5-cleft into long linear lobes: receptacle densely bristly: anthers sagittate or with tails.

Tribe 9. CYNAROIDEAE.

Pappus chaffy or none.

Pappus plumose.

Flowers yellow; stemless or short-stemmed.

Flowers pink or white, leafy-stemmed and branching.

Flowers yellow or purple, leafy-stemmed and usually branching.

Pappus of capillary bristles, not plumose.

Akenes flat or flattish.

Akenes narrowed at the summit or beaked.

Akenes truncate, not beaked.

Akenes columnar or terete, not flattened.

Akenes beaked.

293. MICROSERIS.

295. MICROSERIS.

294. STEPHANOMERIA.

295. TRAGOPOGON.

299. LACTUCA.

298. SONCHUS.
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Akenes 4-5-ribbed. 296. **Taraxacum.**
Akenes 10-ribbed. 297. **Troximon.**
Akenes not beaked.
   Pappus copious, white and soft. 300. **Crepis.**
   Pappus a single row of rough tawny bristles.

**Tribe 2. Ambrosieae.**
Staminate and pistillate flowers in the same head: involucre of a few rounded bracts.
Staminate and pistillate flowers in separate heads: involucre of the pistillate heads bur or nut-like.
Involucral-bracts of the staminate heads united: involucre of the pistillate heads with a single series of tubercles and prickes.
Involucral-bracts of the staminate heads separate: involucre of the pistillate heads an oblong bur.

Ray-flowers none. 307. **Bigelovia.**
Ray-flowers white, purple or blue, never yellow.
   Involucral-bracts in 2-5 rows, with herbaceous tips. 310. **Aster.**
   Involucral-bracts in 1-2 rows, never with herbaceous tips. 311. **Erigeron.**
Ray-flowers yellow.
   Pappus of 2-8 rigid and early-falling awns. 305. **Grindelia.**
   Pappus of copious slender or capillary bristles.
   Pappus double, the outer row very short.
   Pappus simple.
   Bristles of pappus copious and unequal, somewhat rigid. 308. **Alopappus.**
   Bristles of pappus equal and nearly in a single series, slender. 309. **Solidago.**

**Tribe 3. Asteroideae.**
Receptacle chaffy. 312. **Psilocarphus.**
Receptacle naked.
Staminate and pistillate heads on different plants.
Pistillate and perfect flowers in the same head; staminate flowers none. 313. **Antennaria.**

**Tribe 5. Helianthoideae.**
Ray-akenes obcompressed.
   Disk-akenes obcompressed. 320. **Bidens.**
   Disk-akenes prismatic-quadrangular or laterally compressed. 316. **Balsamorhiza.**
   Disk-akenes slender and abortive. 322. **Lagophylla.**
Ray-akenes laterally compressed.
   Disk-akenes 4-angled or laterally compressed.
   Ray-flowers fertile, rarely wanting: heads small. 321. **Madia.**
   Ray-flowers neutral, rarely wanting: heads large.
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Receptacle flat, or convex.
Akenes very flat, winged when young.  318. HELIANTHELLEA.
Akenes neither very flat nor winged.  319. HELIANTHUS.
Receptacle elongated, becoming columnar.  315. RUDBECKIA.
Ray-akenes neither obcompressed nor laterally compressed.
Heads few-flowered: rays short and broad.  323. BLEPHARIPAPPUS.
Heads many-flowered: rays elongated.  317. WYETHIA.

TRIBE 6. HELENOIOIDEAE.

Ray-flowers none: corollas all tubular.  326. CHAENACTIS.
Ray-flowers present.
  Ray-flowers sterile.  328. GAILLARDIA.
  Ray-flowers fertile.
    Involucral-bracts erect, subulate-linear.  325. RIGIOPAPPUS.
    Involucral-bracts erect, oval or lanceolate.  324. ERIOPHYLLUM.
    Involucral-bracts spreading or reflexed at maturity.  327. HELENIUM.

TRIBE 7. ANTHEMIDEAE.

Ray-flowers none: corollas all tubular.  332. MATRICARIA.
Receptacle high-conical.
Receptacle flat to hemispherical.  333. ARTEMISIA.
Ray-flowers present.
Receptacle naked.
Receptacle chaffy.
  Involucre narrow: rays short.  329. ACHILLEA.
  Involucre broad: rays conspicuous.  330. ANTHEMIS.

TRIBE 8. SENECIONIDEAE.

Leaves all alternate.  335. SENECIO.
Leaves all or some of them opposite.  334. ARNICA.

TRIBE 9. CYNAROIDEAE.

Flowers at the margin of the head mostly sterile.  337. CENTAUREA.
Flowers of the head all alike.  336. CIRSIUM.

293. MICROSERIS.

Stemless or short-stemmed herbs, with milky juice: leaves mostly radical, often pinnatifid: flowers yellow, the heads terminal, on scapes or long peduncles, mostly nodding before flowering: receptacle without chaff or bristles: pappus chaffy or plumose or none: corollas in all the flowers of the head ligulate: akenes 8-12-ribbed.

Pappus of 15-20 soft and plumose bristles.  M. NUTANS.
Pappus of 5 flat long-awned scales.  M. LINEARIFOLIA.
**M. nutans** Gray. Perennial, from one or more fusiform tubers, simple or branched, puberulent or glabrous, 10-40 cm. high; leaves 10-20 cm. long, lanceolate or linear-lanceolate, rarely oval, sometimes entire, usually laciniate-pinnatifid into numerous linear lobes; peduncles stout and elongated; heads 8-20-flowered: involucre oblong or turbinate-campanulate, 2 cm. long, the larger 8-10 bracts lanceolate, attenuate-acuminate: pappus of 15-20 soft white plumose bristles, broadened at base, as long as the columnar akenes. Common on hillsides.

**M. linearifolia** Gray (*M. macrochaeta* Gray.) Annual, branched at the base, 15-40 cm. high; leaves lanceolate, 10-15 cm. long, mostly pinnatifid into linear lobes, loosely pubescent when young, becoming glabrous; peduncles stout, glabrous, striate-grooved: involucre cylindric, 2.5-3 cm. high, glabrous, the bracts of two lengths, lanceolate, acuminate; akenes fusiform, attenuate upwards, 10-12 mm. long; pappus silvery, as long as the akenes, consisting of five linear scales, abruptly terminating in shorter awns. In loose rocks, banks of Snake River. *M. macrochaeta* is the same thing, founded on immature specimens in which the awn is relatively longer, as the base develops later.

294. **STEPHANOMERIA.**

Leafy-stemmed and branching herbs, with milky juice and small heads: flowers pink or white: receptacle without chaff or bristles: pappus of plumose or partly plumose bristles or rarely chaffy awns or narrow scales: corollas all ligulate; akenes short, truncate at both ends, about 5-ribbed or angled.

**S. paniculata** Nutt. Annual, erect, divaricately branched, 40-80 cm. high; leaves linear, sessile, entire or the lower ones pinnatifid, 2-6 cm. long, or much reduced on the flowering branches: heads 3-8-flowered, numerous, in loose panicles, short-pedicelled: involucre 8-9 mm. long, the outer scales very short: receptacle naked: akenes roughened, 4-5 mm. long; pappus grayish-brown, of 15-25 bristles, plumose nearly to the broadened base, a little longer than the akenes. Bluffs of Snake River.

295. **TRAGOPOGON.**

Stout leafy-stemmed and usually branching biennials or perennials, with milky juice: leaves entire, grass-like, clasping: flowers yellow or purple, in large solitary heads: involucral simple, of several equal bracts: pappus of numerous long-plumose bristles: corollas all ligulate: akenes narrowly fusiform, 5-10-ribbed, long-beaked.

**T. porrifolius** L. Biennial, glabrous throughout, the stout stems about 1 m. high; leaves lanceolate, attenuate from the broader somewhat clasping base, 10-15 cm. long; peduncles long and stout, swollen under the head: involucral bracts lanceolate, acuminate, 4-5 cm. long, exceeding the violet rays: outer akenes roughened, the inner smooth, 1 cm. long, attenuate into a beak of equal length: pappus brownish, as long as the beak, plumose nearly to the tip. Escaped from gardens and spreading.
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296. TARAXACUM.

Acaulescent biennials or perennials, with milky juice: leaves radical, pinnatifid; flowers yellow, on scapes: receptacle flat, naked: involucre of 2 rows of bracts: pappus of cipions and white-ciliare bristles which are not plumose: corollas all ligulate: akenes oblong or fusiform, angled, about 10-ribbed, attenuate at base, with a long filiform beak at the apex.

T. officinale Weber. Glabrous or loosely pubescent when young: leaves oblong or oblongate, variously pinnatifid, the lobes usually toothed and turned backward, 10–20 cm. long; peduncles 10–30 cm. high: involucre cylindrical, the inner bracts either linear or linear-lanceolate, the outer similar but shorter and reflexed: heads many-flowered: rays yellow: akenes brownish, spinulose above, the pyramidal apex abruptly narrowed into a slender beak, twice as long as the body: pappus white, cipions. Abundantly introduced.

297. TROXIMON.

Acaulescent annuals or perennials, with milky juice: leaves radical, clustered: heads solitary, on scapes: flowers yellow, rarely orange or purplish: bracts of the involucre in a few rows: receptacle flat, not cleft: pappus of cipions white capillary bristles, which are not plumose: corollas all ligulate: akenes oblong or linear, terete, 10-ribbed, the apex contracted into a neck or prolonged into a beak.

Annual: akenes with a beak longer than the body. T. Heterophyllum. Perennial.

Beak of the akenes longer than the body. T. Grandiflorum. Beak of the akenes not longer than the body. T. Glaucum.

T. heterophyllum Greene. Annual: leaves linear or lanceolate or oblanceolate, entire or variously toothed or pinnatifid, 5–12 cm. long, loosely pubescent: peduncles erect, pubescent or glabrate, 10–30 cm. high: involucre campanulate, 1.5–2 cm. high, the bracts in two series, the outer shorter and usually pubescent: akenes numerous, oblong or fusiform, 10-ribbed or the outer 10-winged, attenuate into a narrow beak, twice or thrice as long: pappus bright white, soft and cipious.

var. kynamplura Greene. Outer akenes or sometimes all of them thicker, the well-developed wings sinuously folded.

Common everywhere, the variety probably most abundant.

T. grandiflorum Nutt. Perennial, loosely pubescent or glabrate: leaves lanceolate or oblongate, attenuate-acuminate to obtuse, mostly pinnatifid into numerous lobes, 10–20 cm. long; peduncles stout, 30–60 cm. high: involucre campanulate, tomentose at base, 3–4 cm. high, the bracts in about 3 series: akenes fusiform, acutely 10-ribbed, 6 mm. long, attenuate into a slender beak, 20 mm. long: pappus bright white, soft and capillary, much shorter than the beak. Dry ground, common.

T. glaucum Nutt. Perennial, leaves lanceolate or linear, entire or dentate or variously pinnatifid, acuminate or attenuate at apex, pale or glau-
flora, glabrous or loosely pubescent, 10-25 cm. long; peduncles stout, erect, usually glabrous or glabrulate, except at the base of the involucre, 30-60 cm. high; involucre hemispherical, 2-3.5 cm. high, glabrous or somewhat pubescent at base; bracts in 2-3 indistinct series, lanceolate or nearly ovate, acuminate, the outer shorter; corollas pale yellow: akene pubescent, ribbed, 10-14 mm. long, attenuate into a stout nerved beak shorter than the body: pappus white, copious, the slender bristles scabrous, longer than the akene. Low ground, common and variable.

298. **SONCHUS.**

Leafy-stemmed mostly glabrous generally coarse herbs, with milky juice: flowers yellow, in corymbose or paniculate heads: bracts of the involucre imbricated, the outer shorter: receptacle flat, naked: pappus of copious very fine and short capillary bristles, which are not plumose: corollas all ligulate: akeines flat or flattish, truncate, not beaked.

*S. asper* Vill. Annual, erect, 30-90 cm. high, somewhat glaucescent, glabrous below, glandular above: lower leaves ovate or broadly spatulate, obtuse or acute, rarely lobed, spinulose-dentate, the petioles margined; upper leaves oblong or oval, sessile and clasping at base, acuminate: heads cymosely arranged: involucre cylindric-campanulate, about 1 cm. broad, glabrous: flowers yellow: akeines flat, margined, 3-nerved on each side. Sparingly introduced.

299. **LACTUCA.**

Leafy-stemmed herbs, with milky juice: flowers yellow or blue, in paniculate few to many-flowered heads: bracts of the involucre in 2-4 few rows, the outer shorter: receptacle flat, naked: pappus of copious very short and fine capillary bristles which are not plumose: corollas all ligulate: akeines flat or flattish, narrowed at the summit or beaked.

Leaves spiny: flowers yellow.
Leaves not spiny: flowers violet.

*L. scariola* L. Biennial, erect, 1-2 m. high, glabrous and somewhat glaucescent: leaves oblong or lanceolate, spiny on the margin and midrib, entire or irregularly toothed or cleft, sessile and usually auriculate-clasping at base, 5-20 cm. long, the uppermost much reduced: heads in large loose panicles: involucre narrowly cylindric, glabrous, 10-12 mm. long, the outer bracts much shorter than the inner ones: rays yellow: akeines flattened, narrowed into a beak longer than the body, as long as the bright white pappus. A troublesome weed.

*L. pulchella* DC. Perennial, erect, leafy, 30-90 cm. high, puberulent or glabrulate: leaves lanceolate, tapering at each end, acute or cuspidate, entire or sinuate toothed or lobed, 5-15 cm. long; lower leaves petioled: heads loosely panicled: involucre cylindric, glabrous, 12-14 mm. long, the outer bracts successively shorter, all lanceolate, acute: flowers blue or violet: akeines flat, not margined, 4 mm. long, very short beaked: pappus copious, white. Banks of Snake River. A very troublesome weed in some sections.
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300. CREPIS.

Annuals or biennials with milky juice, not pilose: heads several
many flowered: flowers yellow: involucre usually double: receptacle
flat, naked, sometimes alveolate: pappus simple, of copious and
white capillary bristles which are not plumose: corollas all
ligulate: akenes oblong, linear or fusiform, nearly terete or obtusely
angled, 10–20-ribbed, generally contracted at base and more tapering
at the apex, sometimes even beaked.

Heads 5-10-flowered.  C. intermedia.
Heads 25-30-flowered.  C. occidentalis.

C. occidentalis Nutt. Perennial, erect, thinly white-tomentose throughout,
8-30 cm. high: stems usually with few erect branches: leaves broadly
lanceolate, acute or acuminate, 5-10 cm. long, pinnately toothed or cleft into
narrow lobes, short-petioled or sessile: heads on stout peduncles: involucre
oblong-cylindric, 12–18 mm. long, tomentose and with a few large black
glandular hairs, the principal bracts lanceolate, acuminate, the smaller basal
bracts relatively broader: flowers 25-30: akenes brownish, fusiform, 8-10
mm. long, 10-18-ribbed, longer than the bright white pappus. In loose
rocks near Wawawai.

C. intermedia Gray. Perennial, erect, thinly canescent or glabrate,
30–60 cm. high: leaves lanceolate, attenuate-acuminate, with few or numerous
slender teeth or lobes, or divided into narrow segments, rarely entire,
10–20 cm. long, the basal ones petioled: heads 5-10-flowered, loosely or
somewhat compactly corymbose: involucre oblong-cylindric, ashy-puberulent,
the principal bracts 5-9 in number, 10–12 mm. long, with a few small
ones at base: akenes acutely 10-ribbed when mature, oblong-fusiform, attenuate
toward the apex, a little longer than the bright white soft pappus. Rather common, very variable.

301. HIERACIUM.

Hispid and hirsute often glandular perennials with milky juice:
leaves merely toothed or entire: heads small to medium, paniculate
or rarely solitary: flowers yellow or sometimes white: bracts of involucre in two rows: receptacle flat, naked: pappus of a single
row of rough tawny bristles which are not plumose: corollas all
ligulate: akenes oblong or columnar, terete or 4–5-angled, mostly
10-ribbed or striate, the apex truncate.

Plant covered with long soft hairs.  H. scouleri.
Plant pubescent or glabrous.  H. canadense.

H. scouleri Hook. Perennial, erect. 30–60 cm. high, densely beset
throughout with long soft white hairs with swollen bases: basal leaves
lanceolate or oblanceolate, entire, acute or obtuse, 10–20 cm. long, tapering
into margined petioles; cauline similar, sessile, 5–12 cm. long: inflorescence
corymbose or paniculate, glandular: involucre 1 cm. high, very glandular
and often villous: corollas yellow; akenes columnar; pappus fuscous. Common
on hillsides. Very variable in the amount and length of the pubesence.
H. canadense Michx. Perennial somewhat scabrous throughout; stems stout, 30-120 cm. high; leaves numerous, lanceolate, entire or incisedly serrate, sessile and somewhat clasping at base, gradually smaller upwards, 1-10 cm. long, none clustered at base; heads corymbed, rarely solitary, on stout peduncles: involucre hemispheric, puberulent or glabrous, sometimes glandular, 1-2 cm. broad, the bracts in 2-3 series, the uppermost loose; corolla yellow: akenes columnar; pappus brownish. Low ground, rare.

302. IVA.

Herbs: leaves simple, at least some of the lower opposite: heads small, nodding, in the axils of the leaves or in terminal spikes or panicles: flowers monoecious, in the same head; a few marginal ones pistillate, the others staminate and more numerous: bracts of the involucre few, rounded, commonly united into a cup: receptacle chaffy, with scales subtending the sterile flowers: akenes obovate, thick.

I. xanthifolia Nutt. Annual, tall and stout, 1-2 m. high, pubescent or puberulent; leaves opposite or the uppermost alternate: broadly ovate, acuminate, incisedly serrate, scabrous above, 3-ribbed, 6-12 cm. long; petiole stout, with a few scattered stout hairs; panicles terminal and in the axils of the upper leaves, bractless, large and dense: heads sessile or nearly so, about 2 mm. broad, hemispherical; bracts in two series of 5 each, the outer broadly ovate, the inner obovate or oblong and truncate: akenes usually 5. Sparingly introduced along railways.

303. AMBROSIA.

Annual or perennial herbs: leaves pinnately-lobed, at least the lower opposite: heads small, greenish, monoecious: pistillate heads 1-flowered, in terminal bractless racemes or spikes: involucral-bracts of staminate heads united: pistillate flowers enclosed in an akenes-like 1-celled involucre, usually armed with a single series of tubercles or prickles: pappus none: corollas of staminate flowers broad, 5-toothed; of the pistillate none: akenes ovoid or obvoid, thick.

Annual: involucre spiny in fruit. Perennial: involucre tubercled or naked in fruit.

A. artemisiaefolia. A. psilostachya.

A. artemisiaefolia L. Annual, with many slender branches, pubescent, 30-90 cm. high; upper leaves alternate, the lower opposite, ovate or lanceolate, the uppermost sessile, often entire and acute, the others variously pinnately lobed, mostly petaled; blades 1-3 cm. long; staminate heads numerous, pedicelled, drooping, bractless, the involucre crenate: pistillate heads solitary or clustered, sessile in the leaf-axils below the staminate racemes: fruit 3 mm. long, short-beaked, armed with 4-6 teeth or spines. Native on the sandy banks of Snake River.

A. psilostachya DC. Perennial, with numerous rootstocks, hirsutely and strigously pubescent: stems stout, erect, 60-120 cm. high: leaves thick, the lower petaled, the upper sessile, once or twice pinnately cleft; lobes
lanceolate, acute, entire or toothed: staminate heads short-peduncled, in strict racemes; pistillate heads solitary in the axils: fruit obovoid or oblong, 3 mm. long, short-pointed, rough-reticulated, unarmed or with a few short teeth. Introduced at Pullman.

304. **XANTHIUM.**

Annual herbs: leaves alternate, petioled: heads monoecious, in axillary or terminal clusters or short interrupted spikes: the pistillate 2-flowered and below the several-flowered staminate: involucre of staminate flowers of several distinct narrow scales: involucre of pistillate flowers bur-like, ovoid or oblong, closed, indurated, 2-celled, 2-flowered, armed all over with strongly hook-tipped bristles: pappus none: corolla none: akenes obovoid, thick.

Leaves white beneath, a 3-pointed spine in each axil. **X. spinosum.** Leaves green on both sides: no axillary spines. **X. silphiifolium.**

**X. spinosum** L. Much branched, the stems decumbent or ascending, pubescent, 30-60 cm. high: leaves ovate-lanceolate, acute or acuminate, entire or 3-lobed, cuneate at base, sessile or nearly so, white-tomentose beneath, green and shiny above, 5-12 cm. long; axils bearing stout 2-3-parted yellow spines: fertile involucres oblong-cylindric, solitary or 2-3 in the upper axils, 1-1.5 cm. long, armed with slender rather weak prickles and beaked with 1 or 2 stouter ones. Sparingly introduced.

**X. silphiifolium** Greene. Coarse and stout, 15-90 cm. high, scabrous throughout: leaves broadly ovate, coarsely toothed or somewhat angularly lobed, cuneate at base, 5-10 cm. long, on stout, usually longer petioles: fertile involucres about 4 cm. long, armed with numerous hooked spines, the two terminal ones stoutest, all of them glandular-hispid, except at their apexes, and about 1 cm. long. Common along Snake River. This plant has here-tofore been referred to **X. canadense** Mill. but no eastern American plant quite matches it.

305. **GRINDELIA.**

Biennial or perennial herbs: leaves sessile or partly clasping: heads yellow, medium or rather large, solitary, terminating leafy branches, or occasionally more or less corymbose, many-flowered: rays fertile, numerous, narrow, or rarely none: involucral-scales numerous, narrow: receptacle flat or convex: pappus of 2-8 rigid and early-deciduous awns: style-branches tipped with an appendage: akenes compressed or turgid or the outermost somewhat 3-angled.

**G. nana** Nutt. Stems erect, 15-60 cm. high, simple or branched above: basal leaves spatulate, petioled, the upper sessile and partly clasping, entire or serrate, glabrous: heads hemispherical, 10-14 mm. broad; bracts with slender revolute tips, sticky-viscid: rays 16-30, 5-8 cm. long: akenes narrow, somewhat 2-toothed at summit: pappus awns 2-3. Infrequent within our limits.
306. CHrysopsis.

Low herbs: leaves numerous, alternate, sessile; heads solitary or in corymbs with yellow flowers; rays fertile or sometimes wanting; involucral-scales narrow, acute, with scarious margins; receptacle flat; style-branches with appendages; pappus double, of two kinds, the interior of long copious capillary bristles, the exterior of short bristles or chaffy scales; akenes oblong-linear or ovate-oblong, compressed, hairy.

C. villosa Nutt. Perennial, the stems decumbent or suberect, 15-30 cm. long, canescent throughout and more or less villous; leaves numerous, oblong or oblanceolate, mostly acute, sessile or nearly so, 2-3 cm. long; heads solitary or corymbed, terminating short leafy branches; involucre hemispherical, 1-1.5 cm. broad; bracts canescent or nearly glabrous; rays golden-yellow; akenes obovate, pubescent; outer pappus very short.

Rocky banks of Snake River, variable.

307. BigeloviA.

Herbs or undershrubs: leaves narrow, alternate; heads mostly small, with 5-30 yellow flowers, in corymbs cymes or panicles; flowers all perfect, with tubular corollas; rays none; involucre imbricated; receptacle flat; pappus simple, of copious unequal tawny capillary bristles; style-branches with appendages; akenes narrow, terete or angular, slightly if at all compressed.

B. graveolens var. albicaulis Gray. Shrub, 30-90 cm. high, with numerous, erect, somewhat fascicled branches, these densely white-woolly: leaves numerous, narrowly-linear, entire, white-woolly, somewhat pungently pointed, 2-6 cm. long; heads numerous, in terminal dense corymbs; involucre about 8 mm. high; the bracts acutish, sparsely tomentose or glabrate; corolla-tube villous, the lobes lanceolate; akenes linear; pappus soft. Banks and bluffs of Snake River.

308. AploppAPPUS.

Herbs or low undershrubs: leaves alternate, rigid; heads solitary, terminal, or clustered, many-flowered; ray-flowers fertile or rarely none; involucre imbricated; bracts with or without foliaceous tips; receptacle flat or flattish; pappus tawny or reddish, of copious and unequal capillary bristles, somewhat rigid; style-branches with appendages; akenes turbinate and linear, terete, angled or more or less compressed.

Heads large, 1.5-2.5 cm. broad; rays very small. A. carthamoides.

Heads smaller, 1-1.5 cm. broad; rays conspicuous. A. racemosus.

A. carthamoides Gray. Erect, stout, 30-40 cm. high, rough-pubescent or scabrous, becoming glabrous; basal leaves spatulate-lanceolate, coriaceous, cuspidate, entire or nearly so, 10-40 cm. long; upper cauline smaller, sessile, by rather broad bases; heads solitary, terminal or 1-2 in the upper axils, 1.5-
2.5 cm. broad; involucre hemispherical, 1-2 cm. high; bracts green, coriaceous, oblong-lanceolate or ovate, cuspidate, the lowermost leaf-like, entire or nearly so, pubescent: rays usually present, small, scarcely or not exceeding the pappus, sterile: akenes smooth, glabrous, flat, 4-nerved; pappus coarse, brownish, nearly as long as the corolla. Kamiack Butte, in open pine woods; very variable.

**A. racemosus** Torr. Perennial: stems erect, 60-90 cm. high, sparsely soft-hairy: leaves lanceolate, coriaceous, acute, entire, 5-15 cm. long, the cauline sessile, the basal petiolated, all somewhat scabrous on both surfaces and with sparse pubescence: heads racemously or somewhat paniculately arranged, mostly long-peduncled: involucre turbinate or campanulate, 1-1.5 cm. broad, the well-imbricated bracts linear, acute, pubescent, rigid and coriaceous, green-tipped: rays 6-8 mm. long; akenes pubescent: style-branches filiform: pappus brownish. Hillsides, rather common. Our form is not typical.

**309. SOLIDAGO.**

Perennial herbs: leaves alternate: heads small, mostly in panicles or panicked racemose clusters, radiate, the ray-flowers fertile, yellow: involucre imbricated, the bracts usually without herbaceous tips: pappus simple, of a single series of mostly equal and slender scabrous capillary bristles: style-appendages lanceolate or triangular-subulate: akenes terete or angular, 5-12-ribbed.

Radical leaves spatulate, much longer than the cauline. **S. MISSOURIENSIS.**

**S. serotina** Ait. Stems stout and tall, 1-1.5 m. tall, very smooth below the involucre, the stem often glaucous: leaves lanceolate or oblong-lanceolate, acuminate, prominently 3-nerved, and usually saliently sharply-serrate, 6-15 cm. long, smooth on both sides: heads 5-7 mm. high, crowded on the spreading often curved branches of the large pyramidal panicle: bracts thin, linear, obtuse: rays 7-14, yellow: akenes pubescent. Common along Snake River, otherwise scarce.

var. **salebrosa** Piper, n. var. Leaves harshly scabrous on both surfaces, usually less serrate, otherwise like the species. This variety is the common Solidago of the Columbia Basin and extends eastward across the continent. It has been referred to **S. canadensis** and its varieties and to **S. elongata**, from both of which its larger heads distinguish it. It differs from **S. serotina** Ait. in nowise except for its scabrosity. The type is Piper no. 1580, from Pullman.
310. ASTER.

Mostly perennial herbs: leaves alternate: heads solitary, corymbed or panicked, many-flowered, radiate: ray-flowers several or numerous, in one row, fertile or rarely sterile, white, purple or blue, never yellow: disk-flowers yellow, often turning purple: involucre imbricated; bracts commonly with herbaceous tips: receptacle flat or convex, naked: pappus tawny, simple, of copious slender scabrous capillary bristles: anthers tipped with an appendage: styles appended: akenes more or less compressed, rarely slender 4–5-nerved.

Heads small, less than 1 cm. broad.
- Rays white.  
- A. multiflorus.

Heads larger, 1 cm. broad or more.
- Involucral-bracts coriaceous, appressed.  
- Leaves scabrous on both sides.  
- Leaves smooth on both sides.  
- Involucral-bracts with recurved glandular tips.  
- Involucral-bracts green or green-tipped, not coriaceous.  
- Whole plant soft-pubescent.  
- Whole plant nearly glabrous.  
- Leaves thickish, somewhat serrate.  
- Leaves thin, entire.  
- A. occidentalis.  
- A. fremontii.

A. multiflorus Ait. Perennial, erect, 30–90 cm. high, rough-pubescent: leaves linear or oblong-linear, entire, acute, sessile or somewhat claspine, rigid, 1–3 cm. long or those on the flowering branches much smaller: heads in large panicles, densely crowded, often secund on the spreading branches, nearly sessile: involucres turbinate-campanulate, 3–5 mm. broad, the numerous bracts well imbricated, rough-pubescent and ciliate, their green tips outwardly recurved: rays white, 3–4 mm. long: akenes puberulent: pappus sordid. In frequent in our limits.

A. amethystinus Nutt. Perennial, erect, 30–60 cm. high, sparsely rough-pubescent: leaves not rigid, linear, entire, acute, sessile, 2–6 cm. long, those of the flowering branches much reduced: heads small, usually numerous, in rather loose elongated panicles: involucres turbinate, well-imbricated, 5–7 mm. broad; the bracts linear, cuspidate-acute, green and spreading at tip, ciliate except at the apex: rays violet, 6–7 mm. long: akenes canescent: pappus sordid. Rocky banks of Snake River at Wawawai.

A. conspicuus Lindl. Perennial; the stout smooth stems 30–60 cm. high: leaves oblong or obovate, thick and firm, acute or obtuse, serrate, 5–12 cm. long, harshly-scabrous on both sides, all sessile: inflorescence glandular: heads usually many, in large corymbs: involucres campanulate, 10–15 mm. broad; the bracts well imbricated, scarious, mostly acute, ciliate and glandular, many of them green-tipped: rays violet, 1–1.5 cm. long: akenes minutely pubescent: pappus sordid. Open pine woods, Thatuna Hills and Kamiack Butte: also Snake River bluffs near Colton.

A. laevis L. Perennial, erect, about 1 m. high, glabrous and somewhat glaucous throughout: leaves ovate, oblong or oblong-lanceolate, acute or ob-
tuse, entire or rarely serrate, 5-15 cm. long; the basal petiolated; the cauline sessile or half-clasping by a broad base: inflorescence loosely paniculate or corymbose: involucre turbinate, about 1 cm. broad; the rigid bracts well-imbricated, acute, appressed, green-tipped: rays violet, 8-12 mm. long: akenes glabrous or nearly so: pappus sordid. Near Palouse City.

A. canescens var. viscosus Gray. Biennial, erect and simple or branching from the base, 30-60 cm. high, whitish-puberulent throughout: leaves rigid, linear-lanceolate or the lower spatulate, cuspidately-toothed or entire, 2-6 cm. long, those of the flowering branches much reduced: heads usually numerous, paniculate or corymbose arranged: involucre turbinate-campanulate, 1-1.5 cm. broad; the bracts in numerous imbricated ranks, the tips green, very glandular and spreading or recurved: rays purple or violet, 8-10 mm. long: akenes canescent: pappus sordid. Bluffs of Snake River.

A. jessicae Piper. (A. latahensis Henderson). Perennial, tufted, 1-1.5 m. high, soft-pilose throughout: basal leaves ovate or oval, acute or acuminate, entire or few-toothed, long-petiolated, 6-10 cm. long; cauline broadly lanceolate, acute, entire, narrowed at base into a short broadly-marginated petiole or sessile, 2-10 cm. long: heads in loose panicles, the peduncles stout, leafy: involucre campanulate, 1-1.5 cm. broad, the bracts green, lanceolate, acute, softly-pubescent, the lower little shorter, some of them integrading into the leaves: rays violet, broad, 1 cm. or more long: akenes pubescent: pappus sordid. Low ground along the Palouse and Union Flat.

A. occidentalis var. intermedius Gray. Perennial, erect, glabrous or nearly so: leaves rather thick; the basal lanceolate, acute, somewhat serrate or entire, petiolate; the cauline sessile, lanceolate, mostly serrate, the uppermost much reduced: inflorescence loosely corymbose-paniculate: involucre campanulate, 10-12 mm. broad, the bracts loosely imbricated, subequal, linear, acute, green but not at all fleshy: rays violet or white, 1 cm. long: akenes sparsely pilose: pappus sordid. Banks of Snake River at Almota.

A. fremontii Gray. Perennial, somewhat pubescent or nearly glabrous, .5-1 m. high, usually branched above: larger leaves thin, oblong-lanceolate, entire, acute or obtuse, scabrous on the margin, 2-5 cm. long, only the lowest petiolated, the others sessile and partly clasping, those on the flowering branches small, linear: heads loosely corymbose, the peduncles nearly naked: involucre 7-9 mm. high, broadly campanulate, the bracts all alike, linear, acute, loosely imbricated, nearly equal: rays violet, 6-8 mm. long. In moist copses, common and variable.

311. ERIGERON.

Herbs: very similar to Aster, but differing in the usually naked-peduncled heads: involucre simpler, of narrow and erect equal bracts, not coriaceous and without herbaceous tips: rays narrower and usually very numerous, often in more than one row: pappus more scanty or fragile, sometimes with a conspicuous short outer row: style appendages very short or roundish or obtuse: akenes mostly 2-nerved.
E. compositus Pursh. Perennial, tufted from a woody crown: leaves hirsute or glabrous; basal leaves long-petioled, the blade 1-3-times ternately divided into linear obtuse lobes, 4-10 mm. long; cauline sessile, mostly linear and entire; flowering stems 6-15 cm. high, bearing solitary heads: involucre sparsely hairy, 6-8 mm. high: rays 30-50, pink or white, 6-10 mm. long: akenes short-pubescent: pappus simple. Rocky banks of Snake River. Originally found by Lewis and Clark on the banks of the Clearwater.

E. speciosus DC. Perennial, tufted, sparingly hirsute or nearly glabrous: stems 30-50 cm. high, leafy to the top, erect: leaves lanceolate, rarely linear, entire, acute or acuminate, usually ciliate at least at the base: the upper cauline sessile by a broad base; the lower and radical petioled, 5-15 cm. long: heads few, in a loose corymb: involucre hirsute or nearly glabrous, 5-6 mm. high: rays about 100, narrow, violet, about 1 cm. long: akenes pubescent: pappus double, the outer bristles very short. Gravelly soil along the Palouse from Guy to below Colfax.

E. corymbosus Nutt. Perennial, erect or decumbent, 15-50 cm. high, harshly pubescent throughout: radical leaves linear, spatulate, 3-nerved, 6-15 cm. long: cauline linear, 1-nerved, acuminate, sessile, gradually smaller to the top: heads slender-peduncled, sometimes solitary, mostly in loose corymbh: involucre 7-8 mm. high, whitish, hirsute: rays 30-50, violet, rarely white, 6-12 mm. long: pappus double, the outer bristles very short, sometimes wanting. Common on the hills.

E. concinnus Torr. & Gray. Perennial, erect, commonly tufted from a stout crown, 10-30 cm. high, very pubescent, with long and soft hairs: leaves spatulate-linear, entire, 2-5 cm. long, nearly erect: heads loosely corymbed: involucre hirsute, 5 mm. high: rays white, pink or violet, numerous, 5-6 mm. long: pappus double, the outer short but conspicuous. Dry ground, very rare in our limits.

E. acris L. Biennial, erect, glabrous or sparingly pubescent, 30-60 cm. high: basal leaves spatulate-lanceolate; cauline lanceolate, sessile, all entire, acute or obtuse, 5-10 cm. long: heads paniculate or corymbose, 6-8 mm. broad: involucre puberulent and somewhat hirsute: rays very narrow, pinkish, equalizing the disk, within them a series of tubular filiform pistillate flowers: akenes smooth: pappus copious, brownish. Open woods, Thatuna Hills.

E. divergens Torr. & Gray. Annual, usually tufted and branched, soft-hirsute throughout, leafy to the top: lower leaves spatulate, obtuse, 2-8 cm. long; upper cauline lanceolate, sessile, smaller, all entire or sometimes
toothed or lobed; heads numerous, short-peduncled; involucre 4-5 mm. high, hirsute; rays pale or violet, very numerous, 5-6 mm. long; pappus double, the inner of a few deciduous bristles, the outer persistent, very short, about as long as the breadth of the akenes; receptacle becoming convex. Sandy banks of Snake River, rare.

**E. strigosus** Muhl. Annual or biennial, erect, branched above, sparsely hirsute, leafy to the top; lower leaves spatulate-lanceolate, acute, entire or dentate, the blades 5-8 cm. long; upper cauline lanceolate, entire, sessile, smaller; heads loosely corymbed; involucre 3-4 mm. high, glabrous or with a few bristly hairs; rays white, numerous, short, 4-6 mm. long; pappus of the disk-flowers double, the inner of few deciduous bristles, the outer of short persistent scales: ray-flowers with few or no bristles to the pappus. Moist places, uncommon.

**312. PSILOCARPHUS.**

Low woolly annuals: leavesentire, mostly opposite; heads small, discoid, many-flowered, in terminal capitate clusters and in the forks of the branches, surrounded by the upper leaves: fertile flowers numerous, in several series on the globular chaffy receptacle: pappus none: akeue loose in the bladder-like bract, oblong or narrower, slightly compressed.

**P. elatior** Gray. Erect and simple or more commonly branched from the base and spreading, 5-10 cm. high, loosely white-woolly throughout: leaves lanceolate or linear-spatulate, 1-2 cm. long; heads 6-8 mm. broad, subtended by leaves: fruiting bracts appressed, tomentose: akenes cylindrical. Common in low ground near Moscow: very rare near Pullman.

**313. ANTENNARIA.**

Low white-woolly caespitose perennials; leaves alternate, entire: heads small, solitary or corymbose, completely dioecious: receptacle naked: stamine flowers with the pappus-bristles thickened or barbellate at the apex; pistillate with the slender pappus-bristles united at base into a ring.

Densely matted, 2-5 cm. high. **A. dimorpha.**

Plant 30-50 cm. high; heads in racemes. **A. racemosa.**

Plant tufted, 20-30 cm. high: heads corymbose. **A. luzuloides.**

**A. dimorpha** Torr. and Gray. Densely tufted from stout rootstocks, 2-5 cm. high, silvery canescent throughout: leaves spatulate or oblanceolate, mostly acute, 1-2 cm. long; heads solitary, on very short few leaved stems: stamine heads subglobose, 8 mm. high; the involucral scales ovate-lanceolate, obtuse; pappus not thickened at the tip, minutely toothed: pistillate heads subcylindric, 8-12 mm. high, with broadly lanceolate, mostly acute, involucral scales, glabrous except at base; pappus of long fine smooth bristles: akeue oblong-linear, pubescent with short hairs, 2-hooked at the summit. Stony soil, bluffs of Snake River, sometimes occupying considerable areas.
A. racemosa Hook. Perennial by stout leafy stolons: stems slender, erect, 15-40 cm. high, glabrous or nearly so: basal leaves oval or ovate, obtuse, green and glabrous or glabrate above, white-woolly beneath, 1-3 cm. long, cuneate at base, petioled: cauline sessile, lanceolate, mostly acute, 1-3 cm. long: inflorescence glandular, racemose or somewhat paniculate: staminate heads always racemose, subglobose, 4-6 mm. high, slender-peduncled, the involucral scales brownish, obtuse: pappus with thickened tips: pistillate heads usually corymbose, oblong, 6-8 mm. long, the involucral scales greenish, narrow-tipped: pappus simple. Open woods, Thatuna Hills.

A. luzuloides Torr. and Gray. Tufted perennial, 10-40 cm. high, silvery throughout and closely woolly: leaves numerous, linear or linear-lanceolate, acute, the lowest petioled, the upper sessile, 2-10 cm. long: heads numerous, in corymbs, yellowish-white; staminate subglobose, 4 mm. high; the inner involucral bracts obtuse, with ivory-white papery tips: pappus with much dilated obtuse tips: pistillate heads oblong, 4-5 mm. long; the pale involucral bracts thin, scarious at the tips: akenes glandular. Stony hillsides, common.

314. GNAPHALIUM.

Woolly herbs: leaves alternate, entire: heads small, discoid: pistillate flowers very numerous, in more than one row; perfect flowers fewer in the center; staminate flowers none; all white or yellow: pappus-bristles slender, not thickened above: akenes oblong or ovate.

Low, much branched. G. PALUSTRIS.
Tall, 30-60 cm. high. G. DECURRENS.
Sticky-glandular. G. SPRENGELII.
Woolly, not glandular.

H. palustris Nutt. Annual, much branched at base, 5-12 cm. high, very woolly throughout: leaves lanceolate, oblong or spatulate, 1-2 cm. long: heads 2-3 mm. high, sessile, in small terminal or axillary clusters, which are very woolly and subtended by leaves: involucre of few scales, these linear, acute or obtuse, brownish with white tips: akenes glabrous, the bristles falling separately. Common in dried-up pond bottoms.

G. decurrens Ives. Perennial, erect, 30-60 cm. high, glabrous beneath a thin early-decious tomentum: basal leaves spatulate; cauline spatulate-lanceolate or linear-lanceolate, acute, all conspicuously decurrent at the base, 2-5 cm. long: heads in dense clusters, these usually corymbed: involucre turbinate-campanulate, yellowish-white: bracts thin, scarious, ovate-lanceolate, mostly acute: akenes smooth. Open woods, Thatuna Hills.

G. sprengelii Hook & Arn. Biennial (?), erect, very leafy, 30-60 cm. high, simple or branched below, persistently tomentose, not glandular: leaves linear-lanceolate or somewhat spatulate, acute, 5-8 cm. long, scarcely decurrent at base: heads 4-5 mm. high, in one or few dense clusters: involucre hemispheric, the bracts greenish-white, oblong, obtuse: akenes glabular. Low ground, Pullman, rare.
315. **RUDBECKIA.**

Mostly perennial herbs: leaves alternate; heads mostly radiate, many-flowered; ray-flowers sterile, rarely wanting; disk-flowers perfect: receptacle elongated, becoming columnar; pappus a chaff-like cup or 4 chaffy teeth more or less united into a cup; akenes quadrangular and mostly laterally compressed.

**R. occidentalis** Nutt. Perennial: stems erect, .5-1 m. tall, smooth; leaves ovate, acuminate, coarsely dentate or nearly entire, short-petioled or the upper entire, usually pubescent beneath, smooth above, 6-12 cm. long; heads rayless, the disk at length ovate-conical or columnar, 3-5 cm. long, dark-brown: involucre loose, foliaceous: akenes 3 mm. long: pappus merely a low scarious rim on the apex of the akene. Moist open places, Thatuna Hills.

316. **BALSAMORRHIZA.**

Low perennials: leaves mostly radical: heads large, usually solitary: flowers yellow; receptacle flat or barely convex with linear-lanceolate chaff: pappus none: ray-akenes obcompressed; disk-akenes prismatic-quadrangular or laterally compressed.

**B. sagittata** Nutt. Root stout and woody, resinous, the bark coarsely ridged: basal leaves erect or nearly so, sagittate-hastate or oblong-cordate, entire, silvery-canescent, 10-25 cm. long, on slender petioles about as long or longer; cauline leaves few, small, spatulate or oblancoleate: peduncles hardly exceeding the leaves, 30-50 cm. high: involucre white-woolly, 3-4 cm. broad: rays 10-25, yellow, entire and acute or rarely few-toothed at the apex. Very plentiful.

317. **WYETHIA.**

Perennial herbs: stems simple, rarely branching; leaves alternate, mostly entire and ample: heads many-flowered, solitary or few, medium or large: flowers yellow; ray-flowers elongated: pappus a chaffy crown or cup: ray-akenes neither obcompressed nor laterally compressed.

**W. amplexicaulis** Nutt. Whole plant dark-green and glabrous, more or less resinous: radical leaves oblong-lanceolate or oblancoleate, entire or somewhat dentate, acute or acuminate, erect or nearly so, 15-40 cm. long, narrowed at base into a short petiole; cauline shorter and relatively broader, sessile and partly clasping at base: stems 30-60 cm. high, bearing a terminal head and usually 1-5 smaller lateral ones, all peduncled: involucre 2-3 cm. high; bracts lanceolate, acute, the outer ones longest, loose, somewhat spreading: rays bright-yellow, about 3 cm. long: akenes clavate, 8-10 mm. long, with a well developed crown, cut into small teeth and rarely bearing 1-2 awns. Abundant in wet meadows. This plant is one of the so-called "compass-plants."
318. **HELIANTHELLEA.**

Perennial herbs: leaves entire, both opposite and alternate: heads large, terminal, chiefly solitary and long-peduncled; flowers yellow; ray-flowers sterile; disk-flowers perfect: receptacle flat or convex, chaffy: pappus a pair of persistent awns or chaffy teeth, and a crown of intermediate thin chaffy scales: ray-akenees laterally compressed; disk-akenees 4-angled or laterally compressed; all very flat, winged when young.

**H. douglasii** Torr. & Gray. Rough-hairy throughout, simple or branched above, erect, 60-120 cm. high: leaves opposite, or the upper alternate; lower ones spatulate-lanceolate, obtuse or acute, 6-15 cm. long, the upper cauleine lanceolate, sessile, smaller: heads solitary and terminal or several, terminating the branches: involucres 2-3 cm. broad, the bracts lanceolate, hirsute-ciliate, little imbricated: rays 2-3 cm. long: akenees obovate, more or less ciliate: pappus a pair of long awns, with broadened bases. Rocky hillsides, common.

319. **HELIANTHUS.**

Coarse annuals or perennials: leaves entire or toothed, all or at least the lower ones opposite: heads solitary or corymbose, medium or large: ray-flowers yellow, sterile; disk-flowers yellow, brownish or dark-purple: receptacle flat or convex: pappus a pair of early-falling chaffy scales or awns: akenees neither very flat nor winged: ray-akenees laterally compressed; disk-akenees 4-angled, compressed.

**H. annuus** L. Annual, the stems rough-hairy, erect, 1-2 m, high or de-pauperate forms much smaller: leaves alternate, except the lowest, all petioled, 3-ribbed at base, ovate, acute, dentate or entire, very rough on both sides, the lower somewhat coriaceous, very variable in size: heads 5-15 cm. broad: receptacle flat or depressed: chaff shorter than the flowers, usually 3-cleft: disk dark-colored: akenees pubescent, 5-8 mm. long: pappus of 2 scales. Bluffs of Snake River.

320. **BIDENS.**

Annual or perennial herbs: leaves opposite: heads small or medium, yellow or sometimes white: ray-flowers 3-10, sterile or none, in which case the flowers are all perfect and tubular: receptacle chaffy: pappus of 2-4 rigid backwardly-barbed awns: ray and disk-akenees obcompressed.

**B. frondosa** L. (*B. vulgata* Greene.) Annual, the stems erect, usually branched above, glabrous, 30-90 cm. high: leaves pinnately 3-5-foliolate, petioled; leaflets lanceolate, acute, serrate, abruptly narrowed at the base: heads 15-25 cm. broad, stout-peduncled: involucres broadly campanulate, the outer 10-16 bracts foliaceous, linear, unequal, much exceeding the brownish scarious-margined inner ones: ray-flowers none: akenees flat, obovate, 7-9 mm.
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long, somewhat pubescent, ciliate on the margins; awns 2, half as long as the akene, retrorsely barbed. Common along Snake River.

321. MADIA.

Annuals: leaves linear or lanceolate, entire or slightly toothed, at least the upper alternate: heads peduncled, clustered: flowers yellow; ray-flowers 1–20, pistillate or rarely wanting; disk-flowers perfect: receptacle chaffy only at the margin: pappus none or of several small scales in the sterile flowers: ray-akenes laterally compressed, enclosed in the infolded involucral-scales; disk-akenes laterally compressed.


M. filipes Gray. Annual, slender, erect, usually branched above, hirsute-pubescent below, glandular above, 10–30 cm. high; leaves linear, 1–3 cm. long; heads 2–3 mm. high, long-peduncled, loosely corymbous; bracts of the involucre 4–8, enclosing as many ray-flowers which scarcely exceed the bracts: disk-flowers solitary: akenes black, obovate, but lop-sided, that of the disk-flower straight, those of the ray-flowers curved. Dry ground, rather common.

M. glomerata Hook. Annual, erect, simple or with erect branches, very leafy to the top, 30–100 cm. high, hirsute, the inflorescence glandular: leaves linear or linear-lanceolate, ascending, 2–6 cm. long, scabrous and hirsute: heads densely crowded, at length somewhat racemose: rays few or none, short; disk-flowers 2–5; corolla pubescent: akenes black, club-shaped, those of the ray-flowers flattened and 1-nerved on each face, those of the disk-flowers somewhat 4-angled: pappus wanting. Very common.

M. racemosa Torr. & Gray. Annual, erect, 30–90 cm. high, simple or branched above, hirsute below, glandular above; leaves linear or lanceolate, acute, 2–8 cm. long; heads 6–10 cm. high, hemispherical or broadly ovoid, racemously or corymbosey arranged, commonly peduncled; corolla pubescent: rays 5–8, rarely 10; disk-flowers few: akenes flattened and nerved on the broader faces, or the nerve lacking: pappus none. Very variable and as here described including M. dissitiflora Torr. & Gray, whose supposed distinctions break down completely.

322. IAGOPHYLLA.

Annuals: stem slender, much-branched: leaves alternate or opposite, mostly entire: heads small, few-flowered; ray-flowers about 5, pistillate, fertile; disk-flowers as many, perfect but sterile: involucre of as many scales as the ray-flowers: receptacle flat: pappus none: ray-akenes obovate, much obcompressed, smooth; disk-akenes slender and abortive.
L. ramosissima Nutt. Erect, loosely branched, 15-70 cm. high; stems light colored; puberulent; leaves all but the lowest attenuate, entire, linear-lanceolate or the lowest somewhat spatulate, 1-3 cm. long, all white villous; heads 5-6 mm. long, in small clusters on the leafy branches: involucre-bracts ciliate with long hairs, and usually with a few stalked glands on the back: rays yellow, small: akenes 3 mm. long, club-shaped with a ridge down the inner face. Dry ground common.

323. BLEPHARIPAPPUS.

Annuals: heads rather few-flowered: ray-flowers 3-6, short and broad, pistillate; disk-flowers 7-12, perfect, some of the central sterile: involucre-bracts 6-10, nearly in one row: receptacle convex, chaffy: pappus of 10 or 12 linear hyaline scales, each with a stout awn-like midrib, rarely wanting: ray-akenes neither obcompressed nor laterally compressed.

B. scaber Hook. Annual, erect, branched above, 10-20 cm. high, scabrous-puberulent below, glabrous above; leaves numerous, attenuate, linear, somewhat involute, 1-2 cm. long: heads few, somewhat corymbed, terminating leafy branches: involucre 5-6 mm. high: ray and disk flowers white: anthers purple. Bluffs of Snake River opposite Lewiston.

324. ERIOPHYLLUM.

Perennial herbs, sometimes shrubby at base: leaves usually alternate and mostly pinnately or ternately parted or lobed: ray-flowers present, fertile: involucre campanulate or obovoid: bracts erect, commonly united at base, oval or oblong: pappus of nerveless and mostly pointless scales: throat or limb of disk-corollas rather narrow: style-branches truncate or rarely minutely tipped: akenes narrow, mostly 4-angled.

E. caespitosum Dougl. Perennial, erect or decumbent at base, loosely white-woolly throughout: leaves spatulate or cuneate-obovate, the lowermost and upper ones often entire, the others 3-7-lobed or parted: heads long-peduncled: involucre campanulate, 10-12 mm. high; bracts 8-12, oblong, obtuse: rays 6-15, golden-yellow: disk-corollas glandular: akenes glabrous: pappus short. In gravelly soil, common.

325. RIGIOPAPPUS.

Annuals: leaves alternate, linear, entire: heads rather many-flowered: ray-flowers 5-12, pistillate; all the flowers fertile: involucre of one or two rows of rather rigid herbaceous erect subulate-linear bracts: receptacle flat, naked: pappus of 4-5 rigid opaque subulate awn-shaped scales: akenes linear, slender, compressed, those of the disk more or less 4-angled.

R. leptocladus Gray. Annual, erect, slender, minutely pubescent, 10-30 cm. high, simple or usually with slender branches that are leafless below: leaves alternate, linear, acute, erect, 1-5 cm. long, or those near the tips of the slender branches much smaller: heads 8-10 mm. high: flowers yellow or
purplish; akene linear, transversely rugose, hisrate, 5 mm. long; pappus of 3-5 rigid lanceolate scales nearly as long as the akenes. In sandy soil on the bluffs of Snake River.

326. CHAENACTIS.

Annual, biennial or perennial herbs: leaves alternate, 1-3-pinnately dissected: heads medium or large, peduncled, terminating the branches: ray-flowers none; flowers yellow, white or flesh-colored, all perfect and tubular but an outer series more or less enlarged simulating rays: involucre campanulate or hemispherical; bracts equal, in 1-2 rows: pappus of 4-12 awnless and nearly or quite nerveless hyaline or chaffy scales: akenes slender, linear, tapering to the base, more or less 4-angled.

C. douglasii Hook. & Arn. Perennial, loosely white-tomentose throughout, erect, 30-50 cm. high, branched above: leaves oblong-lanceolate in outline, 5-10 cm. long, bipinnately parted into numerous rather crowded obtuse segments: heads corymbed: involucr e campanulate or turbinate, viscid-pubescent, 10-12 mm. high: bracts linear, obtuse: flowers all alike, cream-colored or pinkish: akenes pubescent, those of the rays often glandular: pappus of 5-12 large obtuse silvery scales, two-thirds as long as the akenes or in the ray-flowers only one-third as long. Bluffs of Snake River.

327. HELENium.

Erect, simple or branching herbs: leaves all alternate and all but the lower sessile: heads small or large, many-flowered, on naked terminal peduncles: ray-flowers yellow, several or numerous, pistillate; disk-flowers yellow or turning brownish or purplish, small and very numerous, all fertile: involucral bracts spreading or reflexed at maturity: pappus of 5-12 thin or hyaline chaffy scales with or without midribs: akenes top-shaped, striate-ribbed, hairy on the ribs.

H. autumnale L. Perennial, erect, 30-90 cm. high, glabrous or puberulent: leaves oblong or ovate-lanceolate, acute, dentate or nearly entire, 5-12 cm. long, decurrent on the stem forming wings: heads few or many, long-peduncled, 1-1.5 cm. broad: involucre nearly flat, the bracts linear or linear-spatulate, pubescent: rays 10-16, yellow, somewhat drooping, 1-2 cm. long, all fertile: akenes pubescent: pappus scariosus: the scales acuminate,awn-pointed. Banks of Snake River, rare.

328. GAILLARDIA.

Pubescent herbs: leaves alternate, entire or incised or even pinnatifid: heads solitary and long-peduncled, large: ray-flowers yellow or partly dark-purple, sterile: disk-flowers usually purplish or brownish: involucral-bracts in 2-3 series, the outer larger and foliaceous: receptacle convex or hemispherical with one or more awns among the flowers resembling chaff: pappus of 6-10
hylaline chaffy scales with a prominent midrib which is prolonged into a naked awn, or in the sterile rays scales awnless: akenes oblong, top-shaped, each surrounded by a tuft of hairs.

**G. aristata** Pursh. Perennial, erect, 30-60 cm. high, rough-pubescent: lower leaves spatulate, long-petioled, the upper sessile, all entire or more or less pinnately-lobed, 5-12 cm. long; heads long-peduncled: involucre hairy, the lanceolate acuminated bracts unequal, the longest about 1 cm.: disk flowers dark-purple: rays 10-18, yellow, purplish at base, 1.5-2 cm. long: bristles of the receptacle as long as the akenes or longer. Low ground, common.

329. **ACHILLEA**.

Perennial herbs, rather strong-scented: leaves alternate, serrate or pinnately dissected: heads small, in corymbs, many-flowered: flowers yellow, white or sometimes rose-colored, all fertile; ray-flowers few or several, mostly short or broad, pistillate: involucre narrow, the scales imbricated in a few rows, appressed: receptacle flattish to conical, with thin chaff: pappus none: akenes oblong or ovate, obcompressed, surrounded by a narrow and cartilaginous margin.

**A. millefolium** var. **lanulosa** Piper. (**A. lanulosa** Nutt.) Perennial, erect, usually tufted, 30-60 cm. high, loosely pubescent throughout with white somewhat woolly hairs: basal-leaves short-petioled, oblong or oblong-lanceolate, 8-20 cm. long, pinnately divided into very numerous segments: segments once or twice pinnately-cleft or parted into linear acute lobes: heads small, numerous, in convex or flat-topped terminal corymbs; involucre ovoid or subglobose, 3-5 mm. high: rays 4-5, white, 2-4 mm. long. Abundant everywhere.

330. **ANTHEMIS**.

Herbs: leaves alternate, mostly tripinnately divided: heads many-flowered: ray-flowers numerous, commonly conspicuous, pistillate or sometimes sterile; disk-flowers fertile: involucre broad, the scales very numerous, imbricated and appressed: receptacle convex to oblong-conical, chaffy, with slender or thin scales or awns, subtending at least the central flowers: pappus none, or a short chaffy crown: akenes obovoid or oblong, 4-5-angled, 8-10-ribbed or many-striate, truncate at the apex.

**A. cotula** L. Annual, much branched, puberulent or glabrate, 30-60 cm. high: leaves 1-3 times pinnately-dissected into thread-like lobes: heads 2 cm. broad: receptacle conical, with bristy bracts near the apex, none at the base: involucral bracts oblong, obtuse, pubescent: rays white, 10-18, becoming reflexed in age: akenes 10-ribbed, roughened: pappus none. A weed, becoming common, the herbage strong-scented.

331. **CHRYSANTHEMUM**.

Herbs: heads many-flowered: flowers all with corollas; ray-flowers usually elongated, numerous, pistillate; disk-flowers usu-
ally all fertile: involucre hemispherical or flatter, the scales more or less scarious, short-appressed, imbricated in several rows; receptacle flat or convex, naked: pappus none (in ours): disk-corollas often obcompressed or 2-winged below, 4-5-toothed: akenes short, nearly terete, several-ribbed or angled, truncate at apex.

**C. leucanthemum** L. Perennial, erect, 30-60 cm. high, glabrous or nearly so, usually simple: basal leaves oblong or spatulate, incisedly pinnatifid or toothed: cauline smaller, sessile and partly clasping, linear; heads 3-5 cm. broad, on long naked peduncles; involucral-bracts oblong-lanceolate, obtuse, rusty at tip; rays 20-30, white; akenes many-ribbed; pappus none. Sparingly introduced.

332. **MATRICARIA.**

Herbs: very similar to *Chrysanthemum* but ray-flowers none (in ours): involucre hemispherical or flatter, of numerous more or less scarious appressed scales, in few rows; receptacle high-conical or ovate; pappus none or a minute crown.

**M. discoidea** DC. Annual, 5-15 cm. high, simple or branched, sparsely pubescent or glabrous: leaves oblong, 1-3 cm. long, 1-2-pinnately dissected into small linear acute segments; heads 5-9 mm. high, terminating short stout peduncles: involucre saucer-shaped, the scales oblong, obtuse, green, with scarious margins: ray-flowers none: disk-flowers yellowish-green: receptacle conical: akenes oblong: pappus represented by a low sometimes 1-2-toothed crown. Dry ground, very common.

333. **ARTEMISIA.**

Herbs or undershrubs, bitter and odorous: leaves alternate, usually dissected: heads numerous, small, usually nodding, in racemes or panicles, several to many-flowered, discoid: flowers yellow or yellowish, all tubular, the outermost series pistillate, or all alike, the more numerous perfect flowers either fertile or sterile: involucral-scales dry, imbricated in a few rows, appressed: receptacle flattish to hemispherical, naked, sometimes hairy: pappus none: corollas of pistillate flowers slender and small, 2-3-toothed, of the perfect flowers enlarged above, 5-toothed: akenes obovoid or oblong, almost always glabrous.

Green and glabrous.

- Perennial: leaves linear, mostly entire.
- Biennial: leaves 1-2-pinnately parted.

Canescent or tomentose.

- Leaves narrowly 3-5-parted.
- Leaves and segments broader,
  - Involucre white-tomentose.
  - Involucre glabrous or nearly so.

- **A. dranunculoides** Pursh. Perennial, herbaceous, very odorous, usually tufted, the slender stems 1-1.5 m. high, glabrous throughout: leaves linear,
entire or 3-cleft, 2-10 cm. long, numerous; heads nodding, numerous, in large and leafy panicles: involucre campanulate, glabrous, 2 mm. high: disk-flowers sterile: receptacle naked: akenes glabrous. Snake River canyon.

A. biennis Willd. Biennial, inodorous, glabrous, the stem simple, 30-50 cm. high, leafy to the top: leaves numerous, 5-8 cm. long, all 1-2-pinnately parted into linear, acute, entire or toothed segments: heads small, in short spikes in the axils of the uppermost leaves: involucre campanulate, 3 mm. broad, the bracts green, scariosus-marginated: akenes oblong: pappus none: receptacle naked. Near Colton, apparently introduced.

A. rigida Gray. Perennial, wooly at base, the branches erect, strict, 15-30 cm. high, leafy to the top: leaves rigid, silvery-canescents, mostly cleft or parted into 3-5 linear segments, rarely simple, 1-3 cm. long: inflorescence a leafy spike, the heads solitary in the axils: involucre oblong-campanulate, 3 mm. long, 5-12-flowered: flowers all alike, perfect. Bluffs of Snake River.

A. ludoviciana Nutt. Perennial, herbaceous, 30-90 cm. high, densely white-tomentose throughout: leaves 2-6 cm. long, lanceolate and entire or 3-5-toothed or cleft into linear or lanceolate lobes, persistently tomentose beneath, often glabrate above: heads in large usually dense panicles: involucre oblong-campanulate, 3-4 mm. long, persistently white-woolly: receptacle naked: disk-flowers fertile. Common and variable.

A. inenlanta Nutt. Much like the last, the leaves usually more deeply lobed, early becoming glabrous above: involucre becoming glabrous or nearly so, at least when mature. Common on the banks of Snake River and doubtfully referred to this species.

334. ARNICA.

Perennial herbs: stems mostly simple, from creeping rootstocks: leaves all or some of them opposite, simple, entire or merely toothed: heads rather large, solitary or few, usually long-peduncled, many-flowered: flowers yellow, all fertile; ray-flowers elongated, pistillate, or sometimes none: involucre broadly campanulate, the bracts in 1-2 rows: receptacle naked, flat: pappus a single series of rather rigid strongly scabrous or barbellate capitular bristles: akenes linear, 5-angled or 5-10-ribbed, somewhat hirsute or nearly glabrous.

Basal leaves cordate.
Basal leaves lanceolate.

A. cordifolia. A. pedunculata.

A. cordifolia Hook. Erect from horizontal rootstocks, 20-40 cm. high, sparsely pubescent: basal leaves ovate or orbicular, deeply cordate, dentate, acute or obtuse, 5-10 cm. long, on petioles about as long: cauline usually 2 pairs, less broad, the short petioles margined: heads long-peduncled: involucres turbinate-campanulate, 1.5-2 cm. high, viscid-pubescent, the linear-lanceolate bracts acute: rays 8-12, yellow, 2-3 cm. long: akenes pubescent. Open woods, Thatuna Hills.

A. pedunculata Ryd. Erect, 30-60 cm. high, the crown thickened and rusty-woolly: whole plant viscid-pubescent: basal leaves spatulate-lanceolate, 3-nerved, entire or nearly so, obtuse, 5-12 cm. long; cauline 2-3 pairs, sessile, the upper sometimes very small: heads 1-3, long-peduncled: involucres 10-
12 mm. high, densely glandular-pubescent; rays yellow, 12-16 mm. long; tubes of disk-corollas hairy; akenes pubescent. Moist hillsides, common.

335. SENECEO.

Herbs or shrubby plants: leaves all alternate; heads usually solitary or in corymbs, many-flowered; flowers yellow, all fertile; ray-flowers pistillate or occasionally none: involucral bracts herbaceous, mostly narrow, equal, in one row, or with a few short outer bracts: receptacle flat or merely convex, naked: pappus of very numerous and mostly white fine and soft capillary and merely scabrous bristles: akenes terete or somewhat angled, usually 5-10-ribbed.

Introduced annual.
Native perennials.

Upper leaves reduced.
Equally leafy to the top.
Leaves triangular.
Leaves lanceolate.

S. vulgaris L. Annual, sparsely pubescent or glabrous, usually branched, 15-30 cm. high: leaves spatulate or oblong in outline, 1-3 cm. long, half-clasping at base, pinnately-lobed, the lobes short and usually toothed: heads few to many, in corymbs: involucre 5-7 mm. high, the inner bracts linear, acute, often black-tipped, the outer few and short: rays wanting: akenes puberulent: pappus copious, white. Becoming common.

S. columbianus Greene. Perennial, erect, 30-90 cm. high, floccose-woolly when young, becoming glabrous: basal leaves spatulate, oblanceolate or obovate, mostly acute, dentate, 10-30 cm. long, including the margined petiole; cauline sessile and half-clasping, much smaller: dentate or laciniate: heads numerous, in rather dense corymbs: involucre 5-6 mm. high, the linear acute bracts often black-tipped. Low ground, common and variable.

S. triangularis Hook. Perennial, glabrous throughout, 30-90 cm. high: stem simple, leafy to the top: leaves narrowly or broadly triangular, acute or acuminate, evenly dentate, truncate at base or the lower often cordate and the upper cuneate, 5-15 cm. long, on short petioles: heads corymbed: involucre 5-8 mm. high; bracts linear-lanceolate, acute, pubescent at tip: rays 6-12, yellow. Along streams, Thatuna Hills.

S. serra Hook. Perennial, glabrous, about 1 m. high, very leafy, simple or branched above: leaves lanceolate, acute and usually cuspitate, serrate-dentate or the small upper ones entire, 5-15 cm. long, all sessile by a narrowed base: heads corymbed, very numerous: involucre 5-6 mm. high, the bracts linear, acute: rays 5-10, yellow, 6-10 mm. long. Low ground, common.

336. CIRSIUM.

Mostly biennial herbs: leaves alternate, sessile, mostly pinnatifid and prickly: heads usually large, terminal, many-flowered: flowers all tubular, perfect and all alike, rarely imperfectly dioecious: involucre ovoid or spherical: bracts imbricated, in many rows, the
tips scarious or prickly: receptacle thickly clothed with soft bristles or hairs: pappus of numerous bristles united into a ring at the base, plumose, deciduous: akenes oblong, flattish, not ribbed.

Braacts of the involucre not prickly-pointed.
- Heads very large, sessile.  
- Heads small, peduncled.

Braacts of the involucre prickly-pointed.
- Leaves white-tomentose on both sides.
- Leaves green above.
- Flowers whitish: involucre glandular.
- Flowers rose-red: involucre very woolly.
- Flowers rose-red: involucre slightly woolly.

**C. foliosum** DC. Stems stout, erect, simple, about 1 m. high, very leafy, villous and somewhat woolly: leaves lanceolate or linear-lanceolate, pinnately-lobed, green and villous above, permanently white-woolly beneath, 10-50 cm. long, only the lowest petaled; prickles numerous, weak and slender: heads large, few, in a dense terminal cluster, surrounded at base by the upper leaves which are usually reddish: involucral-bracts loosely imbricated, thin, flat, the outer acuminate, sometimes with a weak prickly point, the inner with scarious dilated somewhat fringed tips: flowers pink, the corolla-lobes as long as or longer than the throat. North hillsides, common. A peculiar plant, apparently a hybrid between this species and **C. breweri**, sometimes occurs in its company.

**C. arvense** Scop. Perennial, with slender creeping rootstocks: whole plant green, thinly tomentose when young, becoming glabrous, much branched, 1-2 m. high: leaves numerous, oblong-lanceolate, pinnately-lobed, sessile and somewhat clasping at base, 10-20 cm. long; prickles numerous, rather weak: heads small, corymbed, dioecious; stamine heads globose, the flowers much exserted; pistillate-heads oblong-campanulate, the flowers scarcely projecting: bracts of the involucres well imbricated, somewhat ciliate, the short ovate outer ones spine-tipped, the inner ones lanceolate, soft-tipped: flowers pink-purple. Sparingly introduced.

**C. undulatum** Spreng. Stout, erect, 5-2 m. high, the whole plant except the heads persistently white-tomentose, or the leaves sometimes glabrate above: leaves lanceolate, pinnately-lobed or parted, 5-15 cm. long; prickles few or numerous, rather stout: heads large, on stout peduncles: involucre well imbricated, the bracts thick, with a glandular spot near the tip; all tipped with spreading prickly points: corollas rose-red or whitish, the lobes about as long as the throat: pappus bristles a little thickened at the apex. Along Snake River, common.

**C. breweri** Piper, n. comb. (*Cnicus breweri* Gray.) Stem erect, loosely branched above, 30-90 cm. high, tomentose when young, becoming glabrous: leaves lanceolate, pinnatifid into rather few lobes, early becoming green and glabrous above, persistently white-woolly beneath, 5-15 cm. long; prickles few: heads large, on nearly naked long peduncles: involucre hemispheric; the bracts firm, closely imbricated in several successively shorter ranks; all prickly pointed and bearing an oblong or linear glandular spot near the tip: flowers yellowish-white: corolla-lobes shorter than the throat. Common at Pullman.

**C. edule** Nutt. Stems usually tall and nearly simple, 1-2 m. high, thinly pubescent: leaves numerous, lanceolate, pinnately-lobed, pubescent
above, woolly beneath, but soon green and glabrate on both sides, 5–20 cm. long; prickles rather weak; heads large, usually clustered, short-peduncled, often surrounded by the upper leaves; involucre persistently white-woolly; bracts loose, all tapering to slender rather weak prickly points, the outer broader and shorter, not glandular; corolla purple, the lobes thickened at the tips, shorter than the throat; pappus-bristles a little thickened at the tips. Moist places, Thatuna Hills, rare.

C. lanceolatum Scop. Stems stout, somewhat woolly, usually branched, leafy to the top, 1–1.5 m. high; leaves lanceolate, deeply pinnatifid, hispid-pubescent but green above, white-tomentose beneath, decurrent at base, 6–15 cm. long, armed with numerous stout prickles: heads large, on stout leafy peduncles: involucre well imbricated, sparsely woolly: bracts lanceolate, acuminate, all tipped with stout erect spiny points: flowers purple. Abundantly introduced.

337. CENTAUREA.

Herbs: heads many-flowered: flowers all with tubular and deeply 5-cleft corollas, some of the marginal ones commonly sterile, these not enlarged nor conspicuous, the others perfect and fertile: involucre globular, the scales tipped or margined with spines or scarious appendages: receptacle very bristly: pappus of numerous rigid or sometimes chaffy naked bristles: akenes mostly compressed, attached by one margin just above the base.

C. nigra L. Perennial, 30–60 cm. high, rough-pubescent; lower leaves oblong or spatulate, entire or dentate, petioled; upper lanceolate, sessile, mostly entire, acute: heads 2 cm. broad; bracts dark-brown, pectinately fringed, the uppermost scarious, margined, erose: flowers red, all perfect, the marginal ones not enlarged: akenes 4-sided: pappus none. Sparingly introduced.
GLOSSARY.

**Adnate.** United, especially when different organs are grown together.

**Alveolate.** Resembling honey-comb.

**Anatropous.** Said of an inverted ovule or seed with the hilum on one side.

**Androgyneous.** Having both staminate and pistillate flowers.

**Annulus.** A ring, especially the ring of thickened cells on a fern sporangium.

**Awn.** A bristle-like terminal or dorsal appendage.

**Barbellate.** Minutely barbed.

**Bifid.** Two-cleft.

**Bract.** A small reduced leaf of the inflorescence.

**Caespitose.** Densely tufted.

**Canescent.** Hoary with a grayish pubescence.

**Callus.** See page 14.

**Capillary.** Hair-like.

**Caryopsis.** A grain; see page 15.

**Cauline.** Pertaining to the stem; on the stem.

**Cernuous.** Slightly nodding.

**Ciliate.** Margined with hairs.

**Circumscissile.** Dehiscing by the falling off of the lid-like top.

**Clavate.** Club-shaped.

**Cleistogamous.** Said of self-fertilized flowers which never open.

**Coriaceous.** Leathery.

**Corm.** A solid bulb.

**Culm.** See page 14.

**Cuneate.** Wedge-shaped.

**Decurrent.** Said of leaves whose base runs down the stem below the point of insertion.

**Dehiscence.** The regular opening of the capsule or anther at maturity.

**Denticulate.** Minutely dentate.

**Diadelphous.** Said of stamens when united in two groups.

**Diandrous.** With two stamens.

**Didynamous.** With two long and two short stamens.

**Dioecious.** With staminate and pistillate flowers on different plants.

**Discoid.** Without ray-flowers.

**Dissected.** Deeply cut into many segments.

**Divaricate.** Widely divergent nearly at right angles.

**Divergent.** Receding from each other.

**Epigynous.** Upon the top of the ovary.

**Equitant.** Astride, as when leaves are folded over each other in two ranks.

**Erose.** Irregularly toothed, as if bitten out.

**Falcate.** Sickle-shaped,
Farinaceous. Starchy.
Fascicled. A cluster.
Fasciculate. Clustered.
Fertile. Seed-bearing.
Fibrous. Stringy.
Fimbriate. Fringed.
Floccose. Having feathery tufts of wool.
Fornix. A swelling in the throat of a gamopetalous corolla.

Galea. The upper lip of a corolla especially when helmet-like or beak-like.
Geniculate. Bent abruptly like an elbow or a knee.
Gibbous. Protuberant; swollen on one side.
Glabrous. Not hairy.
Gland. A secreting organ.
Glaucous. With a whitish bloom that is easily rubbed off, as a cabbage leaf.
Glaucous. Glume-like.
Glume. See page 14.
Gynobase. An elongated receptacle; see page 145.

Hilum. The attachment scar on the seed.
Hirsute. Hairy with a few long hairs.
Hispid. With a few short stiff hairs.
Hypogynous. Attached to the receptacle.

Imbricated. Breaking joints like shingles.
Indurated. Hardened.
Indusium. In ferns, the flap-like or shield-like covering of a sorus.

Lacerate. Torn; irregularly and deeply cleft.
Laciniate. Cut into slender lobes or teeth.
Lenticular. Shaped like a biconvex lens.
Ligulate. Strap-shaped.
Ligule. See page 14.
Loculicidal. Said of a capsule which dehisces by splitting into the cells or cavities.
Lodicule. See page 15.

Monoeious. With stamens and pistils in separate flowers on the same plant.
Micronulate. Slightly mucronate.

Nectary. A honey-secreting organ.
Neural. Said of a flower that does not bear seed.
Ob-. In combination, signifies the reverse of the meaning of the primary word.

Ochroleucous. Yellowish-white.
Orthotropous. Said of a straight ovule or seed that is attached by its base.
Flora of the Palouse Region

Palet. See page 14.
Panicle. A branched raceme.
Panicle. Arranged in a panicle.
Pappus. The hairs, bristles or scales surmounting the akene of the Compositae.
Pectinate. Comb-like.
Pellucid. Semi-transparent.
Penultimate. Next to the last.
Pericarp. The wall of a ripened ovary.
Perigynium. See page 36.
Perigynous. On the calyx.
Pilose. With a few short soft hairs.
Plumose. Plume-like.
Pollinia. Pollen-masses composed of united pollen-grains.
Polygamous. Said of a plant that bears perfect flowers and also either staminate or pistillate.
Puberulent. Very minutely pubescent.
Pubescence. Hairiness.
Pubescent. Covered with hairs of any sort, but especially with short soft hairs.
Pulvinus. A cushion-like swelling.
Pyriform. Pear-shaped.

Rachilla. The axis of a spikelet: see page 14.
Rachis. The axis of a spike.
Radical. Pertaining to the base of the stem: growing at the base of the stem.
Ray. A radiating branch of an umbel; the marginal flowers of a head when their corollas are strap-shaped and different from the others.
Reticulated. Netted or net-like.
Retrorse. Turned or bent backward.
Raphe. The ridge of an anatropous seed formed by the stalk growing to the ovule.
Rugose. Wrinkled or roughened.
Rugulose. Slightly rugose.

Sagittate. Shaped like an arrow-head.
Salient. Prominent.
Samara. An akene-like fruit with the pericarp extending into a wing.
Scabrous. Harsh; beset with short hard hairs or points.
Scarious. Dry and papery.
Secund. One-sided.
Septicidal. Said of a capsule which dehisces by splitting through the partitions between the cells or cavities.
Serratures. Marginal teeth.
Serrulate. With very small serrate teeth.
Setaceous. Bristle-like.
Sordid. Dirty-white.
Sorus. A group, especially of sporangia.
Spathaceous. Spathe-like.
Spathe. One or more usually large colored leaves covering an inflorescence.
Sporangium. A spore-case.
Sporophyll. A leaf which bears sporangia.
Sporangiferous. Bearing runners or any basal branches that are disposed to root (stolons.)
Striate. Marked with fine longitudinal lines or ridges.
Strigose. Having short stiff appressed sharp hairs.
Strigillose. An appendage on some seeds near the point of attachment.
Stylodium. The swollen base of the style or styles.
Sub-. In combination, means nearly.
Subulate. Awl-shaped.
Suffrutescent. Woody only at the base.
Syngenious. Said of stamens whose anthers are united.

Terete. Cylindrical or nearly so; not compressed.
Ternate. In threes.
Tomentose. With close felt-like wool.
Tomentum. Felt-like wool.
Toroae. Having alternate swellings and constrictions.
Torulose. Slightly torose.
Turbinate. Top-shaped.

Utricle. A one-seeded fruit with a bladdery pericarp.

Versatile. Hanging freely on a support like a see-saw.
Villous. Having numerous long soft hairs.
Virgate. Wand-like.
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