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A FLORA
OF THE
South Fork of Kings River

From

MILLWOOD TO THE HEAD WATERS OF BUBBS CREEK

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By

ALICE EASTWOOD

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PREFACE.

In the summer of 1899 Mr. Pierson Durbrow, Mr. S. L. Berry and Mr. Benjamin Brooks planned a trip of two weeks to the south fork of Kings River. Knowing my great desire to explore this region, chiefly for the sake of its flora, they kindly invited me to be one of the party. We were twelve days (July 2-14) in the region, and traveled on foot from Millwood to the headwaters of Bubbs Creek, ascending both branches, the one leading to East Lake and Harrisons Pass, the other to Bullfrog Lake and Kearsarge Pass. We ascended what is known as Mt. Stanford, but no other peak as the time was too limited.

We had only two animals to carry our baggage, and, since provisions and bedding were necessary, my botanical outfit had to be very limited and I was not able to collect as much as I would have liked. Then, too, the time was so short, so that while I tried to collect specimens of all the different kinds of plants that grew along the trails, none were collected in abundance; possibly some of the commoner species were neglected, and probably some of the rarest overlooked.

This collection has, however, been supplemented by two collections made by myself around Millwood in previous years, and by one made by Mr. T. S. Brandegee in the same region some time ago. All the plants from General Grant Park were collected by Mr. Brandegee. There are also a few, and some of the most interesting, which were collected by Miss Catherine E. Wilson and others of a party that visited the Bubbs Creek region in 1897.

This is the first attempt to make a Flora of the Southern Sierra Nevada, and it is necessarily incomplete; but this will perhaps be an incentive to more thorough work, and it is hoped that the members of the Sierra Club will be able to increase the number of species considerably during the coming trip.

Accuracy, simplicity, completeness and brevity have been the constant thought in aiming to compile a Flora that would suit

both those who know a great deal about plants as well as those whose knowledge is limited to the merest rudiments. In order to save space descriptions of families and genera have been omitted, their place being supplied by brief keys whenever it has seemed necessary.

A more descriptive and popular article might have been made, but it would have been very unsatisfactory and, scientifically considered, worthless.

It is earnestly hoped that those who wish to find out the relationships of the beautiful and interesting plants which they will see along the trails and through the forests will be helped by this Flora. The author is always ready to be of service to those who may wish help, and any plants that cannot be determined are especially desired for examination, not only to correct mistakes but to make the issuance of a supplement possible at some future time, adding to the species herein to be found.

A Flora of the South Fork of Kings River.

By ALICE EASTWOOD.

EQUISETACEÆ. HORSE-TAIL FAMILY.

Equisetum robustum A. Br. GIANT HORSE-TAIL. This is the tall rush commonly known by the above name. It grows to a height of several feet and the stems are almost half an inch in diameter. All the horse-tails are easily distinguished by the character of having the stems jointed, each joint fitting into the one just below. The spores are borne in a spike at the top of the stems. This species was seen only along Kings River.

OPHIOGLOSSACEÆ. GRAPE-FERN FAMILY.

Botrychium simplex Hitchcock. GRAPE-FERN. This little fern, so small as to be almost invisible, consists of two parts. The sterile frond is a single lobed leaf, ovate-cordate in outline; the fertile frond is simple or branched, and bears tiny globular sacs which are full of spores. This is very rare, and was seen only near Bubbs Dome, growing near the edge of the water.

FILICES. FERN FAMILY.

Pellæa Breweri Eaton. ROCK-FERN. (Fig. 1.) Densely tufted and woolly at base. Stems dry and brittle, brown, glossy, numerous. Frond simply pinnate, with the lower divisions consisting of two ovate, pointed lobes extending almost to the base, the upper ones narrower and entire.

This is very common around Bullfrog and East Lakes.

Fig. 1.

Pellæa Bridgesii Hook. ROCK-FERN. (Fig. 2.) Tufted at base with the dry, brown, shining stems of former leaves. Fronds

bluish-green, simply pinnate ; the divisions orbicular or ovate, entire but with the margins wavy. This was seen on the trail to Bullfrog Lake and at Millwood not far from the hotel.

Fig. 2.

Pellæa densa Hook. ROCK-FERN. (Fig. 3.) Stems brown, shining. Frond triangular, much dissected, with the ultimate divisions linear and pointed.

This was seen on the hill rising from the forks of Bubbs Creek not far from the falls.

Fig. 3.

Pellæa ornithopus Hook. TEA-FERN. (Fig. 4.) Fronds stiff, dark green, with brown stems, twice pinnate ; the lowest smallest divisions occurring in threes like the foot of a bird. This fern is tufted at base, and woolly with dark brown hairs.

It was collected in Kings River Cañon.

Fig. 4.

Pellaea andromedæfolia Feé. COFFEE-FERN. This is also to be looked for, though it was not seen by the author. This fern is broad, ovate in outline, twice to four times pinnate. The ultimate divisions are small, often opposite, oval, bluish-green. The stems are generally brown but sometimes reddish.

Cryptogramme acrostichoides R. Br. PARSLEY-FERN. (Fig. 5.) In this fern the fertile and sterile fronds are separate. Sterile fronds with green stems, ovate in outline, twice to thrice pinnate with the ultimate divisions oblong, finely crenate or lobed; fertile fronds with narrow, linear divisions.

This is a common fern, growing in rocky places. It was collected at East Lake.

Fig. 5.

Athyrium cyclosorum strictum Gilbert. (Fig. 6.) LADY-FERN. This grows along streams, sometimes even in the beds of streams on clumps of soil. It is 1-2 feet high. The fronds are

bipinnate, lanceolate in general outline, entirely smooth; the ultimate divisions are linear-oblong, minutely crenate.

Bubbs Creek, East Lake, General Grant Grove, under the sequoias along the streams.

Fig. 6.

***Dryopteris rigida arguta* Underw.** SHIELD-FERN. (Fig. 7.) Stems scaly at base, fronds a foot or two long, bipinnate; divisions confluent, oblong, acute, serrate, the apex tipped with a fine, slender, short bristle. Millwood and Bubbs Creek.

Fig. 7.

***Cystopteris fragilis* Bernh.** BRITTLE-FERN. (Fig. 8.) Delicate ferns with creeping rootstocks. Fronds lanceolate, thin, smooth, bipinnate; ultimate divisions decurrent ovate or oblong, toothed or incised. This was collected along Bubbs Creek.

Fig. 8.

Woodsia scopulina Eaton. (Fig. 9.) This forms dense clumps, the stems of the old leaves persist, scaly at base. Fronds from a few inches to a foot long, bipinnate with somewhat distant leaflets; ultimate divisions oblong, crenate. This is common around Bullfrog Lake.

Fig. 9.

The maiden hair ferns are to be looked for. There are three species. *Adiantum pedatum*, or *Five-Finger Fern*, with the fronds round, fan-shaped, 2-forked, each fork bearing several branches. *Adiantum emarginatum* Hook is bipinnate, ultimate divisions semi-circular or kidney-shaped, the upper margin lobed and sharply toothed. *Adiantum Capillus-Veneris* L. This is somewhat similar to the preceding in the outline of the fronds; the divisions are wedge-shaped at base, palmately lobed or incised.

Cheilanthes gracillima Eaton. SCALY-FERN. Is to be sought in rocky places. It is a small fern with linear-oblong fronds, bipinnate, scaly; ultimate divisions crowded, very small, bead-like, smooth on the upper surface except in young fronds, clothed with brown, matted wool on the lower surface.

Cheilanthes amœna, A. Eaton, the Lace-Fern of the Southern Sierra, may also be found in the region. The frond is broadly ovate in outline, much dissected, the smallest divisions very small. The stems are slender, shining, brown. The roots slender, fibrous.

KEY TO THE SEED PLANTS.

OVULES NOT ENCLOSED IN AN OVARY.

Trees or shrubs, usually with needle-shaped or scale-like evergreen leaves Pine Family

OVULES IN AN OVARY.

FLOWERS ON PLAN OF 3; LEAVES USUALLY PARALLEL-VEINED.

Ovary free from the perianth; stamens 6 . . . Lily Family

Ovary attached to the perianth and below it.

Stamens 3 Iris Family

Stamen 1 Orchid Family

FLOWERS GENERALLY ON PLAN OF 4 OR 5; LEAVES GENERALLY NETTED-VEINED.

WITH BUT ONE SET OF FLORAL ENVELOPES OR NONE.

Flowers in catkins. Trees or shrubs.

Diœcious; 1 flower to each scale of the catkin; fruit a many-seeded pod, each seed furnished with a tuft of cotton.

. Willow Family

Monœcious; staminate catkins drooping; pistillate erect, cone-like, with 1 or 2 flowers under each stiff, shield-shaped scale.

. Alder Family

Monœcious; staminate flowers only in catkins; fruit a nut in a cup or burr, or a leaf-like cylindrical sheath.

. Oak Family

Diœcious; sterile flowers with stamens 4-parted, stamens 4; pistillate flowers with calyx 2-lobed or wanting, ovary 1-celled, 2-ovuled; fruit a berry. Silk-Tassel Bush Family

Flowers not in Catkins.

OVARY SUPERIOR.

1-celled, forming a 3-sided or lens-shaped akene, stamens 9, perianth of 6 divisions usually colored like a corolla.

. Buckwheat Family

1-celled, with 2-4 ovules from the top of a central placenta, forming a berry-like fruit containing 1 seed; leaves alternate.

. Sandalwood Family

WITH BOTH CALYX AND COROLLA, THE LATTER OF DISTINCT PETALS.

STAMENS ON THE RECEPTACLE, BELOW THE SUPERIOR OVARY.

Stamens numerous.

Separate, the other floral organs also distinct; petals sometimes wanting; flowers with the sepals 3-6, often irregular.

. Buttercup Family

United by the filaments to form a tube around the styles, and attached to the bases of the petals; anthers 1-celled, kidney-shaped.

. Mallow Family

United into 3-5 bunches; sepals and petals 5; leaves opposite, generally with transparent dots. St. John's-Wort Family

Stamens 10 or less.

10, rarely fewer; petals 5 (sometimes wanting); pod splitting into twice as many valves as styles. Pink Family

10 or 5, sepals and petals 5; carpels 5 on a spike-like axis, distinct at base but cohering near the top and separating from the axis at the base first; 1-seeded. Geranium Family

10 or 5, equal to or double the number of petals; herbs with fleshy leaves. Stonecrop Family

6 (4 long and 2 short), petals and sepals 4 (petals sometimes wanting); fruit 2-celled with a papery partition, or sometimes 1-celled and not opening; herbs with pungent juice.

. Cress Family

5, united over the pistil; petals 5, one of them with a spur.

. Violet Family

1-many, sepals 2, petals 5; ovary 1-celled generally, with shining black seeds; plants with fleshy leaves and showy flowers that open only in bright sunshine. Portulaca Family

OVARY SUPERIOR OR NEARLY SO.

Stamens distinctly on the calyx or on a disk simulating a calyx.

Numerous; ovary simple or compound, free from or partly united to the disk; leaves alternate. Rose Family

Variable in number (5, 10, 20), pods 2-5, completely or partially united to the calyx; styles distinct. Saxifrage Family

10, distinct or united by the filaments; flowers papilionaceous; fruit a legume. Pea Family

Stamens on a disk not simulating a calyx tube.

On the inner margin of the disk as many as the petals and opposite them (petals sometimes wanting); style or stigma 2-4 lobed; fruit a berry or dry pod with 2-4 hard seeds.

. California Lilac Family

Usually 8; fruit of 2 parts, each winged. Maple Family

OVARY DISTINCTLY INFERIOR.

Stamens on the calyx.

4-8, sepals and petals 4; ovary 4-celled.

. Evening Primrose Family

Numerous, petals and sepals 5; leaves adhesive with barbed hairs.

. Blazing Star Family

Stamens on the ovary.

Stamens, sepals and petals 5 (the last very small); styles 2; fruit a pair of seed-like carpels; flowers small, in umbels; leaves alternate. Parsley Family

Stamens, sepals and petals 4; fruit a 1-seeded berry; flowers in cymes or heads, in the latter case with conspicuous involucre; leaves simple, opposite. . . . Dogwood Family

WITH BOTH CALYX AND COROLLA, THE LATTER WITH THE PETALS UNITED.

OVARY SUPERIOR.

Corolla regular.

Ovary deeply 4-lobed, in fruit forming 4 nutlets; herbage generally rough and hairy; inflorescence coiled in bud.

. Borage Family

Ovary 2-celled, ovules numerous; fruit a pod or berry.

. Tobacco Family

Ovary 2-celled (generally 4-ovuled), generally twining plants.

. Morning Glory Family

Ovary 1-celled or imperfectly 2-celled, styles 2-cleft or entire; inflorescence generally coiled in bud (not so in *Nemophila*).

. Baby-Eyes Family

Ovary 3-celled with the seeds on the axis, style 3-lobed.

. Phlox Family

Ovary 1-celled with the seeds on the sides, style 1, stigmas 2.

. Gentian Family

Ovary cells as many as petals, style 1, anthers 2-celled, opening by holes at the top. Manzanita Family

Ovary 1-celled with the seeds in the center, stamens opposite the petals. Primrose Family

Ovaries 2, distinct, with a stigma common to both and united with a crown-like column of stamens; flowers in umbels; seeds with a tuft of silky hairs; plants with milky juice.

. Milkweed Family

Similar to the above except that the stamens are distinct and free from the stigma, but the anthers are disposed to cohere with it.

. Dogbane Family

Corolla irregular.

Fertile stamens fewer than the divisions of the corolla. Ovary deeply 4-lobed, becoming 4 nutlets; corolla 2-lipped; aromatic herbs or shrubs with opposite leaves. Mint Family

Ovary 2-celled, with many seeds in the central axis, style and stigma 1. Figwort Family

Ovary 2-celled with many seeds on the walls; root parasites without any green color. Broom-Rape Family

OVARY INFERIOR.

Ovary with as many cells as petals, anthers 2-celled opening by holes at the top; fruit a berry. Huckleberry Family

Ovary 2-5-celled (sometimes becoming 1-celled); fruit a berry; leaves opposite without stipules. Honeysuckle Family

Ovary 2-5-celled; leaves whorled without stipules, or opposite with stipules. Madder Family

Ovary 2-celled with the seeds on the central axis, or 1-celled with the seeds on the walls; stamens united by both filaments and anthers. Lobelia Family

Ovary 1-celled, becoming an akene, stamens united by their anthers; flowers many, combined in heads and appearing like a single flower. Sun-Flower Family

CONIFERÆ.

Juniperus (*occidentalis*?). JUNIPER, CEDAR. Low-spreading trees, irregularly branching, with shreddy bark and aromatic wood. Leaves triangular, scale-like, folding over each other. Fruit a blue-black berry containing stony seeds and covered with a purplish bloom like a damson plum. On the trail from Kings River up Bubbs Creek on the side hill.

Libocedrus decurrens Torr. INCENSE CEDAR. This becomes a large tree with reddish bark and trunk broadening at base like a sequoia. The branches are horizontally flattened and the leaves scale-like, decurrent in four rows. Fruit a tiny cone, of 4-6 scales in pairs, the two largest only bearing seeds. Seeds with unequal wings. This is abundant in the region where the sequoias are found.

Sequoia gigantea Decn. BIG TREE, GIANT SEQUOIA. This magnificent tree needs no description. It is found in great perfection in the country around Millwood. The leaves are scale-shaped with long-pointed tips. The cones are about 2 inches long and take two seasons to ripen the seeds.

Abies concolor Lindl. WHITE FIR. Large trees with the old bark rough, gray and furrowed, becoming reddish near the base. Leaves pale green, apparently in two ranks, spreading except on the upper branches, obtuse. Cones erect on the top branches, the scales falling from the axis, which remains like a candle on a Christmas tree. Cones 3-5 inches long, green or purple when ripe. The common fir in the region of the sequoias.

Abies magnifica Shastensis Lemmon. RED FIR, SHASTA FIR. The bark of this fir is a beautiful red brown, except on the upper branches. The leaves are close and erect and pointed. Cones 6-9 inches long, each scale covered with a bract. This grows at the upper elevations. It was noted around East Lake, at the Forks of Bubbs Creek, and at Summit Meadow.

Tsuga Mertensiana Carr. HEMLOCK SPRUCE. Only a few small trees of this species were found which grew at the ford across Bubbs Creek. Trunk sloping at base, stem tapering to a very slender pendent apex. Leaves small, flat, with short petioles joined to a hard, woody, persistent base. Cones small, numerous, pendent, purple, long and slender.

Pinus Lambertiana Dougl. SUGAR PINE. Leaves 5 in a sheath, 3-4 in. long. Cones long, narrow, cylindrical, from a foot to more than 2 feet long when fully grown, pendent at the ends of the branches the second year, without knobs or prickles. This becomes a tall and large tree with upper branches widely spreading and with the outlines irregular and picturesque. This is common in the region of the sequoias and through the entire region except at the upper elevations.

Pinus monticola Dougl. SMALL SUGAR PINE. This is smaller than the preceding, with shorter leaves, 5 in a sheath. The cones are 3-8 in. long, without knobs or prickles, and reflexed when the seeds are discharged. This has been reported from the region, but was not collected by the author.

Pinus Balfouriana Jeffrey. BALFOUR'S PINE. Leaves 5 in a sheath, 1-2 in. long, stiff, curved. Cones pendent, almost orbicular, with thick scales each with a short prickle which soon disappears. This is the commonest pine at upper elevations, abundant around East Lake and Bullfrog Lake.

Pinus albicaulis Engelm. WHITE PINE. This is a twisted, shrubby pine at timber line, and reaches a higher altitude than any other tree. The leaves are short, 5 in a sheath. The almost orbicular cones are at the ends of the main branches without knobs or prickles on the scales. It receives its name from the color of the bark. This pine is also found below timber line at the upper part of Bubbs Creek, around Bullfrog and East Lakes.

Pinus ponderosa Dougl. YELLOW PINE. Leaves 3 in a sheath, 5-11 in. long, rather thick. Cones ovate, 3-5 in. long, sessile, generally several together. Scales with stout prickles. The bark of this tree is yellow-brown, arranged in plates.

The variety *Jeffreyi Engelm.* has larger cones, larger and coarser leaves, and is found at higher elevations than the preceding. The bark is much darker, and hence it is often called Black Pine. It is common along Bubbs Creek.

Pinus Murrayana Balfour. LODGE-POLE PINE, HEMLOCK PINE. Leaves 2 in a sheath, short and rather thick. Cones small and slender, 1-3 in. long, whorled, oblique; scales with

strong knobs and delicate prickles. This is a tall, straight, slender tree often found circling the mountain meadows. It was noted at East Lake, along Bubbs Creek and around the meadows at the higher altitudes on the trail to the cañon.

***Pinus monophylla* Torr. & Frem.** NUT PINE. Leaves solitary, pale green, spine-tipped, cylindrical. Cones almost round, and with but very few knobby scales. The large seeds form a valuable part of the food of the Indians of Nevada, where the species is common. It is a low, spreading tree, irregularly branched. This was seen only in Kings River Cañon and on the hill which ascends from where Kings River joins Bubbs Creek.

GRAMINEÆ. GRASS FAMILY.

These grasses were determined by F. L. Scribner, who was at the time Chief of the Division of Agrostology, Department of Agriculture, Washington, D. C. I merely append the list, as the grasses are too difficult for all except specialists.

***Agropyrum caninum* L.** Bubbs Creek.

***Agrostis exarata* Trin.** Bubbs Creek.

***Elymus glaucus* Buckl. var.** Bubbs Creek.

***Festuca microstachya reflexa*.** Bearskin Meadow.

***Hordeum murinum* L.** Bearskin Meadow.

***Melica stricta* Bolander.** Bubbs Creek.

***Phleum alpinum* L.** Bullfrog Lake.

***Sitanion glabrum* J. G. Smith.** Kings River Cañon.

***Sporobolus depauperatus* Torr.** Bubbs Creek.

***Stipa occidentalis* Thurb.** Bubbs Creek.

***Trisetum canescens* Buckl.** Bubbs Creek.

This is not by any means a complete list of the grasses which grow in the region, only a list of those that I collected.

LILIACEÆ. LILY FAMILY.

***Allium bisceptrum* Watson.** WILD ONION. Plants with the odor and taste of onion, bulb having the outer coat marked with a fine veining. Stems a few inches to more than half a foot high, with 2 sheathing leaves near the base and terminated by an umbel of reddish-purple flowers. Involucre consisting of 2 papery bracts, pointed at apex, united at base. Divisions of the small perianth ovate, pointed. Millwood and General Grant Park.

Allium validum Watson. SWAMP ONION. This has not been collected along these trails, but is to be looked for in the meadows. It is tall and large, often several feet high. The stem is 2-edged, the flowers pink in a close umbel with the involucre consisting of 2-4 thin bracts united at base. Divisions of the perianth narrow, linear or lanceolate.

Brodiaea grandiflora Smith. CLUSTER LILIES. Flowers purplish, erect funnel-form with the segments recurving, in umbels, subtended by several lanceolate, pointed bracts, much shorter than the unequal pedicels; these jointed to the perianth, 1-4 inches long. Flowers 1-1½ inches long, thick in texture; stamens 3, alternating with 3 white staminodia in the throat of the perianth. Bubbs Creek trail in dry places.

Calliprora scabra Greene. GOLDEN STARS. Leaves 2, linear, as long as the stem. Flowers yellow, star-like, in 2-10-flowered umbels on pedicels 1-3 in. long. Divisions of the perianth veined with a darker line. Stamens 6, with the filaments attached to the throat of the perianth winged their entire length, 3-forked at top and with the anther on the middle prong. Capsule on a short stem. Common in many places under the pines and one of the loveliest flowers along the trails.

Lilium pardalinum Kellogg. Stems tall. Leaves lanceolate, pointed, whorled. Flowers few to many on erect pedicels which recurve at apex so that the flowers are pendent. Perianth 2 in. or more long, orange, spotted with purple, reddish within, the segments revolute. Stamens and style extending beyond the perianth, conspicuous. This has been found only at Millwood.

Lilium pardalinum parviflorum. This is similar but smaller in all its parts. It is the common lily of the swampy places in Kings River Cañon, extending along the river. It also grows at Millwood and Converse Basin.

Fritillaria. This species is in bloom very early and only the seed pods will be found in July. It is probably an undescribed species, having greenish-white flowers with but little beauty. It grows at Converse Basin and Millwood.

Yucca Whipplei Torr. SPANISH BAYONET. This species is common on the new trail, according to Mr. Pierson Durbrow. The flowering stem is tall and stout, white, surmounted by a large panicle of thick flowers the divisions of which spread star-like when in full bloom. The plant gets its name from the dagger-shaped leaves at base.

Calochortus venustus Dougl. BUTTERFLY TULIP, MARIPOSA. There are two varieties of this variable species. One is purple-flowered, the other white-flowered with a reddish-purple spot above the gland. The sepals in both forms are ovate, linear-attenuate. The flowers are tulip-shaped, petals fan-shaped, stamens oblong, obtuse. Around Converse Basin and Millwood.

Calochortus Leichtlinii Hook. MARIPOSA. Slender, with erect, tulip-shaped flowers; petals dull white, with a dark spot at base. The anthers are arrow-shaped. Common under the pines in many places.

Zygadenus venenosus Watson. POISON ZYGADENE. Stems slender, about a foot high, with a few grass-like leaves at base and on the stem. Flowers small, white, in a terminal raceme on slender pedicels. Segments of the perianth rounded or slightly cordate at base, the gland above rather indistinct along the top. The bulb is said to be poisonous. In wet places along Bubbs Creek.

Tofieldia occidentalis Watson. Leaves grass-like, clustered at base, scape glandular a foot or two high, at the top of which the small white flowers are crowded in a capitate spike. The flowers are very small, star-like, with dark purple anthers conspicuous and protruding. Along Bubbs Creek, not common.

Veratrum Californicum Durand. FALSE HELLEBORE. Stems stout, several feet high, densely clothed with large, ribbed-veiny, sheathing leaves. Flowers in a large terminal panicle, whitish, greenish at base. This is common in wet places and generally forms patches that can be distinguished some distance away.

IRIDACEÆ. IRIS FAMILY.

Iris Missouriensis Nutt. var., or perhaps new species. SWAMP IRIS, BLUE FLAG. Stems stout, a foot or two high. Leaves almost as long, $\frac{1}{4}$ in. wide, pale green, erect, pointed, clothing the stem only at base. Flowers large, violet, with the tube of the perianth very short above the ovary. Pedicels generally 3-4 in. long, enclosed partly in the dilated papery sheaths. Flowers 2-3. Leaves often an inch wide. Pods 3-sided, ribbed, 2 in. or more long. Near Converse Basin.

Iris Hartwegi Benth. MOUNTAIN IRIS. Stem slender, very leafy, forming clumps. Leaves spreading or erect, very pointed, $\frac{1}{8}$ in. wide. Flowers 2, on slender pedicels enclosed by papery sheaths. Tube of perianth half as long as the ovary. Flowers blue, violet or whitish, with slender divisions and large anthers. Converse Basin and Millwood.

Sisyrinchium Elmeri Greene. GOLDEN-EYED GRASS. Stems slender, leafy, less than a foot high. Flowers small, yellow. When the plant is pressed it leaves a purple stain on the paper. Bubbs Creek, at the ford.

Sisyrinchium occidentale Bicknell. BLUE-EYED GRASS. This grows under the sequoias near Big Boulder Creek, where the grove of young trees is to be found. It has winged seeds. In this genus the divisions of the perianth spread like a star, the ovary is inferior and globular, the stamens 3 united by their anthers, the leaves grass-like and the stems winged. The flowers are on slender pedicels springing from an enwrapping spathe.

ORCHIDEÆ. ORCHID FAMILY.

Goodyera Menziesii Lindl. RATTLESNAKE PLANTAIN. Leaves all from the root, ovate, on broad, short petioles, marked with white blotches resembling the skin of a rattlesnake. Flowers inconspicuous in a spike terminating the stem, about a foot tall. Converse Basin, under the trees.

Habenaria Unalaschensis Watson. Root bulbous, stem slender. Leaves mostly near the base, linear. Flowers minute, greenish-white, scattered, 2-ranked. Some specimens have almost all the leaves radical, while others have the stems quite leafy. The plants also differ much in size. To one of the petals is attached a slender pointed spur. Bubbs Creek and Converse Basin, under the trees.

Habenaria leucostachys Watson. FRAGRANT HABENARIA. Roots fleshy, often clustered. Stems stout, with large leaves reaching to the flowers. Spike generally densely flowered with white, fragrant flowers varying in size. Spur of the petal straight or curved, longer than the ovary. Wet Meadows, from Millwood to Bubbs Creek.

CUPULIFERÆ. OAK FAMILY.

Quercus Californica Cooper. BLACK OAK. This is the common oak of the pine regions. It has large, glossy, green, lobed leaves, each lobe ending in a prickle.

Quercus chrysolepis Liebm. GOLDEN-CUP OAK, POST OAK. This has narrow leaves, entire or spiny-toothed, smooth on the upper surface, pale gray on the lower; that of young leaves clothed below with a golden powder. This is a large tree growing along the beds of streams below the pine belt. In Kings River Cañon it is also found on the hillsides and is a compact, small tree.

Quercus Breweri Engelm. BREWER'S OAK. Shrub with broad leaves deeply cut into lobes which are obtuse or again lobed. Acorns sessile or on short stems, cups shallow. Near Millwood.

Quercus Douglasii Hook. & Arn., the BLUE OAK; **Q. lobata Néé**, the VALLEY OAK; and **Q. wislizeni A. DC.**, the LIVE OAK, are common below the pines.

Corylus Californica Rose. HAZEL NUT. Shrub with broad, ovate to orbicular leaves, the margins doubly serrate. The nuts are enclosed in a leafy sheath. Millwood.

Castanopsis sempervirens Dudley. CHINQUAPIN. Leaves oblong to obovate, dark green on the upper surface, covered with golden powder on the lower, apex generally obtuse. Nuts enclosed in brown burrs. Common throughout the region, forming thickets.

SALICACEÆ. WILLOW FAMILY.

Salix lasiandra Candata Sudw. Bark on younger stems brown and glossy. Leaves lanceolate, narrowed at tip to a slender point, bright green on the upper surface, paler on the lower, minutely serrulate. Stipules semi-cordate. Catkins on leafy peduncles. This form a small tree along the banks of Kings River and Bubbs Creek. Early in July the remains of the female catkins may still be found.

Salix fluviatilis Nutt. (S. longifolia Muhl.) Shrub with slender stems, leaves narrow, linear to lanceolate, narrowed to a slender point, almost sessile, minutely serrulate. Catkins small, generally clustered near the ends of leafy branchlets. The young foliage is clothed with white hairs, the older parts become smoother. This is still in bloom in July in Kings River Cañon.

Salix lasiolepis Benth. Shrub with dark brown bark, tomentose on the new shoots. Leaves lanceolate to oblanceolate, 2-4 in. long, 1-2 in. wide, smooth on the upper surface, silky-tomentose on the lower, entire or irregularly serrate; stipules broad, dentate. The catkins come out before the leaves and are sessile along the branches. Millwood, Bubbs Creek.

Salix Nuttallii Sargent. (S. flavescens Nutt.) Shrub with brown bark. Leaves obovate or oblanceolate, downy beneath, smooth above (except the young leaves), entire or serrulate, acute or obtuse. The catkins come out before the leaves and are short and recurved. The odor of the twigs when freshly broken is strong and disagreeable. Millwood.

Salix Sitchensis angustifolia Bebb. Shrub with dull brown bark. Leaves oblanceolate, becoming smooth above, clothed with a lustrous wool on the lower surface. Catkins coming out with the leaves, long and narrowly cylindrical. Capsules on the female catkin white-woolly. Peduncles short, with 2-3 leaves at base. Bubbs Creek, in flower.

Salix Lemmoni Bebb. Shrub with brown, glossy bark. Leaves and young twigs downy, becoming smooth. Leaves oblanceolate, 1-2 in. long, not more than half inch wide, distantly serrulate, paler on the lower surface than the upper. Catkins short, almost sessile, with a few leaves on the short peduncles. Millwood, in May, with the female catkins almost gone. This was identified by Bebb.

Salix Covillei Eastwood. Shrub a few feet high, older stems brown, younger ones clothed with a glaucous bloom that is easily rubbed off. Leaves oblong to oblanceolate, without stipules on the flowering branches. Upper surface silky-pubescent becoming smooth, lower clothed with silvery silky hairs, densely appressed. Catkins appearing before the leaves, sessile, scattered, short. Female catkins with the bracts and capsules clothed with white hairs. Bubbs Creek, near the foot-bridge above the ford.

Salix glauca villosa Anders. Shrub with spreading branches and glossy, brown bark. Leaves oblanceolate, pointed, softly villous when young, becoming smooth and rigid when old. Catkins on short leafy peduncles, short, erect, with tomentose ovaries, long styles and 2 distinct stigmas. This is the common willow of timber line and below in the meadows at the upper altitudes. East Lake and Bullfrog Lake. It is in bloom in July.

Salix petrophila Ryd. This willow is only a few inches in height. It forms mats on the ground, and the little catkins peep out from amid the matted stems and small leaves. The ovaries are tomentose, the stigmas bifid. It was collected in the amphitheatre below Harrisons Pass; in full bloom early in July.

Populus trichocarpa Torr. & Gray. BALSAM COTTONWOOD. Tree with thick, cracked bark. Leaves ovate to oblong-lanceolate, cordate, acuminate, lower surface lighter in color than the upper, often viscid with balsam. Bubbs Creek and Kings River Cañon.

Populus Fremonti Watson. BROAD-LEAVED COTTONWOOD. This is seen in the foot-hills along streams and in the valleys below. The leaves are broad, triangular, with a broad sinus at base. It is a large tree with spreading branches.

BETULACEÆ. ALDER FAMILY.

POLYGONACEÆ. BUCKWHEAT FAMILY.

Oxyria digyna L. Perennial herbs. Leaves round, kidney-shaped, about an inch wide, mostly from the root on very slender petioles. Flowers perfect, small, reddish, in panicles terminating leafless stems. Perianth with 2 erect divisions, 2 spreading, all separate. Stamens 6, stigmas 2, sessile with a tuft of hairs at the end of each. Akene broadly winged. Above timber line, amid the rocks on Harrisons Pass.

Rumex Geyeri Trelease. MOUNTAIN DOCK. Perennial, with smooth stems, dioecious. Leaves lanceolate, less than half an inch wide, $\frac{3}{4}$ inch long, on short petioles with papery sheaths at base. Flowers small, reddish, in terminal panicles, the branches from papery sheaths. Perianth of 6 parts which become larger in fruit, cordate-ovate. Pedicels thread-like, very short, jointed at base. At the upper altitudes.

Polygonum Parryi Greene. A low annual a few inches high, branching chiefly from the base. Leaves linear, pointed, short, crowded. Flowers minute, sessile in all the axils, even the lowest. Millwood, trail to East Lake.

Polygonum Watsoni Small. Tiny annuals an inch or so high, branching or simple. Leaves linear, pointed, crowded at the ends of the branchlets, with thickened margins and prominent midveins, sheathed at base by long papery bracts. Flowers sessile in the axils, generally solitary, deep rose color at tip. Lower leaves much longer than the floral leaves. East Lake trail.

Polygonum minimum Watson. Low and slender, 1-6 inches high, with rough, reddish stems. Leaves ovate or oblong, very small, acute or pointed. Flowers in all the axils very small, erect on slender exserted pedicels, often rose-color. Stamens 5-8. Akenes smooth and shining, longer than the perianth. Trail to East Lake.

Polygonum exile Eastwood. Annual with very slender stems and a few erect branches, 1-2 ft. high. Leaves linear, less than an inch long, with the sheaths fringed. Flowers very small, erect in the leaf axils on very short pedicels or sessile. Kings River Cañon.

Polygonum bistortoides Pursh. PUSSY TAILS. Perennial with woody roots. Stems simple, with few leaves; these linear-lanceolate, sessile by a cordate base, midrib thick; radical leaves on long petioles, broader than the stem-leaves. Flowers in dense spikes at the ends of the stems, small, white. Perianth 5-cleft, stamens 8. This is common in all the higher meadows and is one of the most conspicuous plants.

Eriogonum nudum Dougl. Perennial with stout woody root. Leaves all radical, oblong, on long petioles, densely white tomentose on the lower surface, smooth on the upper; stems generally branching, naked, the involucre in the axils of the branches or terminating the branchlets, involucre ribbed, flowers very small on hair-like pedicels. Kings River Cañon, Bubbs Creek.

There is another form of this or an undescribed species on Harrison's Pass. The stems are leafless, terminated by a capitate cluster. The leaves are quite small and the stem branches at the base.

Eriogonum virgatum Benth. Annual, the whole plant white tomentose. Leaves all radical, oblong to orbicular, narrowed to the petiole, with fluted wavy margins. Stems single or several from the base, slender, branching with wand-like branches. Involucres sessile along the stems and closely appressed. Flowers very small, tapering at base on hair-like pedicels. Millwood and Bubbs Creek.

Eriogonum saxatile Watson. Perennial, tufted at base from a woody rootstock. Stems many, the leafy ones short with the leaves closely clustered, densely white-tomentose throughout. Leaves obovate, acute, tapering to a short petiole. Flowering stems branching always 2-forked, the lower bracts leafy but short; upper ones, true bracts. Flowers white, veined with pink, tapering to an attenuated base, pendent from the involucres. Involucres tomentose, sessile and appressed to the stem. The branches of the panicle are spreading.

Oxytheca inermis Watson. *Oxytheca* differs from *Eriogonum* in having the involucres few-flowered. They are diffusely branching annuals, with slender stems which are glandular on the internodes. This species has the bracts 3, united at base, unequal foliaceous, glandular. The minute involucres are on short pedicels, the flowers are minute. Converse Basin.

Oxytheca spergulina Greene. Annual with the stems always branching with 2 forks, very slender, the leaves at the forks narrowly linear, becoming smaller towards the ends. Involucres very minute, containing 1-2 minute flowers on hair-like pedicels, thrice as long as the flowers. This covers the ground in places like a filmy lace veil. It was collected near Horse Corral Meadow.

CARYOPHYLLACEÆ. PINK FAMILY.

KEY TO THE GENERA.

- Sepals united into a 5-toothed calyx, styles 3. *Silene*, Pink.
- Sepals separate, stigmas 5, petals 2-lobed.
 - *Stellaria*, Chickweed.
- Sepals separate, petals entire or notched, styles 3.
 - *Arenaria*, Sandwort.
- Sepals separate, petals entire or wanting, styles as many as sepals (4-5) *Sagina*, Pearlwort.

Silene Californica Durand. CALIFORNIA PINK. Stems from creeping rootstocks, low, glandular. Leaves opposite, obovate or rhomboid. Flower an inch or more in diameter on pedicels that are deflexed in fruit. Petals 5, bright scarlet, the blades cut into 2 divisions which are generally toothed. Millwood, in shady places. A beautiful and conspicuous plant when in bloom.

Silene Watsoni Robinson. Perennial, matted at base; stems many, slender, 2-10 in. high. Leaves linear, 1-2 in. long, united and clasping at base, lower ones pubescent, upper glandular. Flowers solitary at the ends of the branchlets. Calyx tubular, membranous, between the greenish-purple ribs, becoming inflated, glandular; divisions short, obtuse, with broad, membranous margins. Petals but little longer than the calyx, white or rose-color, the blades bifid, each segment usually with a tooth on the side; appendages in the throat obtuse. Above timber line in the amphitheatre above East Lake and on the trail to University Peak, collected only by Miss Catherine E. Wilson.

Silene Lemmoni Watson. Matted at base from a tap-root. Leaves on radical shoots, crowded, obovate to spatulate, acute, tapering to short margined petioles, clothed with a rough, somewhat hoary pubescence; stem leaves narrowed, diminishing upwards. Stems slender, weak, paniculately branching, glandular, hairy, a foot or so high. Flowers at first pendent, on pedicels that bend about the middle, later becoming erect, almost half an inch long. Calyx membranous, veined with green, becoming inflated, very glandular, hairy, with rounded, membranously-margined divisions. Petals white, blades divided into 4 thread-like segments; appendages in the throat linear. Stamens and styles long, exserted. Millwood and Converse Basin.

Silene Menziesii Hook. Perennial, stems many, weak and slender, clothed with a fine, glandular pubescence. Leaves obovate, shortly pointed at apex, tapering at base, shortly petiolate or sessile, thin, bright green. Flowers axillary in the upper axils on long, slender pedicels; calyx becoming urn-shaped, $\frac{1}{4}$ in. long, narrowly-membranous on the margins, of the short, triangular acute teeth. Petals white, with 2-cleft blades, longer than the calyx; styles about as long. Bubbs Creek.

There are some other forms of *Silene*, of which not sufficient material was collected for satisfactory determination.

Stellaria longipes Goldie. Perennial, with many slender stems from running roots, slender, erect, about 6 in. high, cymosely paniced above. Leaves linear-lanceolate, pointed, sessile, crowded at the base, shining on the lower surface, $\frac{1}{2}$ in.

long. Flowers on long, slender pedicels, with or without a pair of bracts, small, star-like. Sepals ovate with white, membranous margins. Corolla white, a little more than $\frac{1}{4}$ in. in diameter, petals longer than the sepals. Capsule surpassing the calyx, acute, dark and shining. Bubbs Creek.

***Stellaria borealis* Bigelow.** Perennial, with weak, slender stems from creeping roots, smooth throughout. Leaves lanceolate pointed, sessile, an inch long. Flowers small on slender scattered pedicels, longer than the subtending leaves, deflexed in fruit. Calyx $\frac{1}{2}$ in. long, sepals lanceolate pointed, with white, membranous margins. Petals much shorter than the calyx, or none. Capsule acute, longer than the calyx, with the dark colored seeds showing through the thin walls. General Grant Grove.

***Stellaria Jamesii* Torr.** Perennial, with angled, weak, glandular stems. Leaves lanceolate, long-pointed, sessile, viscid, 1-2 in. long. Flowers loosely paniced, with leafy peduncles. Calyx with oblong-linear sepals $\frac{1}{2}$ in. long. Petals much surpassing the sepals, white, divided only $\frac{1}{4}$ - $\frac{1}{2}$ the way to the base. East Lake, collected only by Miss Catherine E. Wilson.

***Arenaria macrophylla* Hook.** Perennial, with low, decumbent, angled stems from slender, running rootstocks; pubescence powdery. Leaves rather crowded, lanceolate, pointed, 1-2 in. long. Flowers in flowered cymes on axillary or terminal peduncles shorter than the leaves. Sepals ovate-lanceolate with sharp, recurving points; white-membranous margins longer than the white petals. Stamens exserted. Seeds with a light-colored, spongy appendage. Millwood.

***Arenaria Nuttallii* Pax.** Stems matted from a tap root, low, glandular, densely clothed with rigid, pointed, awl-shaped leaves, which are $\frac{1}{2}$ in. long, generally with spreading tips. Flowers in close, spreading, terminal cymes, on pedicels shorter than the bracts. Sepals ovate, narrowed to very slender, long, recurving points, reddish at tip, less than $\frac{1}{4}$ in. long. Petals and capsules much shorter. Kearsarge Pass.

***Arenaria Douglasii* Torr. & Gray.** Annual, with spreading, slender stems much branched. Leaves thread-like, an inch or less long, with pubescence slightly glandular. Flowers on slender, erect peduncles from all except the lowest axils. Calyx with ovate, membranously-margined sepals, $\frac{1}{2}$ in. long. Corolla white with obovate petals almost twice as long. Capsule round, with margined seeds. Millwood.

Sagina Linnæi Presl. Densely matted from fibrous roots. Stems 1-2 in. high, leafy and floriferous, thread-like and weak. Leaves linear, mucronate, less than $\frac{1}{4}$ in. long, smooth. Flowers very small, nodding from the top of slender peduncles. Sepals elliptical, with narrow, white, membranous margins. Petals white, much shorter. Capsules splitting into 5 parts, almost twice as long as the calyx. East Lake.

SANTALACEÆ. SANDALWOOD FAMILY.

Comandra pallida A. DC. Smooth, perennial, low, branching herbs with several stems from a woody base. Leaves alternate, oblong, pale green, an inch or less long. Flowers perfect in axillary or terminal umbel-like cymes without bracts. Calyx bell-shaped, thick in texture, greenish, pink or purplish. Anthers 2-celled, with a tuft of hairs where the filaments are inserted. Fruit globose, crowned by the persistent calyx like a rose hip, the size of a small pea. Millwood and in other places.

PORTULACACEÆ. PORTULACA FAMILY.

Montia perfoliata Howell. MINERS' LETTUCE. Root leaves on long petioles, stem leaves forming a round perfoliate leaf below the flowering stems. Flowers small, white, often growing on but one side of the stem. There is a great difference in the plants that grow in the shade and those that grow in the sun; the former are green and large, the latter are red and low, with all the parts smaller. Millwood, Bubbs Creek.

Montia Chamissonis Greene. Stems erect or procumbent, propagating by runners that have a round bulblet at tip. Leaves oblong-spatulate in several pairs. Flowers in racemes, having bracts only with the lower flowers; pedicels recurving in fruit. Petals rose-color, longer than the calyx. This is always found in wet places. Summit Meadow.

Spraguea umbellata Torr. PUSSY-PAWS. Stems several, usually from a thick root. Root leaves oblanceolate or spatulate, forming a rosette at the base, stem leaves becoming mere bracts. Flowers pink, densely clustered in umbellate spikes curling in at the tips. Sepals thin and papery, petals 4, stamens 3, style 2-lobed at apex, pod with 2 valves. This is common from Millwood to Harrisons Pass. The plants at the upper altitudes are much smaller in every way and more compact than those lower down.

LAURACEÆ. LAUREL FAMILY.

Umbellularia Californica Nutt. CALIFORNIA LAUREL OR BAY, SPICE-WOOD. This is rare in the region and was seen forming a shrub in the vicinity of Converse Basin. The shrub was without flowers or fruit, but easily distinguished by the aromatic foliage.

RANUNCULACEÆ. BUTTERCUP FAMILY.

KEY TO THE GENERA.

Flowers diœcious in panicles; sepals 4-7, greenish; petals none; akenes in a head terminated by long, naked styles.

. *Thalictrum*, Meadow Rue.

Sepals 5; petals 3-15, each with a honey gland at base, generally yellow. *Ranunculus*, Buttercup.

Sepals 5, petal-like, similar; petals 5, each with a long, hollow spur projecting below the sepals. *Aquilegia*, Columbine.

Sepals 5, petal-like, the upper one prolonged backwards at the base into a spur; petals 4, two running into the calyx-spur, the others partly covering the pistils and stamens.

. *Delphinium*, Larkspur.

Flowers small, white, in a corymb which lengthens into a raceme and terminates the stem; fruit of red or white berries on spreading pedicels. *Actæa*, Baneberry.

Thalictrum sparsiflorum Turcz. Perennial, tall, 1-3 ft., smooth and glaucous, leafy. Leaves twice or thrice-palmately-compound, with the leaflets on short petioles, roundish and lobed. On the male plant the stamens form the most conspicuous part of the flower. East Lake.

Ranunculus alismæfolius alismellus Gray. Stems low and slender, 6 in. high, weak, smooth, perennial, from creeping root-stocks. Lower leaves simple, elliptical-lanceolate, on long petioles, upper leaves sessile. Flowers small, $\frac{1}{4}$ - $\frac{1}{2}$ in. in diameter, 1-2 at the ends of the stems. Akenes rather thick in a globular head, tipped with a short style. This grows in the wet meadows. Collected at Summit Meadow.

Ranunculus oxynotus Gray. Stems low, tufted, smooth, 2-3 in. high; root-leaves on long petioles, with broad, orbicular, crenately-lobed blades, an inch or less across; stem-leaves deeply 3-5-lobed, on short, broad petioles. Flowers solitary at the ends of the stems, inch or more in diameter. Sepals broad, orbicular, clothed with long, brown hairs. Petals yellow, orbicular. This is an Alpine species and was collected by Miss Catherine E. Wil-

son in the amphitheatre above East Lake. It may be a new species, as it does not agree in all particulars with typical forms of the above species.

Ranunculus orthorhynchus platyphylius Gray. Stems rather stout, a foot or more high, clothed with numerous spreading hairs. Radical leaves on long, broad petioles, compound, with 3 leaflets, the upper one 3-lobed, lateral deeply toothed or lobed; stem leaves similar but with shorter petioles, the uppermost sessile and simple; all very hairy. Flowers yellow, half an inch or more in diameter. Sepals reflexed; petals oblanceolate to spatulate. Akenes flat in a globular head, large and tipped with a straight pointed style as long as the body of the akene. Bearskin Meadow and in other wet places.

Ranunculus occidentalis Eisenii Gray.* Stems stout, a foot or two high, smooth except at base. Radical leaves on long, broad, hairy petioles, with 3-lobed blades, the lobes cleft into uneven divisions, wedge-shaped; stem leaves with the divisions more deeply and more sharply cleft. Flowers small on slender pedicels, $\frac{1}{4}$ in. in diameter. Sepals reflexed; petals orbicular; akenes flat in a globular head tipped with a short, curved style. Bearskin Meadow, Millwood.

Aquilegia truncata F. & M. COLUMBINE. Stems stout, a foot or two high, slightly pubescent and glandular, especially above. Leaves thrice-palmately-compound, with large, 3-lobed divisions; the lower on long petioles, the upper almost sessile. Flowers in showy panicles terminating long peduncles. Sepals red; petals with spurs red, the short blades yellow. Stamens yellow, numerous, much exserted. Fruit consisting of 5 erect, 1-celled, slender pods tipped with long styles. Bearskin Meadow, but common in other places.

Aquilegia pubescens Coville. Stems somewhat tufted at base and clothed with dead leaf stalks, a foot or more high, glabrous at base, glandular, pubescent above. Radical leaves on slender, smooth petioles, simply ternate with 3 leaflets, each 3-parted to 3-divided, the divisions crenately lobed; stem leaves similar but on short petioles. Flowers yellow with spreading spurs more than an inch long, sepals broad, more than half an inch in length. Collected on the trail to University Peak by Miss Catharine E. Wilson. This species is found only at upper elevations.

Delphinium polycladon Eastwood. Stems two feet or more tall with many spreading branches, rather slender and weak. Lower part of plant smooth, upper pubescent. Leaves orbicular

in outline, mostly near the base, 3-4 in. across with 3-5 broad, wedge-shaped divisions with short, pointed lobes; petioles long and slender. Flowers paniculate on slender pedicels, about $\frac{3}{4}$ in. in diameter, bluish-purple; upper petals white, veined with blue, the lower with a yellowish, hairy spot at the base of the blade. The seed pods pubescent, spreading but little, with the walls so thin that the seeds can be seen through. Near the forks of Bubbs Creek, growing in a wet place where the brush was dense.

Delphinium pratense Eastwood. MEADOW LARKSPUR. Root tuberous, near the surface of the ground. Stems slender, simple or branched from the base, about a foot high, villous with soft, white, deflexed-spreading hairs, densest near the base. Lower leaves more than an inch broad, having 3-4 wedge-shaped divisions each with linear-oblong, mucronate lobes; petioles about 2 in. long; stem leaves with simple, linear divisions or merely lobed and really bracts. Flowers at first scattered on long pedicels, later forming a loosely or closely flowered simple or compound raceme. Flowers purple and white, $\frac{3}{4}$ in. across, with the spur very slender and often 2-toothed at tip. Lower sepals almost equaling the spur, obovate, acute, the upper broader and with a conspicuous spot near the apex. Lower petals bifid and shortly fringed, white, with a purple blotch near the base of the blade; upper petals 2-lobed at apex, white, with the margin wavy. Pods pubescent, slightly spreading. This grows in the high meadows; collected at Horse Corral Meadows. It is desirable to collect good flowering and fruiting specimens of these larkspurs so as to see the variation in different places.

Actæa spicata arguta Torr. Leaves large, 1-2 with broad triangular outline, 3-5 times compound; the leaflets ovate, irregularly and unequally cut. Berries as large as peas, red when ripe. East Lake, in flower.

Anemone occidentalis Watson is to be looked for beneath melting snow-banks. It has large white or violet flowers nearly 2 in. in diameter, succeeded by dense, globose heads of akenes tipped with long, feathery styles.

Aconitum Columbianum Nutt, MONKSHOOD, is also to be looked for in the meadows and other wet places. It has dark purple or blue flowers, with the upper sepal forming a hood within which are the only petals. Fruits similar to those of larkspurs.

CRUCIFERÆ. CRESS FAMILY.

KEY TO THE GENERA.

PODS SHORT, FLOWERS USUALLY VERY SMALL.

Pods roundish, 1-seeded, surrounded by a wing.

. *Thysanocarpus*, Lace-pod.

Pods obcordate, 2-celled, flattened contrary to the partition.

. *Capsella*, Shepherd's Purse.

Pods elliptical or lanceolate, 2-celled, flattened parallel to the partition, seeds not winged. *Draba*, Mountain Cress.

PODS ELONGATED, FLOWERS MORE CONSPICUOUS.

Flowers yellow.

Pods somewhat 4-sided, flattened contrary to the partition, lower leaves compound with the terminal leaflet rounded and larger than the others. *Barbarea*, Winter Cress.

Pods terete. Leaves compound.

. *Sisymbrium*, Hedge Mustard.

Flowers white or rose-color.

Pods 2-sided or terete with nerved valves, roots woody, seeds usually winged. *Arabis*, Rock Cress.

Pods flattened parallel to the partition; calyx closed, with the sepals more or less united, purplish.

. *Streptanthus*, Jewel-flowers.

***Thysanocarpus curvipes* Hook.** Annual, simple or much branched, lower part hirsute. Leaves in a bunch at the base, dentate; stem leaves auricled at base, pointed. Flowers in corymbs, in fruit becoming a long raceme with the pods pendent on recurved, capillary pedicels. Pods almost orbicular with a perforated or crenate wing and tipped with a slender style. Kings River Cañon, Millwood, Converse Basin.

***Capsella Bursa-pastoris* Medic.** Leaves in a bunch at base, with winged petioles, deeply dentate; stem leaves sessile with arrow-shaped base. Racemes in fruit branched. Pods on spreading, slender pedicels, obcordate, with the base wedge-shaped. Common along the trails near camping places.

***Draba stenoloba* Ledeb.** Stems many from a tufted, leafy base, slender, simple or branched, less than a foot high. Leaves narrowly obovate or oblanceolate, entire or sparingly dentate, stellate-pubescent; stem leaves 1-2. Flowers yellow, turning white or pinkish in fading, in fruit forming a long raceme with the pods scattered. Pods smooth on slender pedicels, about the same length, $\frac{1}{2}$ in., tipped with a sessile stigma. East Lake.

Draba sp. This is another species also found at East Lake, but collected without the fruit as it was too early in the season. This has white flowers and pods (immature) clothed with stellate pubescence. The caudex is branched at base; leaves in a tuft, oblanceolate; those on the stem, 2-3, serrate. This may be a form of *D. incana* L., or is perhaps undescribed.

Draba Breweri Watson. Stems many, from a tap root, tufted at base, hoary throughout with dense stellate pubescence. Leaves oblanceolate, narrowed at base; stem leaves 2-4, sessile, lanceolate. Racemes densely flowered, petals persistent white; sepals stellate-pubescent; pods often twisted, stellate-pubescent; stigma sessile or nearly so. This is found only above timber line. It is a few inches high. Collected on Kearsarge Pass and Harrisons Pass.

Draba Lemmoni Watson. Stems only an inch or two high, densely tufted on the branched caudex from a tap root, forming mats. Leaves thickish, obovate or oblanceolate, $\frac{1}{8}$ - $\frac{1}{2}$ in. long, ciliate and hispid with stellate hairs. Flowers in corymbs, lengthening to racemes, terminating slender stems which are leafless except perhaps at base. This also is found only above timber line. It was collected on Harrisons Pass and on the trail to University Peak.

Draba eurycarpa Gray. Low, forming dense mats an inch or so high, hoary with dense, stellate pubescence; very leafy on the short caudex. Flowers few or solitary on short, thread-like stems. Sepals purple, edged with white, clothed with white stellate pubescence. Petals white, with slender claws which are as long as the sepals. Pods dark red or blackish, oblong-ovate as long as the stems, $\frac{1}{2}$ in. or more, smooth, but tipped with a short, pubescent style. The hoary pubescence of the foliage contrasts strongly with the dark, smooth, conspicuous pods. Found only above timber line on Harrisons Pass.

Barbarea sp. This may be a form of *B. vulgaris*, but the specimens are too young. Leaves mostly near the base, stems less than a foot high, smooth. Flowers yellow, corymbose. Pods an inch long, tipped by the style, somewhat compressed between the seeds. This grew under a melting snowbank on the trail to Harrisons Pass.

Sisymbrium incisum Engelm. var. Annual, a foot or two high, branching, stellate with a rather sparse pubescence; somewhat glandular on the inflorescence. Leaves compound, the divisions once or twice lobed with round, obtuse lobes. Flowers

very small, corymbose, in fruit becoming racemose. Pods terete, with one row of seeds in each part, about half an inch long, on spreading pedicels of the same length, sharp, pointed and curved. This grew at Summit Meadow and at similar places.

***Arabis perfoliata* Lam.** TOWER MUSTARD. Stems solitary, simple or branching above. Leaves at base hairy, lyrate-pinnatifid or dentate, petioled; stems leaves ovate, clasping by an auricled base, 2-6 in. long, $\frac{1}{2}$ -1 $\frac{1}{2}$ in. wide, smooth and glaucous. Flowers white, small; pods slender, erect, 2-4 in. long. Converse Basin.

***Arabis repanda* Watson.** Stems stout and branching, very hairy below. Leaves 1-4 inches long, obovate, toothed or entire. Flowers small, tinged with purple. Pods spreading, flat, 2-4 in. long, $\frac{1}{8}$ in. wide, tipped with a style, $\frac{1}{8}$ in. wide. The pods vary in width and in the manner of spreading, usually horizontally and somewhat curved downwards. The seeds are conspicuously winged and in two rows. Millwood, Converse Basin, Bubbs Creek, Summit Meadow.

***Arabis platysperma* Gray.** Low, branching from the root, glaucous, smooth. Leaves oblanceolate; radical petioled; cauline sessile, less than an inch long. Flowers few, rose-color. Pods erect, 1-1 $\frac{1}{2}$ in. long, tipped by a sessile stigma. Only found at the upper elevations at East Lake and Bullfrog Lake.

***Arabis Holbællii* Hornem.** Biennial, hoary with stellate pubescence; stems simple or branched, erect, 2-3 feet high. Leaves oblanceolate, 1-2 in. long, entire or sparingly toothed, densely clustered at the base and on the lower part of the stem. Flowers pendent, white or purplish, small. Pods pendent on deflexed pedicels, becoming 3 in. long, $\frac{1}{8}$ in. wide, tipped with a sessile stigma. Seeds margined, in one row in each division. Converse Basin, Bubbs Creek.

***Arabis arcuata* Gray.** Perennial, with many stems from the root, clothed with a dense, white, stellate pubescence. Leaves in tufts at the base, linear to linear-oblanceolate, $\frac{1}{2}$ -2 in. long, entire or serrate; stem leaves clasping by an auricled base. Flowers purplish. Pods on short pedicels, arching downwards, becoming 3 in. long. Seeds in 2 rows, narrowly winged. Converse Basin and around Millwood.

***Streptanthus gracilis* Eastwood.** Biennial, with several slender stems from the root, glaucous and glabrous, a few inches to a foot high. Radical leaves orbicular to narrowly oblong, toothed, those at base on slender petioles as long as the blades,

together about an inch ; stem leaves ovate to oblong, clasping by an auricled base $\frac{1}{4}$ -1 in. long. Flowers racemose, generally few on very short pedicels. Calyx purplish, urn-shaped, the sepals united to above the middle with the divisions about half as long, oblong, obtuse. Petals pink or rose-color, the oblong or obovate sinuate blades as long as the calyx, the broad, margined claws exserted. Pods linear, erect, tipped with a sessile stigma. This pretty little *Jewel-flower* grows in the upper elevations ; collected on the trail from East Lake to Harrisons Pass, but not above timber line ; also on the trail to Bullfrog Lake.

MALVACEÆ. MALLOW FAMILY.

***Sidalcea reptans* Greene.** Stems slender, several from a woody root, often rooting at the joints, the leaves chiefly from the base, on long, hairy petioles, the blade inch or more long, orbicular, the sinus almost closed, the margin 5-lobed, the lobes with rounded, broad, obtuse or mucronate teeth. Flowers in a racemose spike, stellate-tomentose. Calyx with triangular, long-pointed segments. Corolla deep rose-color ; petals obcordate, an inch or less long, densely ciliate on the claws. Carpels closely honeycombed, the beak turned to the axis, inconspicuous. This is common in the mountain meadows at rather high elevations. It has been collected at Bearskin Meadow, Converse Basin, General Grant Park, Millwood.

***Sidalcea glaucescens* Greene.** Stems many, from a perennial root, slender, erect, branching slightly, pale green with a close, rather sparse stellate-pubesence, 1-2 ft. high. Lower leaves on long petioles ; blades little more than an inch in diameter, orbicular, 5-7-lobed, with the lobes crenate across the truncate top ; stem leaves on shorter petioles, the upper ones with narrow, much deeper divisions, often entire. Raceme with few distant flowers ; bracts narrowly linear. Calyx with triangular, pointed lobes much longer than the short top-shaped tube, spreading in fruit. Corolla rose-color, $\frac{3}{4}$ in. long ; petals wedge-shaped, denticulate along the top. Carpels swollen, strongly veined, the meshes longer than wide, not beaked. This grows in shady places and was collected under the trees at Converse Basin.

***Fremontia Californica* Torr.** This is known as *Slippery Elm* because of the character of the bark. It is common below Millwood, and in June is a glorious sight. The branches are decked with beautiful golden flowers each as large as a dollar.

HYPERICACEÆ. ST. JOHN'S-WORT FAMILY.

Hypericum Scouleri Hook. ST. JOHN'S-WORT. Erect, with simple stems from running root-stocks. Leaves oblong, obtuse, opposite, clasping, an inch or less long. Flowers almost an inch in diameter, in panicked cymes, yellow. Stamens in several sets; styles more or less united with capitate stigmas. Pod splitting at the partitions into 3 valves. This grows in wet places. Collected at Summit Meadow.

Hypericum anagalloides Ch. & Schl. Stems low, forming mats, smooth, slender, leafy. Leaves elliptical, $\frac{1}{2}$ in. long, pale green, sessile, opposite. Flowers yellow, small, $\frac{1}{4}$ in. in diameter, either cymose or solitary at the top of the stems. This grows in the wet meadows, and may be a variety of the above species. It scarcely agrees with *var. Nevadense Greene*.

VIOLACEÆ. VIOLET FAMILY.

Viola blanda Willd. WHITE VIOLET. Stems low from creeping root-stocks, smooth. Leaves orbicular, kidney-shaped, from less than an inch to a little more in diameter; petioles generally very long and slender, in some plants 6 in. Flowering stems radical, long and slender, about as long as the petioles. Flowers white, fragrant, the lower petals veined with purple. In wet places, varying much in size. Collected at General Grant Park and Millwood.

Viola lobata Benth. Stems branching from the base, 6 in. or more high, pubescent throughout. Leaves various, from cordate crenate to palmately deeply-lobed, and much broader than long; petioles on lower leaves 2-3 in. long, upper much shorter than the blades. Flowers axillary, yellow, rather large. Seed pods $\frac{1}{2}$ in. long. In the shade of the conifers in the redwood forest of Converse Basin; also at Millwood.

Viola præmorsa Dougl. var. Stems several, from the perennial tap-root, spreading, hoary with a close, rough, white pubescence, 3-5 in. high, leafy. Leaves ovate, wedge-shaped or somewhat cordate at base, about $\frac{1}{2}$ in. long; petioles the same length or longer, margin sinuate-toothed. Flowers axillary, yellow, on peduncles as long as the petioles. Calyx with linear, pointed sepals. Ovary slightly pubescent, globular. Bubbs Creek, on the trail.

GERANIACEÆ. GERANIUM FAMILY.

Geranium incisum Nutt. Perennial, with branching, leafy stems; pubescence hairy and glandular. Flowers large, 1 inch across, on long pedicels that are spreading or somewhat reflexed in fruit. Petals purple, woolly on the inner surface. Stamens with woolly filaments. Fruit with the beak glandular. Converse Basin, General Grant Park, Millwood.

Geranium Richardsonii Fisch. & Mey. This is like the preceding, but less pubescent and glandular. The stems are taller and weaker, the flowers smaller and always white, though the petals may be veined with pink. This grows in wet places and was collected at Bearskin Meadow.

ACERACEÆ. MAPLE FAMILY.

Acer glabrum Torr. MOUNTAIN MAPLE. Shrubby, a few feet high, smooth throughout. Leaves palmately 3-lobed almost to the base, the middle lobe largest, irregularly toothed, an inch or more in diameter, turning red in the fall and often infested with small, red galls. Fruit smooth, the wings not spreading. Bubbs Creek; rare.

The Buckeye, *Aesculus Californica Nutt.*, is common below Millwood.

RHAMNACEÆ. CALIFORNIA LILAC FAMILY.

Rhamnus crocea ilicifolia Greene. RED-BERRIED RHAMNUS. Much branched shrub with smooth, oblong or round, veiny, spiny-toothed leaves an inch or less long. The flowers are minute and the sessile berries are bright scarlet, 2-seeded, as large as small currants. Bubbs Creek.

Rhamnus Californica Esch. COFFEE-BERRY, CASCARA SAGRADA. Shrub with elliptical leaves on short petioles, acute at each end, finely pubescent on both sides but densest on the veins below and the petioles. Flowers small, greenish, in axillary, few-flowered cymes. Fruit when ripe a black-purple berry containing 2-3 seeds. Bubbs Creek.

Ceanothus parvifolius Trelease. Blue blossoms. Low shrub, with alternate leaves, 3-nerved, smooth, elliptical, less than an inch long. Flowers blue, in simple racemes on long peduncles and with the pedicels long and thread-like (almost $\frac{1}{2}$ inch). Pods smooth, without crests. Converse Basin.

Ceanothus integerrimus H. & A. CALIFORNIA WHITE LILAC. Tall shrub with erect stems; leaves alternate, 3-nerved, elliptical, 1-2 in. long, slightly pubescent. Flowers white, in panicles on peduncles almost half as long, which persist. Fruit smooth, without crests. This is common in Kings River Cañon. There was also a form collected with lower, stouter stems; panicles much shorter and more condensed; leaves broader.

Ceanothus cordulatus Kellogg. SNOW BUSH. Low spreading shrub, forming the chaparral in many places along the trails. Branches becoming spines an inch or more long, grayish brown. Leaves alternate ovate, 3-nerved, pubescent, entire or serrulate, about $\frac{1}{2}$ in. long. Flowers white, in small clusters. Fruit slightly lobed and crested. Bubbs Creek, East Lake.

CRASSULACEÆ. STONECROP FAMILY.

Sedum stenopetalum Pursh. STONECROP. Perennial, from running rootstocks, low, 3-5 in. high. Leaves fleshy, narrow, broadest at base, $\frac{1}{4}$ in. long. Flowers yellow, in branching cymes, almost sessile. This is a bright little plant full of star-like blossoms, often growing in patches. Forks of Bubbs Creek.

Sedum roseum Scop. Stems erect from a fleshy root, erect, simple, from a few inches to a foot high. Leaves ovate to oblong, dentate, fleshy, rather thickly clothing the stem, $\frac{1}{2}$ -1 in. long. Flowers dark red in a head terminating the stem, small. Stamens with small round anthers on slender filaments surpassing the petals. This grows at or above timber line. Collected on Kearsarge Pass and Harrisons Pass. The anthers are purple or yellow.

SAXIFRAGACEÆ. SAXIFRAGE FAMILY.

KEY TO THE GENERA.

HERBS, LEAVES ALTERNATE, FRUIT CAPSULAR.

Ovary 2-celled, seeds in the center, stamens 10, petals 5, calyx free from the ovary or united only at base.

. Saxifraga, Saxifrage.

Ovary 1-celled, with seeds on the sides. Stamens 10, petals cleft or lobed, conspicuous. Tellima, Wood Star.

Stamens 5, petals pinnatifid with thread-like divisions, capsule depressed. Mitella, Fringe Flower.

Stamens 5, petals entire, small; capsule 2-beaked, half inferior. Heuchera, Alum-root.

SHRUBS; LEAVES ALTERNATE, SIMPLE; FRUIT A BERRY.

. Ribes, Currant, Gooseberry.

Saxifraga integrifolia Sierrae Coville. MEADOW SAXIFRAGE. Perennial, from a woody root, simple, erect, 1-2 ft. high, leafless except at the root, glandular-hairy, rather stout, hollow. Leaves 2-6 in. long, 1-1½ in. wide, oblong, elliptical to obovate, obtuse or acute at apex, narrowed at base, serrate or entire. Flowers in capitate clusters at the ends of slender peduncles which vary from the lowest, 2 in., to the almost sessile, uppermost ones; bracts and bractlets lanceolate. Flowers small; sepals triangular, obtuse, reflexed; petals white, spatulate; stamens with dilated filaments; capsule bladderly-dilated, reddish, with the stigmas divergent. This is abundant in the mountain meadows and in other wet places. Summit Meadow, General Grant Park.

Saxifraga nivalis L. ALPINE SAXIFRAGE. Perennial. Leaves clustered at the base of the slender 2-3-in. high flowering stems, smooth throughout. Leaves oblanceolate, obtuse, ½ in. or more long, denticulate with callous teeth. Flowers small, in heads terminating the green or purplish stems. Sepals erect, obtuse. Petals white, oblanceolate; stamens on broad filaments, stigmas strongly divergent. This little plant grows only above timber line, and was collected on Harrisons Pass.

Tellima scabrella Greene var. Stems slender, erect, usually with one branch or simple, rough pubescent and somewhat glandular, 1-1½ ft. high. Root leaves on long petioles, usually with a bulblet in the axil when the plant is old; blades 3-5-lobed, kidney-shaped, crenate, about an inch in diameter; petioles 2-3 in. long; stem leaves similar with the petioles shorter. Flowers racemous on very short pedicels, distant. Calyx bell-shaped, obtuse at base, cohering but slightly to the capsule. Petals with the claws exerted; blade entire or 3-cleft, the middle lobe much larger than the lateral. Styles and stigmas 3, very short. This differs from the typical form in having the petals lobed instead of entire. General Grant Grove, Millwood, Converse Basin.

Mitella Breweri Gray. Perennial, from fibrous roots. Leaves all radical, round, kidney-shaped, almost 2 in. in diameter, on petioles twice as long as the blade; margin doubly crenate; smooth except for a few long brown hairs on the upper part of the petioles. Flowers small, greenish, in racemes at the ends of the slender, leafless stems which are longer than the leaves; pedicels short. Calyx star-shaped; petals pinnately fringed, the corolla almost ¼ in. in diameter. Common at East Lake.

Heuchera micrantha Dougl. Perennial, from thick, woody stems, 1-2 ft. high. Leaves radical on long, hairy petioles, 2-6

in.; blades ovate-orbicular, crenately-lobed, the lobes crenately-dentate, deeply cordate at base, 2 in. wide, $2\frac{1}{2}$ in. long. Flowering stem with 1-2 bracts, paniculate, the peduncles and pedicels slender, finely glandular. Flowers very small; calyx wedge-shaped at base. Petals white, linear, narrow, exserted beyond the sepals, with the stamens and the pointed ovary tipped with the hair-like styles. Millwood.

Heuchera, new species, near *H. rubescens* Torr. Perennial, from a woody, thick rootstock, tufted at base with a branched caudex, very leafy and clothed with the brown bases of former leaves. Leaves ovate-orbicular, cordate or truncate at base, crenately-lobed and conspicuously ciliate, about $\frac{3}{4}$ in. in diameter, smooth. Flowers in narrow panicles terminating the leafless stems; inflorescence glandular, puberulent. Calyx urn-shaped, with the base wedge-shaped, hairy and glandular. Petals white, narrowly-linear, exserted with the stamens and style. Bubbs Creek, at upper elevations.

Ribes amictum Greene. PRICKLY GOOSEBERRY. Shrub with widely spreading branches, spines under the axils stout, three, except on the younger branches, $\frac{1}{2}$ in. long. Leaves small, less than an inch in diameter, 3-5-lobed, smooth, or clothed with fine, close pubescence. Peduncles 1-2 flowered; bracts small, clasping, at first enclosing the flower. Calyx dark crimson, half an inch long, with hoary tube and reflexed lobes in flower. Petals white, involute. Stamens with filaments slightly exserted; anthers mucronate, rose-color. Berry densely clothed with stout prickles, which together with the surface of the skin are clothed with fine, curly hairs. This is used for making jelly by the people in the mountains. Bubbs Creek, Millwood.

Ribes lasianthum Greene. Low, spreading shrub with tortuous branches, very spiny, with generally 3 spines at the axils; bark shreddy. Leaves small, less than $\frac{1}{2}$ in., almost glabrous, but with the petioles glandular-puberulent, orbicular, 3-5-lobed. Flowers 1-3 in short-stemmed clusters, yellow. Calyx hairy with the tube longer than the lobes, petals spatulate, longer than the stamens; filaments broad, anthers obtuse, cordate. Fruit not known. This was seen only on Harrisons Pass near timber line. The material is too poor for certainty regarding the species, and it is very desirable to have specimens with fruit collected.

Ribes lacustre molle Gray. GOOSEBERRY. Low and intricately branched, with 3 stout spines at each fascicle and some scattered prickles; old bark shreddy; glandular, hairy-pubescent throughout. Leaves deeply 3-parted, the upper lobe much larger,

the lower 2-cleft, all irregularly toothed. Flowers in racemes. Calyx saucer-shaped, parted almost to the base, pinkish, hairy. Petals and stamens very small and short. Ovary clothed with glandular, purple hairs. This is between a gooseberry and a currant, but is considered the former chiefly on account of the prickly stems.

Ribes cereum Dougl. RED CURRANT. Much branched, with short, stout branches, 1-3 ft. high, without spines or prickles, glandular. Leaves 3-5 cleft, irregularly and sharply toothed, truncate or cordate at base. Flowers in corymbs on peduncles as long as the petioles, 3-9-flowered; bracts enfolding the ovary, pedicels very short. Calyx tubular, white but tinged with pink or green, glandular, $\frac{3}{8}$ in. long, the lobes short. Petals orbicular, small. Fruit red, translucent, glandular, sweet but not agreeable. Bubbs Creek.

Ribes ascendens Eastwood. WILD CURRANT. Erect shrub 3-4 ft. high, slightly glandular, without spines or prickles. Leaves 3-lobed with the lobes doubly toothed, petioles hairy at base equaling or exceeding the blades, which are 1-2 in. across. Peduncles erect in flower, curving downwards in age, longer than the leaves and naked to the short spicate racemes; bracts conspicuous, longer than the pedicels. Calyx rose-color, campanulate, persisting on the berry. Petals and stamens small. Fruit a glandular berry turning purplish in ripening, the pedicels upwardly curving on the pendent racemes. Millwood, General Grant Grove.

ROSACEÆ. ROSE FAMILY.

KEY TO THE GENERA.

TREES OR SHRUBS.

§ *Stipules free from the petioles.*

Shrubs with white flowers; fruit a stone fruit (a fleshy outer coat enclosing a nut). . . . Cerasus, Cherry.

Shrub with white flowers; fruit like a berry with 5 cells, each containing 1 seed. . . . Amelanchier, Service Berry.

§ *Stipules united to the base of the petiole (sometimes wanting); calyx 5 lobed, without bractlets.*

Shrubs with small white flowers in panicles; pistils 5, distinct, forming small pods. . . . Holodiscus, Meadowsweet.

Shrubs or woody vines; petals 5, conspicuous; pistils numerous on a conical receptacle, each becoming a small stone-fruit.

. Rubus, Raspberry.

Low, aromatic shrubs, with leaves finely, pinnately dissected; pistil one, becoming a large akene; flowers white, half inch across, in cymes. . . . *Chamæbatia*, Mountain Misery.

Tall shrubs with simple leaves; flowers solitary, small, greenish, with calyx only; pistil solitary, in fruit terminating in a long, feathery style. . . . *Cercocarpus*, Mountain Mahogany.

Shrub with compound leaves; petals rose-color, conspicuous; pistils many, in fruit forming bony seeds, which are enclosed in a red, fleshy receptacle when ripe. . . . *Rosa*, Wild Rose.

HERBS.

Stipules united to the base of the petioles; calyx 5-lobed, with bractlets alternating with the lobes.

Pistils numerous on a dry receptacle; style either bent in the middle or feathery; petals purplish or yellow, conspicuous. *Geum*, *Avens*.

Pistils very numerous on a red, fleshy receptacle; petals white; leaves compound, with 3 leaflets. *Fragaria*, Strawberry.

Pistils numerous on a dry receptacle; leaves pinnately compound; calyx saucer-shaped; petals generally yellow. *Potentilla*, Cinquefoil.

Pistils numerous on a dry receptacle; calyx bell-shaped; petals white or yellow, with claws; leaves pinnately compound, with the upper leaflets more or less running together. *Horkelia*.

Pistils 5-10, on a dry receptacle; stamens only 5; petals very small, greenish-yellow; leaves compound, with three 3-toothed leaflets. *Sibbaldia*.

***Cerasus emarginata* Dougl. var.** Leaves finely and sparsely pubescent, oblanceolate to elliptical, 1-2 in. long, $\frac{1}{2}$ - $\frac{3}{4}$ in. wide, crenate, obtuse, narrowed at base, with two glands at the base of the blade, margin slightly revolute, crenulate, each crenature tipped with a small, glandular bristle. Corymbs few-flowered, much shorter than the leaves. Cherry dark red, bitter and astringent, about $\frac{3}{8}$ in. in diameter. This is common in many places along the trails and forms part of the brush or chaparral.

***Amelanchier alnifolia* Nutt. var.** Leaves oblong to orbicular, about an inch long, pale green, clothed with fine, silky hairs, dentate from below the middle with spine-tipped teeth; petioles much shorter than the blade, white, woolly. Flowers white, in racemes (in fruit the lower pedicels lengthen); fruit purplish or black when ripe, as large as a green pea, surmounted by the persistent triangular calyx lobes. Millwood; Bubbs Creek, near its junction with Kings River.

***Holodiscus dumosa* Nutt.** Low, straggling shrub; leaves small, wedge-shaped, toothed along the top, $\frac{1}{4}$ in. long, silky-

woolly. Flowers white, $\frac{1}{4}$ in. in diameter, in close panicles or even in simple racemes; fruit densely hairy. On rocky hills at the forks of Bubbs Creek.

Cercocarpus parvifolius Nutt. Leaves oblanceolate to obovate, wedge-shaped, at base tapering to a short petiole, feather-veined, crenate-dentate from about the middle, green and smooth on the upper surface, pale gray-green on the lower; calyx tube long and slender, the border thickly set with stamens; tail of the akene an inch or more long. Converse Basin, Millwood, and other places along the trails.

Rubus parviflorus Nutt. Leaves broad, orbicular, 3-5 lobed, 3-6 in. broad, doubly crenate-dentate and mucronate, clothed with fine, silky hairs, glandular on the petioles. Flowers cymose, few in a cluster, $1\frac{1}{2}$ in. in diameter; sepals tipped with long points; petals white, obovate; fruit inverted-saucer-shaped, red, pleasant to the taste. Bubbs Creek.

Rubus leucodermis Dougl. BLACK RASPBERRY. Stems very prickly, covered with a glaucous bloom. Leaves compound, with 3-5 leaflets, the top one the largest, green on the upper surface, white on the lower, doubly dentate. Flowers white; fruit glaucous-black, sweet. Converse Basin.

Chamæbatia foliolosa Benth. Low shrub, with widely spreading branches, forming mats under the pines, aromatic, with resinous glands; petals white, 5, obovate, $\frac{1}{3}$ in. long; leaves obovate-oblong in outline, pinnately much dissected, with the ultimate segments minute and crowded. This is commonly known as tar-weed, as it leaves a viscid gum on the clothes of those who walk through patches of it.

Rosa spithamea Watson. WOOD-ROSE. Low bush growing under the pines, slender, with few straight prickles; leaves with 5-7 leaflets on very short petioles; stipules glandular-ciliate; leaflets obovate-orbicular, dentate, the teeth glandular-ciliate; flowers an inch in diameter; calyx lobes long-pointed and with small, leaf-like tips, somewhat glandular-ciliate near the top; fruit globular, as large as peas. Millwood, Converse Basin, and other places under the pines.

Rosa gratissima Greene. Stems very prickly, erect, branching, 2-3 feet high. Leaves bright green, thin, glandular; leaflets obovate to elliptical, about an inch long, serrate-dentate, not glandular along the edge nor on the stipules; flowers clustered at the ends of short branchlets, more than an inch in diameter; sepals cottony-tomentose, long-pointed, with short, foliaceous

tips. Fruit not seen. This grows in wet places on the trail up Bubbs Creek. It is readily distinguished from the other species by the much more prickly, taller, more branched stems as well as greater number of flowers.

Geum macrophyllum Willd. Stems 1-3 feet high, hairy; leaves with the largest division at the top. Corolla yellow, with broad lobes, longer than the sepals; receptacle smooth; styles bent near the middle, the upper part falling, leaving the lower part hooked. Kings River Cañon, Millwood.

Fragaria sibbaldifolia Rydberg. Leaves very hairy on the lower surface, sparingly so on the upper, the middle leaflet largest, broadly obovate, coarsely toothed, runners long and slender. Stems short, with few flowers. Bubbs Creek.

Potentilla flabellifolia Hook. Leaves trifoliate on long, slender petioles; thin and smooth; leaflets broadly obovate, petiolate, deeply toothed; stipules broad. Stems slender, sparsely leaved, with small leaves and conspicuous stipules. Flowers few, yellow, $\frac{3}{4}$ in. in diameter; petals twice as long as the sepals, deeply notched; divisions and bractlets about equal, lanceolate, acute. This is found in wet places near melting snowbanks at high altitudes. Collected at Bullfrog Lake.

Potentilla Nuttallii Lehm. Stems tall 2 feet, branching from the woody base and with a compound paniculate inflorescence. Leaves palmately-compound; the lowest ones on long petioles, the uppermost almost sessile; leaflets oblong-obovate, 1 in. long, deeply toothed, hoary with appressed, silky hairs; stipules large, entire or toothed. Flowers half an inch in diameter; corolla not much surpassing the calyx; petals obovate; calyx with ovate divisions, narrowly pointed, alternating with bractlets less than half as large. Bubbs Creek, along the trail.

Potentilla lactea Greene. Stems tall, 1-2 feet high, generally with slender, flowering branches. Leaves pinnately-compound with 5-9 leaflets diminishing downwards, obovate-cuneate, dentate above the middle, finely hairy, pubescent and slightly glandular; stem leaves few, small, almost sessile. Flowers $\frac{3}{4}$ in. in diameter; petals yellowish-white, obovate, obtuse, about one-third longer than the sepals; these lanceolate, alternating with narrowly linear bractlets two-thirds as long. Bubbs Creek.

Potentilla reflexa Greene. Stems tall and stout, 1-2 feet high, branching, clothed with long, glandular hairs. Leaves pinnately-compound, with 5-9 leaflets; radical leaves 6-10 in. long on petioles as long as the blade; leaflets, except the top,

unequal-sided, suborbicular, deeply toothed, almost an inch long ; upper leaves smaller and almost sessile. Inflorescence open and sparingly branched ; flowers yellow, small, less than half an inch across ; petals as long as the sepals, broadly ovate, obtuse ; sepals ovate, with pointed tips, alternating with bractlets much smaller and not half as long. Millwood, Bubbs Creek.

Potentilla Breweri Watson. Stems several, low, from a branching caudex, more or less densely clothed throughout with white, silky hairs. Leaves pinnately-compound, mostly radical ; those on the stem with the stipules more conspicuous than the blades ; leaflets 7-13, crowded, palmately-lobed, with linear, acute divisions, cuneate in general outline. Flowers about $\frac{1}{2}$ in. in diameter, few, in a terminal cyme ; divisions of the calyx triangular, pointed, the alternating bractlets lanceolate and a little shorter ; petals yellow, orbicular, surpassing the sepals. Bullfrog Lake.

Horkelia tridentata Torr. Stems several, from a woody root, hoary with long, silky white hairs. Leaves pinnately-compound with 3-9 leaflets ; those at base on long petioles ; those on stem becoming smaller and almost sessile ; leaflets small, with 3 teeth at apex ; stipules conspicuous. Flowers very small in crowded capitate cymes, terminating the stems ; sepals triangular, pointed, alternating with narrowly-linear bractlets about the same length ; petals white, lanceolate, scarcely longer. This is common under the pines. Collected at Millwood and Converse Basin.

Horkelia unguiculata Rydberg. Stems many, from a woody root, about a foot high, densely clothed with long, silky hairs throughout. Leaves linear in outline, with numerous, crowded leaflets which are divided into linear segments to the very base. Flowers crowded in capitate cymes at the ends of the stems ; divisions of the calyx and bractlets narrowly-triangular, long-pointed, almost the same length, minutely serrulate ; petals white, with broad, obovate-orbicular blade, truncate along the apex, surpassing the calyx. Millwood.

Horkelia pygmæa Rydberg. Low, with a much branched caudex, from a woody root. Leaves almost all radical, linear in outline, 1-2 in. long, narrow, with the leaflets crowded, elliptical-obovate, tipped with a fine bristle, glandular, very small, $\frac{1}{8}$ in. long or less. Flowers yellow in cymes terminating the stems, a little more than $\frac{1}{4}$ in. in diameter ; sepals as long as the petals, the bractlets linear, double ; petals obovate, obtuse. This is common near East Lake and in similar situations at the same altitude.

Sibbaldia procumbens L. Low and densely matted, not an inch in height, clothed sparingly with long, appressed hairs; leaflets $\frac{1}{4}$ in. long; flowers a little more than $\frac{1}{8}$ in. in diameter. Harrisons Pass.

LEGUMINOSÆ. PEA FAMILY.

KEY TO THE GENERA.

- Leaves palmately-compound with more than 3 leaflets; flowers in racemes, often whorled. *Lupinus*, Lupine.
- Leaves trifoliate; flowers in heads. *Trifolium*, Clover.
- Leaves pinnately-compound with 2 to many leaflets; flowers solitary or in umbels. *Lotus*.
- Leaves pinnately-compound, ending in tendrils; stigma forming a hairy ball. *Vicia*, Vetch.
- Leaves pinnately-compound, with or without tendrils; style hairy down the inner side. *Lathyrus*, Wild Pea.

Lupinus. Calyx generally 2-lipped. Corolla with broad standard and wings united above enclosing the incurved, pointed keel. Stamens in two sets; one set in the bud has long anthers, the others have shorter filaments and are tipped with globular anthers. As the flower develops the ball-tipped filaments grow longer and push the pollen up to the top of the keel, from which the pistil projects. The leaflets are usually narrow, and fold at mid-day. The flowers are generally blue, but white and yellow flowered species exist, as well as some dull in color and one combining yellow and rose-color. The species are difficult and are all uncertain. They have been sent to Dr. B. L. Robinson, Gray Herbarium, for determination.

Trifolium tenerum Eastwood. Perennial, from creeping rootstocks, with stems low, numerous, leafy, forming mats in the meadows, soft, hairy with fine hairs. Leaflets narrowly elliptical to oblanceolate, pointed and tipped with a bristle, serrulate on the margin with bristle-tipped teeth, the conspicuous veins terminating in the bristles; petioles short; heads few-flowered, 1-6, on thread-like peduncles; involucre smooth, very small, of 2-5 separate, spiny bracts. Calyx open, bell-shaped, veiny, membranous between the veins; corolla long and slender; the banner with 3 rounded teeth at the truncate apex, and all parts white except the purple keel. Ovary containing one ovule. Summit and Bearskin Meadows.

Trifolium multicaule Jones. This is similar to the above,

but the pubescence is less hairy, the leaflets are broader, from obovate to oblanceolate, obtuse at apex, spiny, serrulate; the wings and standard as well as the keel are tinged with purple. Summit Meadow.

Trifolium monanthum Gray. Perennial or annual, with many slender stems branching from the root, smooth throughout, or with a few scattered hairs, spreading, but only about an inch high. Leaflets obovate, wedge-shaped at base, $\frac{1}{4}$ in. long, truncate, notched or obtuse at apex; petioles long and thread-like. The heads contain only 1-3 flowers; involucre with a few linear bracts; the flowers are white or tinged with purple. This was collected at Summit Meadow and on Kearsarge Pass.

Trifolium microcephalum Pursh. Annual, with slender stems, woolly, 4-6 in. high. Leaves obovate, obtuse or notched at apex, serrulate; stipules ovate, pointed. Heads subtended by a bell-shaped involucre, the teeth broad at base, narrowed to a long, bristly point, the tube membranous and veiny, woolly-pubescent. Flowers small; calyx membranous, the divisions tipped with long bristles. Bearskin Meadow.

Lotus Americanus Bisch. Annual, generally much branched with slender stems, soft-woolly throughout. Leaflets generally 3 on a linear axis. Flowers solitary, salmon-color, axillary on slender peduncles which are generally longer than the leaves, with a single leaflet below the flower. Pods an inch or more long. A common species; collected at Millwood, General Grant Park.

Lotus hirtellus Greene. Annual, branched from the base, spreading, hoary with short hairs throughout. Leaflets rather fleshy, unequal in number on the two sides, the axis broad. Flowers 1-2, on long, stout peduncles, with a trifoliate leaflet below the flower. Flowers small. Pods about an inch long, not compressed between the seeds, somewhat sickle-shaped. Kings River Cañon, on the hillside trail.

Lotus crassifolius Benth. Stems stout, 2-3 ft. high, branching and forming clumps, glaucous. Leaves large, with 7-13 obovate leaflets nearly an inch long, mucronate, narrowed at base to a short petiolule; stipules small and membranous at the base of the short petioles. Flowers $\frac{1}{2}$ in. long in umbels terminating peduncles, with a 1-3 foliate bract near the middle. Calyx tubular, with 5 short teeth; corolla greenish-yellow, all the parts tipped with dark purple. Pods stout, about 3 in. long and $\frac{1}{4}$ inch wide. Kings River Cañon and in other places.

Lotus Torreyi Greene. Stems many, from running rootstocks, 2-3 ft. high, hoary with fine, closely appressed hairs. Leaflets generally 7, elliptical to oblanceolate, half an inch long, $\frac{1}{8}$ in. or more wide; axis and petioles slender; stipules small, membranous, pointed. Flowers in umbels, subtended by 1-3 leaflets on slender peduncles generally longer than the leaves. Calyx with very narrowly pointed divisions and a tubular tube. Corolla half an inch long, the banner and wings yellow, the keel white. Bearskin Meadow and in Kings River Cañon.

Lotus Nevadensis Greene. Perennial, from a woody taproot; stems slender, wiry, very numerous, canescent with a close white pubescence, about a foot high. Leaves with 3-5 small, oblanceolate to orbicular leaflets $\frac{1}{4}$ in. long, without petioles, unequal in number on the two sides. Flowers in umbels on peduncles shorter than the leaves, yellow, $\frac{1}{4}$ in. long, generally with a single bract below the umbel. Pods ending in a long, thread-like point, much curved, in a semicircle, small. Millwood and Bubbs Creek, under the trees; quite common and widely distributed.

Vicia Americana truncata Brewer. Low vine clinging by means of the branched tendrils at the ends of the leaves. Leaves with about 12 leaflets on very short petioles; stipules cut into sharp points; leaflets about half an inch long, truncate across the top, often toothed and always with a bristle in the middle. Flowers in racemes on slender peduncles much shorter than the leaves, bluish-purple, $\frac{1}{2}$ - $\frac{3}{4}$ in. long. Converse Basin, Millwood.

Lathyrus sulphureus Brewer. Tall vine climbing by branched tendrils; stems angled, smooth. Leaflets 5-9, ovate, 1 in. long, tipped with a slender bristle, smooth. Flowers small, yellow, fading brownish; pods flat, $1\frac{1}{2}$ in. long. Millwood.

The red bud, *Cercis occidentalis*, is conspicuous along the road to Millwood in June, when it is in full bloom. The crimson peablossoms come out thickly on the branches before the leaves have developed. The leaves are orbicular, kidney-shaped, bright green and smooth. The pods are purple. It is one of the most beautiful of the shrubs of California.

ONAGRACEÆ. EVENING PRIMROSE FAMILY.

KEY TO THE GENERA.

♂ PODS SPLITTING INTO FOUR PARTS WHEN RIPE.

* Seeds furnished with a tuft of wool.

Calyx tube short or wanting. *Epilobium*, Willow-herb.

** Seeds without any wool.

Anthers versatile.

Calyx tube not produced beyond the ovary; capsule 2-celled;
stamens in 2 sets, one sterile. *Gayophytum*.

Calyx tube produced beyond the ovary into a linear or funnel-
shaped tube; anthers uniform.

. *Oenothera*, Evening Primrose.

Anthers attached by the base.

Calyx tube funnel-shaped, the lobes reflexed; petals sessile,
stamens in 2 sets, one shorter.

. *Godetia*, Farewell to Spring.

Calyx tube funnel-shaped, the lobes reflexed; petals with claws;
stamens in 2 sets, one often sterile. *Clarkia*.

Calyx tube funnel-shaped, the lobes erect; petals sessile, 2-lobed.

. *Boisduvalia*

♂ ♂ PODS NOT SPLITTING OPEN WHEN RIPE, SEEDS

1-4.

Leaves alternate; parts of the flower in fours; stamens 8, in 2
sets, one sterile. *Heterogaura*.

Leaves opposite; parts of the flower in twos; fruit a 1-2-seeded
burr. *Circæa*, Enchanter's Nightshade.

***Epilobium Watsoni* Trelease.** Stems stout, 3 feet high, pale green, with short, closely appressed pubescence of spreading hairs. Leaves opposite, sessile, lanceolate, 1-2 in. long, serrulate, with glandular teeth. Flowers rose-color, ½ in. in diameter. Millwood, in wet places.

***Epilobium glaberrimum* Barbey.** Stems branching from the base and above, smooth throughout. Leaves narrowly oblong to lanceolate, 1-2 in. long, sparingly serrulate, glaucous. Flowers rose-color, ¼ in. long. Pods linear, very slender, 1-3 in. long, on long, slender peduncles 1-2 in. long. Millwood and near Big Boulder Creek. This grows in the neighborhood of red-wood forests.

***Epilobium brevistylum* Barbey.** Stems slender, simple, from a few inches to a foot high, smooth to the inflorescence. Leaves oblong to lanceolate, an inch or less long, distant, sparingly serrulate with blunt teeth or entire. Flowers few in the

upper axils, pink, $\frac{1}{8}$ in. long. Pods slender, 1-2 in. long, on peduncles as long or shorter, slightly glandular. This droops when it is in bud, but is later erect. East Lake; a subalpine species.

Epilobium Hornemanni Reichenb. Stems simple or branching from the base, less than a foot high, leafy, more or less clothed with white spreading hairs. Leaves thin, ovate-oblong, obtuse, entire or sparingly serrulate, sessile, an inch or less long, the largest a little more than an inch wide. Flowers rose-color, $\frac{3}{8}$ in. across. Pods slender, 1 in. long, on peduncles less than half as long; minutely glandular. Bubbs Creek.

Epilobium ursinum Parish. Stems simple or branched from the base, clothed with loose, woolly hairs below, glandular above, 1 $\frac{1}{2}$ -2 feet high. Leaves ovate to lanceolate, $\frac{1}{2}$ -1 in. long, serrulate with callous teeth. Flowers very small, $\frac{1}{8}$ in. long, white or lavender. Pods about an inch long, tapering to short peduncles. Raceme disposed to be pendent in bud. Converse Basin, in a grove of Sequoia near Big Boulder Creek.

Gayophytum diffusum Torr. Annual, branching diffusely with thread-like branches, smooth except for a sparse, hoary pubescence on the inflorescence. Leaves linear, 1-2 in. long, becoming very small above. Flowers white turning pink, a little more than $\frac{1}{4}$ in. in diameter. Pods $\frac{1}{4}$ in. or more long on hair-like pedicels of the same length, the seeds are outlined through the thin walls of the pod. Bearskin Meadow, Millwood.

Gayophytum eriospermum Coville. Stems 1-2 ft. high, rather stout, branching diffusely, smooth except for some fine white hairs on the buds, pedicels and pods. Leaves linear, the lowest 3 in. long, petioled. Flowers $\frac{1}{2}$ in. in diameter, white turning rose-color. Seed pods similar to the preceding but more spreading. Millwood.

Gayophytum pumilum Watson. Stem branching, annual, 6 in. or more high, branches erect, smooth. Leaves narrowly linear-lanceolate, less than an inch long, petioled. Flowers very small, $\frac{1}{8}$ in. in diameter or less. Pods flattened contrary to the partition, half an inch long, on short peduncles from all the leaf axils. Growing in wet places at Millwood.

Oenothera hirtella Greene. Stems branching from the annual root, white epidermis, shreddy below, viscid and white hairy. Lowest leaves lanceolate, narrowed to a petiole; upper leaves sessile, ovate, with the margins crisped-undulate. Flowers yellow, very small, axillary. Pods linear, very narrow, becoming

coiled, narrowed slightly at top. This was seen only on the Bubbs Creek trail on the dry hill-side.

Godetia pulcherrima Greene. Stems branching from the annual root and also above, generally diffuse, pale green from a fine, white, appressed pubescence, 1-2 ft. high. Leaves lanceolate, tapering to a short, slender petiole, acute at apex, mostly entire, about an inch long. Flowers rose-color, 2 in. in diameter; the petals notched or sinuate across the top. Pods almost sessile, beaked at apex, less than an inch long. The buds are pendent and the tips of the calyx not free. This is a free bloomer, and most beautiful species. It is common in the vicinity of Millwood.

Clarkia rhomboidea Dougl. Stems diffusely branching, $\frac{1}{2}$ -2 ft. high, from an annual root, pubescent throughout with fine, close, white hairs. Leaves elliptical, pointed at each end, on short petioles, $\frac{1}{2}$ -2 in. long. Flowers in the upper axils, the buds pendent. Petals crimson, the blades rhomboidal, about $\frac{1}{4}$ in. long. Pods on short, erect peduncles almost hugging the stem, generally curving inwards, distinctly 4-sided, beaked at top. Millwood, Bubbs Creek.

Clarkia elegans Dougl. Stems simple or branching, 1-4 ft. high or sometimes taller, smooth or slightly pubescent. Leaves ovate to linear, sinuately toothed or entire, pale green. Petals entire, rhomboidal, crimson, $\frac{1}{2}$ in. long; stamens all perfect. Flowers pendent in bud. Pods sessile, spreading, narrowed towards the top, slightly glandular. Kings River Cañon.

Boisduvalia densiflora Watson. Stems erect, generally simple, $\frac{1}{2}$ -2 ft. high, grayish with dense white pubescence, closely appressed. Leaves lanceolate, pointed, the lowest tapering to short petioles, the upper sessile, 1-2 in. long, sparingly denticulate. Flowers small, in capitate spikes that lengthen in fruit. Pods sessile, almost concealed by the leaves. This is a variable species which is seldom twice the same. The specimens from which the description was drawn were collected on the trail up Bubbs Creek.

Heterogaura Californica Rothr. Annual, with widely branching stems, $\frac{1}{2}$ -2 ft. high, minutely glandular, puberulent. Leaves lanceolate, tapering to short, slender petioles, 1-2 in. long, entire or sparingly toothed. Spikes closely flowered but the fruits distant, sessile; bracts narrowly-linear. Petals 4, entire, spatulate, crimson, $\frac{1}{4}$ in. long; the claws narrow. Fruit $\frac{1}{8}$ in. long, obovate, angled, nut-like, 1-2-seeded. Millwood.

Circæa Pacifica Magnus. Perennial, from rootstocks bearing tubers. Stems slender, branching, smooth, about 6 in. high. Leaves ovate-cordate, or orbicular, thin, sparingly serrulate, $\frac{1}{2}$ -1 $\frac{1}{2}$ in. long, 1 in. wide; petioles slender, as long or longer. Flowers small in panicles. Corolla white, $\frac{1}{8}$ in. or less long. Pods the same length, on deflexed pedicels, slightly longer. Millwood, in shady, moist places.

LOASACEÆ. BLAZING STAR FAMILY.

Mentzelia congesta T. & G. Stems much branched, from an annual or biennial root with white, shining epidermis and a rough pubescence, 1-2 ft. high. Leaves linear-lanceolate, pinnately lobed or entire, sessile, 1-2 in. long. Flowers clustered at the ends of the branchlets, the leaves broadening and becoming ovate and pointed, forming a kind of an involucre, bracts long-wedge-shaped, 3-toothed at top. Sepals narrowly pointed. Petals scarcely $\frac{1}{4}$ in. long, orange. Pods club-shaped, $\frac{3}{8}$ in. long, surmounted by the persistent sepals. The internodes between the leaves are often more than 3-4 in. long; the bracts and involucral leaves are membranous at base. Bubbs Creek trail, on dry hills.

UMBELLIFERÆ. PARSLEY FAMILY.

KEY TO THE GENERA.

- Fruit orbicular, covered with hooked prickles; flowers yellow or purple. *Sanicula*.
- Fruit cylindrical, elongated, bristly; flowers white.
. *Washingtonia*, *Myrrh*.
- Fruit strongly flattened on the back with the ribs winged.
Leaves once or twice pinnately compound, flowers white or purple. *Sphenosciadium*.
Leaves ternately compound, flowers white or greenish.
. *Angelica*.
- Fruit strongly flattened on the back without ribs but with the margins thickened; leaves ternately compound; flowers white.
. *Leptotaenia*.
- Fruit strongly flattened on the sides, the ribs having thin, undulate wings; flowers yellow. *Pteryxia*.
- Fruit terete, seed-face involute enclosing a central cavity.
. *Drudeophytum*.

***Sanicula bipinnata* H. & A.** Annual, from a tap-root, erect, branching diffusely, $\frac{1}{2}$ -1 ft. high, nearly smooth. Leaves thin, twice pinnately compound, with the ultimate segments lobed or

toothed. Umbel 3-4-rayed, sometimes compound ; involucre leaf-like ; globular heads subtended by small united bracts. Millwood and General Grant Grove.

Washingtonia brachypoda Heller. Roots sweet, aromatic ; stems rather stout, a foot or so high, pubescent or smooth. Leaves ternately compound. Flowers small. Fruit strongly ribbed, pointed at each end, hispid on the ribs. Bubbs Creek, General Grant Park.

Sphenosciadium capitellatum Gray. Stems stout, 2-3 ft. high. Leaves large, nearly smooth, pale green ; leaflets linear to lanceolate, toothed or lobed, an inch or more long. Umbels with 4-8 white, woolly rays terminated by globular heads of white or purplish-tinged flowers ; involucre wanting ; bracts under the heads narrowly-linear. Pods white-hirsute. Bubbs Creek trail.

Angelica Breweri Gray. Stems stout, 2-3 ft. high, ribbed, finely pubescent. Leaves nearly a foot in diameter ; leaflets lanceolate, sharply serrate, sometimes lobed at base, $\frac{1}{4}$ - $\frac{1}{2}$ in. wide, an inch or more long. Umbels large, with numerous thread-like rays ; involucre wanting, also the bracts under the umbels. Bubbs Creek.

Angelica lineariloba Gray. Stems stout, 2-3 ft. high, ribbed, smooth. Leaves about a foot wide and long ; the leaflets linear, entire, spine-tipped, 1-2 in. long, the edges folding together, minutely rough-pubescent. Umbels with numerous smooth, slender rays ; without involucre or bracts under the heads. Bubbs Creek.

Leptotænia multifida Nutt. Stems 1-2 ft. high, smooth and glaucous. Lowest leaves about a foot long ; leaflets dissected into short, linear lobes, less than $\frac{1}{2}$ in. long and narrow, the thickened margins and midribs roughly ciliate. Umbels 10-rayed but without involucre, and the small umbels without bracts. Bubbs Creek.

Pteryxia Californica C. & R. Without a stem or with the scapes rarely with a single leaf at base, about a foot high, smooth. Leaves pinnately thrice compound ; the segments very small, linear, bristle-tipped (the whole leaf becomes 6 in. or more long and almost as wide). Rays of the umbel unequal, 5-10 ; involucre wanting, the bracts under the small umbels thread-like. Flowers yellow ; immature fruit reddish. The caudex is branched from a perennial tap-root, and the plants grow in bunches. Collected at Bubbs Creek, Millwood and Bullfrog Lake.

Drudeophytum vestitum C. & R. Without a stem, from a woody, thick root. Leaves pinnately compound, with the segments minute, crowded, orbicular, densely clothed with short, stiff, white hairs; petioles an inch or less long, generally longer than the leaves, which are ovate-orbicular in outline. Scapes surpassing the leaves; umbels half an inch in diameter, capitate; involucre and bracts under the small umbels united, membranous along the edges and sharply toothed. Flowers minute, white; fruit white-hairy. This small plant is found only above timber line, and was collected on Harrisons Pass.

GARRYACEÆ. SILK-TASSEL TREE FAMILY.

Garrya pallida Eastwood. It is a straight shrub, 3-5 ft. high or perhaps taller; stems dark brown, the younger growth canescent with fine, appressed, white pubescence. Leaves oblong to elliptical, opposite, with clasping petioles, with a recurved point at apex, tapering at base, 1-2 in. long, glaucous and clothed with fine, white, appressed hairs which are denser on the lower than on the upper surface, somewhat persistent on the older leaves. Catkins pendent; the bracts and ovaries tomentose; berries becoming smooth. This was seen only in Kings River Cañon. It is very desirable that this be collected in flower and especially the staminate plant. Only the pistillate plants have so far been seen.

CORNACEÆ. DOGWOOD FAMILY.

Cornus Nuttallii Audubon. Small tree, with smooth bark. Leaves ovate to orbicular, pointed at apex, rounded at base, 1-3 or more in. long, 1-2 or more in. wide, finely pubescent on both sides, the lower side paler than the upper. Flowers in a head surrounded by a conspicuous involucre of large white or yellowish bracts, sometimes tinged with red and resembling petals. Berries bright red, in clusters. The heads are sometimes 6 in. in diameter, and are blooming after the leaves have appeared. Millwood.

Cornus occidentalis Coville. Shrub 3-6 ft. high, with smooth, purplish bark. Leaves ovate-elliptical, 2-3 in. long, $\frac{1}{2}$ -1 $\frac{1}{2}$ in. wide, acute at apex on a short petiole, paler on the lower surface, the pubescence scarcely perceptible. Flowers in compound cymes without an involucre, small, white. Berries unknown. Kings River Cañon.

LORANTHACEÆ. MISTLETOE FAMILY.

Phoradendron flavescens villosum Engelm. This is the mistletoe that grows on the oaks. It was noted on *Quercus chrysolepis* and on *Q. Californica*. In Kings River Cañon.

Phoradendron Bolleanum Eichler. This is the species found on the firs. It was noted on *Abies concolor* in Kings River Cañon.

Razoumofskyia occidentalis abietina Greene. This also was found on *Abies concolor* in Kings River Cañon. It is distinguished from the preceding by the brownish-yellow color of the herbage and the scale-like leaves.

VACCINIACEÆ. HUCKLEBERRY FAMILY.

Vaccinium cæspitosum Michx. Bilberry. Low shrub forming patches under the trees, only a few inches high, leafy, smooth and not angled. Leaves obovate, $\frac{1}{2}$ –1 in. long, almost sessile, serrulate, deciduous, smooth. Flowers pink, in the axils on drooping pedicels; the corolla urn-shaped, $\frac{1}{4}$ in. long. Berry blue when ripe, edible. Bullfrog Lake. This is only to be looked for at the higher elevations.

ERICACEÆ.

KEY TO THE GENERA.

COROLLA WITH THE PETALS UNITED.

Fruit a berry with the seeds more or less cohering.

. Arctostaphylos, Manzanita.

Fruit a capsule.

Corolla open bell-shaped, 5-lobed; leaves scale-like, folding closely over each other; anthers with points; capsule splitting on the sides. Cassiope.

Corolla bell-shaped; leaves heath-like; anthers without points or appendages; capsule splitting at the partitions.

. Bryanthus, Mountain Heather.

Corolla basin-shaped; leaves broad; anthers enclosed in pouches; capsule splitting along the partitions.

. Kalmia, Mountain Laurel.

Corolla large, funnel-form, 5-lobed; stamens exserted, declined; capsule woody, splitting at the partitions. Showy flowers; plants shrubby. Rhododendron, Azalea.

COROLLA WITH THE PETALS ALL SEPARATE.

Shrub several feet tall; flowers in umbels.

. Ledum, Labrador Tea.

Herbs with green foliage (except in Pyrola aphylla).

Flowers in a corymb or umbel on a leafy stem; petals widely spreading, style short, stigma shield-shaped.

. Chimaphila, Prince's Pine.

Flowers in a raceme on a scape; petals not widely spreading; style long. Pyrola, Wintergreen.

Herbs red or brown, without any green foliage.

Stems brown; corolla urn-shaped. Pterospora, Pine-drops.

Stems red, corolla bell-shaped. Sarcodes, Snow-plant.

Arctostaphylos Mariposa Dudley. Shrub 3-5 feet tall with spreading branches, the older bark smooth, the younger pale green, hairy and glandular. Leaves pale green, minutely veiny, entire or serrulate with spiny teeth, orbicular to oblong, 1-2 in. long, mucronate at top; petioles short, glandular, hairy. Panicle drooping, with viscid peduncles and pedicels and small, triangular bracts. Seeds bony, large. Millwood and Kings River Cañon.

Arctostaphylos patula Greene. Tall, erect shrub with spreading branches; stems smooth except on the inflorescence and the younger growth, these clothed more or less with a glandular and powdery pubescence. Leaves bright green, almost smooth, elliptical, acute, $1\frac{1}{2}$ in. long, 1 in. wide, mucronate. Panicles many flowered, drooping at first; bracts small; peduncles and pedicels somewhat glandular but not viscid. Berry smooth. Millwood, the common species at upper elevations.

Cassiope Mertensiana Don. Perennial, growing in patches, bright green and smooth. Flowers in the upper axils on filiform pedicels recurved at apex so that the flowers droop. Calyx reddish, edged with white. Corolla white, $\frac{1}{4}$ in. long. This was seen only on Bubbs Creek near the foot bridge at the ford.

Bryanthus Breweri Gray. Low stems, generally less than a foot high, forming patches. Stems very leafy, somewhat glandular. Leaves narrowly linear, the revolute edges meeting the thick midvein, not quite $\frac{1}{2}$ in. long, becoming shorter and broader towards the inflorescence. Flowers corymbose in the upper axils, later becoming racemose; pedicels filiform covered with brown glands, nearly $\frac{1}{2}$ in. long; sepals, petals and anthers purplish. This is quite common. It was collected at Bullfrog and East Lakes and on Kearsarge Pass.

Kalmia glauca microphylla Hook. Low plant with woody base, smooth throughout, 2-4 in. high. Leaves elliptical, less than $\frac{1}{2}$ in. long, with the lower surface paler than the upper and

the margins revolute and entire. Flowers clustered at summit on long filiform pedicels $\frac{1}{2}$ –1 in. long; the stigma exserted. This is found only at the higher elevations and was collected on the edge of Bullfrog Lake and on the trail to Harrisons Pass.

Rhododendron occidentale Gray. This well known shrub is abundant at Millwood. The leaves are deciduous, and the large fragrant flowers are clustered at the ends of the leafy branchlets.

Ledum glandulosum Nutt. Erect shrub, 2–6 feet high, with smooth stems. Leaves numerous, elliptical, bright green on the upper surface, the lower covered with yellow glands, entire, an inch or less long. Flowers in terminal corymbs, white. Sepals small, orbicular, fringed with hairs; petals larger, dotted with glands. This is common at East Lake.

Chimaphila Menziesii Spreng. Stems low from running rootstocks, smooth, 3–6 in. high. Leaves elliptical, about an inch long, acute at each end, serrate. Flowers in umbels terminating long filiform peduncles, pink, nearly half an inch across; filaments with a hairy ring in the middle. Converse Basin.

Pyrola aphylla Smith. Stems generally leafless, sometimes with some rudimentary leaves or scales at base, reddish, about 6 in. high, slender. Calyx with the divisions triangular, much smaller than the petals, pink, with thin margins, oblong, a little more than $\frac{1}{4}$ in. long. Style curved. Under the conifers near Converse Basin and in other places.

Pyrola pallida Greene. Leaves all at the base, pale and glaucous. Obovate to orbicular, the petioles about as long as the blades, margined, together about 2 in.; margin thickened, somewhat undulate, oblong-orbicular, $\frac{1}{4}$ in. long, greenish white; style curved.

Pyrola picta Smith. Leaves all from the base, ovate, obtuse, on short petioles, from $\frac{1}{4}$ – $\frac{1}{2}$ as long as the blade, together $1\frac{1}{2}$ – $2\frac{1}{2}$ in. long, dark green, veined with white, reddish on the lower side. Flowers red, greenish-white or tinged with rose. Near Big Boulder Creek, under the trees.

Pyrola minor L. Leaves all basal, broadly oblong to orbicular, with petioles as long as the blades, together about 2 inches, distantly serrulate, thin, obtuse. Flowers white, petals oblong, $\frac{1}{4}$ in. long; style straight. This is a smaller plant than the other species, not more than 6 in. high. It was collected only by Miss Catherine Wilson and at East Lake.

Pterospora Andromedea Nutt. PINE-DROPS. Stem simple, 1-3 ft. high, brownish throughout, the leaves small, scale-like, scattered. Raceme long and with many flowers; pedicels spreading and recurved. Flowers reddish or brownish, glandular, especially along the margins of the sepals, less than $\frac{1}{4}$ in. long. Under the conifers near Millwood.

Sarcodes sanguinea Torr. SNOW PLANT. Stems stout, red, $\frac{1}{2}$ -1 ft. high, glandular, thickly covered with fleshy scales, the upper ones linear, pointed, conspicuously fringed on the margins. Flowers thickly clustered in a dense raceme; pedicels erect but flowers slightly drooping, red, $\frac{1}{2}$ in. long. Seed pod flattened, globular, $\frac{3}{4}$ in. in diameter, opening by a hole on top. This showy plant grows in the coniferous forests near Millwood.

PRIMULACEÆ. PRIMROSE FAMILY.

Primula suffrutescens Gray. MOUNTAIN PRIMROSE. Stems branched at base from a tap-root, very leafy below the scape. Leaves spatulate, tapering to long, broad petioles, densely clustered, dentate along the top, smooth. Scape and inflorescence glandular, surpassing the leaves; flowers in umbels on pedicels as long as the calyx; bracts of the involucre narrowly-linear and pointed. Calyx $\frac{1}{4}$ in. long, with pointed divisions, extending almost to the base; corolla bright crimson, salver-form, the tube but little longer than the calyx, the border $\frac{1}{2}$ in. or more across with the divisions obcordate. This beautiful plant grows only above timber line and amid the rocks. It is one of the most conspicuous Alpine flowers. Harrisons Pass, Kearsarge Pass.

Dodecatheon alpinum Greene. MOSQUITO BILLS, SHOOTING STARS. Leaves all at base, oblanceolate, smooth, 1-2 in. long, $\frac{1}{8}$ - $\frac{3}{8}$ in. wide, scapes about a foot high, slender. Flowers in umbels with few rays unequal, calyx and corolla reflexed, crimson. Stamens on very short filaments; the anthers long and meeting so as to form a point around the pistil. Pod splitting across the top into 5 parts. This grows in wet meadows at upper levels. It was collected along Bubbs Creek.

Dodecatheon Jeffreyi Moore. Stout, from thick, clustered roots. Leaves sometimes a foot long and 2 in. wide, tapering to very broad petioles which are sheathing at base, pale green, sparingly toothed, oblanceolate. Scape a foot or two high, stout, sparingly glandular at the lower part, more conspicuously so at the inflorescence; branches of the umbel 1-4 in. long, unequal; bracts of the involucre pointed, $\frac{1}{2}$ in. long. Flowers

large, crimson ; petals about an inch long ; anthers short, forming a blunt point. Pod splitting as the preceding. This is found in all the high meadows and in wet places on the high mountains. Millwood, Mt. Brewer, Kearsarge Pass, University Peak, Bubbs Creek.

GENTIANACEÆ. GENTIAN FAMILY.

Gentiana holopetala Gray. Stems slender, simple or with one or two erect branches each terminating in a single flower on a long, smooth peduncle. Leaves linear to oblanceolate, opposite, pointed, $\frac{1}{2}$ – $1\frac{1}{2}$ in. long. Calyx $\frac{3}{4}$ in. long, with lobes longer than the tube, narrowed to a long, slender point. Corolla blue, with membranous folds between the oblong, obtuse lobes, $1\frac{1}{2}$ in. long, the lobes $\frac{1}{2}$ in. There is some variation in the leaves, and the lobes of the corolla are entire or fringed at apex. Pod on 2 short stems. East Lake.

There are probably other species of Gentian, but they were not found, as they are to be looked for in the late instead of the early summer.

APOCYNACEÆ. DOGBANE FAMILY.

Apocynum pumilum Greene. Perennial, with branching stems about a foot high, generally spreading, clothed with a pale pubescence. Leaves opposite, ovate, about an inch long, almost sessile, distinctly mucronate, much paler on the lower than the upper surface. Flowers in corymbs at the ends of the branches ; corolla pink, bell-shaped, rather fleshy, with recurving lobes having 5 scales opposite the lobes on the inner side and near the base ; stamens with short filaments and arrow-shaped anthers uniting in a ring. Fruit a pair of slender pods ; seeds with a tuft of silky down. Millwood, Kings River Cañon.

ASCLEPIADACEÆ. MILKWEED FAMILY.

Asclepias speciosa Torr. SILKWEED. Covered with white down, stout, erect, with large, thick, oblong leaves, opposite or whorled. Umbels on peduncles shorter than the leaves, many-flowered. Flowers large, purplish-red, the hoods around the stamens almost half an inch long, spreading with a horn-like prolongation from the summit ; besides the short, inflexed, true horn. Seed pods rough with soft spinous processes. Seeds when ripe, brown, with a tuft of silky hairs at one end. The anthers in this family are concealed in the stamen tube and are yellowish-

brown, having the outline of a pair of scales. This was seen in Kings River Cañon.

Asclepias Mexicana Cav. Stems rather slender, 3-6 ft. high. Leaves in whorls of 3-6, linear, sessile, smooth, 3-6 in. long. Umbels clustered to form a corymb, densely flowered, on peduncles longer than the petioles. Flowers rather small, greenish-white or tinged with purple. Hoods broadly ovate, shorter than the beak-like, incurved horn. Seed-pods slender, tapering to the top. Kings River Cañon.

Gomphocarpus cordifolius Benth. Smooth, with ascending stems 2-3 ft. high. Leaves clasping by a heart-shaped base, opposite or sometimes in threes. Umbels 1-5 with the flowers on slender pedicels. Corolla dark reddish-purple. Hoods tipped with a point where the open edges come together, but without horns. Pods smooth, erect, on pedicels that are deflexed. Kings River Cañon.

CONVOLVULACEÆ. MORNING-GLORY FAMILY.

Convolvulus Berryi. MORNING-GLORY. Stems usually lying on the ground or supported by the other plants, clothed with dense, white wool. Leaves broadly triangular, mucronate at each angle, the two lateral often sharply lobed, 1-2 in. long, the largest leaves becoming more than 2 in. wide at base. Flowers axillary, solitary on long peduncles, frequently curved. Bracts close under the calyx, similar to the leaves but smaller. Calyx with obtuse divisions shorter than the bracts. Corolla white, tinged with pink, funnel-form, 1½ in. across. Millwood and near Converse Basin.

Cuscuta subinclusa Dur. & Hilg. DODDER. Parasites with yellow stems, no leaves, and small white flowers in bunches, climbing and living upon other plants. Corolla urn-shaped, ⅓ in. long, with the lobes shorter than the tube. Pod conical, capped with the withered corolla, usually containing one seed. Bubbs Creek, on various plants.

SOLANACEÆ. NIGHTSHADE FAMILY.

KEY TO THE GENERA.

Corolla wheel-shaped; anthers longer than the filaments, uniting to form a cone; fruit a berry. . . Solanum, Nightshade.

Corolla tubular, with a spreading border; stamens not united; fruit a pod splitting from the top. . . Nicotiana, Tobacco.

Solanum Xanti Gray. Half shrubby, generally with many

stems, viscid, pubescent with simple whitish hairs. Leaves ovate, obtuse, tapering at base to a short petiole. Flowers in umbels, corolla violet, rotate. Berries purplish or green, as large as peas. This was seen on Bubbs Creek.

***Nicotiana attenuata* Torr.** Stems simple or branching, viscid. Leaves at base chiefly, ovate to oblong and elliptical, about an inch wide and two inches long, on petioles half as long as the blade. Stem leaves lanceolate acuminate, on short petioles. Flowers dirty white, in a loose terminal raceme, salver-form, the tube an inch long and the border less than half as wide. Pod exceeding the calyx, which consists of long and slender divisions about half an inch long. Bubbs Creek.

SCROPHULARIACEÆ. FIGWORT FAMILY.

KEY TO THE GENERA.

COROLLA TUBULAR, 2-LIPPED.

Tube with a sac or swelling at base, throat with a palate on the lower lip; stamens 4; pods opening by 1-2 holes at top.

. *Antirrhinum*, Snap-dragon.

Tube short, with a swelling at the base on the upper side; upper lip with 2 spreading divisions, lower 3-lobed, the middle lobe compressed at the sides and enclosing the 4 stamens; fifth stamen in the form of a small gland at the base of the tube.

. *Collinsia*.

Tube globular, upper lip of 4, erect lobes, lower turned down or spreading; stamens 4, in 2 pairs, the fifth in the form of a scale on the upper side of the throat of the corolla.

. *Scrophularia*, Bee-plant.

Tube swelling towards the throat, upper lip 2-lobed, lower 3-cleft; stamens with anthers 4, the fifth a conspicuous filament without an anther.

. *Pentstemon*, Beard-tongue.

Upper lip long, erect and pointed, lower short, 3-toothed and with 3 folds below the teeth; calyx and bracts colored like a corolla, the latter with 4 divisions; stamens 4, enclosed in the upper lip.

. *Castilleja*, Painters-brush.

Upper lip compressed at the sides and arched, often with a long beak, the lower with 3 reflexed or spreading lobes, the middle one smallest; stamens 4, in the upper lip; calyx 2-5-toothed, irregular.

. *Pedicularis*.

Lobes of the corolla spreading, 2 forming the upper lip and 3 the lower; calyx bell-shaped, 5-toothed, and with 5 folds or angles enclosing the corolla tube; stamens 4, with the anther cells diverging.

. *Mimulus*, Monkey-flower.

COROLLA NOT TUBULAR.

Calyx and corolla 4-parted, with the lobes more or less unequal; stamens 2; pod inversely heart-shaped, flowers small.

. *Veronica*, Speedwell.

SCROPHULARIACEÆ.

Antirrhinum leptaleum Gray. Annual, stems erect, simple or with few branches near the base, clothed with spreading glandular hairs. Leaves lanceolate to linear, inch or two long, lowest narrowed at base to short petioles, obtuse at apex. Flowers from almost the lowest axils on very short pedicels almost perpendicular to the stem. Calyx with linear-lanceolate sepals, acute, a little longer than the capsule, about as long as the stout persistent style. Corolla violet, with tube a little longer than the calyx, border 2-lipped, upper lip of 2 rounded lobes separated by an obtuse sinus, lower of 3 spreading divisions broader than the upper, the fold in the throat of 2 parts; spur at base of tube short, blunt. Stamens 4, the 2 longer with the filaments at apex broader than the anthers, the shorter dilated but little, with a tuft of hairs about the middle; lower on the longer filaments. Capsule oblong, a little unequal sided; style stout, curved, as long as the capsule. Seeds deeply convoluted, numerous. Converse Basin, Sequoia Mills.

Collinsia tinctoria Hartweg. Annual, from less than a foot to 3 feet or more in height, smooth, erect. Leaves opposite, the lowest oblong-elliptical on short petioles, united and clasping at base; upper leaves lanceolate to narrowly ovate, crenate-dentate, acute, clasping at the sessile base. Flowers in whorls some distance apart on short pedicels. Calyx glandular, hairy, of 4 linear divisions, the 2 lower almost twice as wide as the 2 upper. Corolla creamy white, tinged or veined with reddish-purple, keel shorter than the wings, throat broad, smooth throughout except for some hairs on the inner surface of the wings, ear-like folds at base of wings prominent, crest on throat of upper lip broadly V-shaped, the tooth-like gland at base of tube as long as tube. Filaments hairy on the lower half, anther cells becoming almost flat. Ovary orbicular. This becomes very tall in the wet meadows, the flowers are larger and the whole plant smoother than when it grows in dryer places. The glands leave a purple stain on the paper in which the plants are pressed. Kings River Cañon, Bubbs Creek.

Collinsia Wrightii Wats. Annual, usually much branched, low, slender and spreading, purple-glandular. Leaves in few pairs, lowest oblong-spatulate, entire on petioles of the same length or longer, upper linear-lanceolate, entire or with a few scattered teeth near the apex, 1-2 inches long, narrow, obtuse. Flowers small, 4 or 5 in the whorls, on thread-like pedicels that become spreading later and deflexed, half an inch long; bracts

none on upper whorls. Calyx with open-campanulate tube, acuminate divisions as long as the tube, as long as, or longer than, the capsule. Corolla with lobes of upper lip yellow, lower purplish-blue, wings slightly longer than the keel, throat shorter than the divisions. Stamens 4, with smooth filaments; one pair with a tuft of hairs at base. Seeds 2 thick, brownish-black, grooved on the face, the surface marked under a lens with minute venation like a honey-comb. In *C. Torreyi*, a closely allied species, the seeds are curved, these are straight. Sequoia Mills, Kings River Cañon.

***Collinsia Childii* Gray.** Stems erect, a foot high, generally branching from the lower axils, puberulent and glandular. Lowest leaves oblong, narrowed to a short petiole, crenate; upper oblanceolate to lanceolate, rather thin, revolute, entire or toothed, on short petioles, midrib puberulent, blade otherwise smooth, inch or more long. Flowers small on erect pedicels, not deflexed in fruit, shorter than the leaf-like lower bracts, longer than the small upper ones. Calyx urn-shaped in fruit, with the triangular divisions longer than the tube, glandular, hairy, about as long as the capsule. Corolla small, purple, tube longer than the upper divisions, shorter than the lower, wings narrow, longer than the keel. Stamens 4, with smooth filaments. Seeds light brown almost $\frac{1}{8}$ inch long, boat-shaped, beautifully and finely veined. Sequoia Mills.

***Scrophularia Californica* Cham.** CALIFORNIAN BEE-PLANT. Tall, stout, perennial herbs, 2-5 ft. high; nearly smooth. Leaves opposite, oblong-ovate, usually cordate at base, coarsely doubly-toothed or slashed. Flowers brownish-purple in fascicled cymes. The honey glands produce a large quantity of honey. This was not collected, but is to be expected in the region.

***Pentstemon Newberryi* Gray.** Stems 6 inches to a foot high, from creeping, woody rootstocks, smooth and glaucous except the more or less glandular inflorescence. Leaves orbicular or ovate-oblong, the lower on short, margined petioles; upper sessile, serrate; blades $\frac{1}{4}$ inch long, pedicels slender, bracts minute. Division of calyx extending to the base, narrowly-linear, long-pointed, becoming half inch or more in fruit. Corolla carmine-red, narrowly tubular-funnel-form, the 2 lips almost equal, upper 2-cleft, clothed internally with white hairs, lower 3-cleft. Anthers clothed with long, white, dense wool, exserted, becoming shield-shaped when open, sterile filament bearded on one side more than half its length. Bubbs Creek, Sequoia Mills, trail to Bullfrog Lake.

Pentstemon Davidsonii Greene. Low, with creeping underground stems, smooth except for some glandular pubescence on the pedicels and calyx. Leaves spatulate, tapering to the base of the petiole which is about as long as the blade, together less than an inch, thickish, veinless, entire, obtuse. Flowering stem with a few small, sessile, bract-like leaves, as long or shorter than the flowers which terminate it; these purple-blue, more than an inch long. Calyx with divisions linear, acute, almost half inch long extending to the base. Corolla tubular, funnel-form, upper lip 2-cleft, shorter than the 3-cleft lower one. Anthers clothed with dense purplish wool, becoming shield-shaped when open, filaments short, clothed at the apex with short, woolly hairs. Above timber line on Harrisons Pass.

Pentstemon breviflorus Lindl. Shrubby, with many slender, wand-like stems, often several feet high, smooth and glaucous, forming a brushy clump several feet high. Leaves lanceolate, narrowed at base to slender petiole which abruptly widens and clasps the stem, sharply and somewhat distantly toothed, acute, about an inch long. Flowers in spreading panicles, the branchlets corymbosely 2-5 flowered, the lowest ones longest. Calyx with awl-shaped, pointed divisions, longer than the tube. Corolla flesh-color or yellowish, striped with pink, the 2 lips widely gaping, upper curved, emarginate, lower with 3 recurved and pendulous lobes, both clothed externally near the top with long hairs. Filaments dilated and bearded at base, sterile, smooth, with the bearded basal dilation much smaller. The anthers become shield-shaped when open. Capsule when ripe about as long as the calyx. Kings River Cañon, in rocky places; Sequoia Mills.

Pentstemon procerus Dougl. Perennial from running rootstocks, varying in height according to altitude, from a few inches to 2 feet. Stems erect, simple, with 1-several axillary whorls of crowded flowers, glabrous except the glandular inflorescence. Radical leaves oblanceolate to spatulate on slender petioles; stem leaves sessile and clasping, entire, acute or mucronulate. Calyx divisions extending to the base, somewhat membranously margined, $\frac{1}{3}$ as long as the corolla tube, lanceolate, glandular. Corolla dark blue or purple, narrow-tubular, half inch or less in length, almost equally 5-cleft, lower lip bearded on the inner side. East Lake, Converse Basin.

Pentstemon lætus Gray. Shrubby at base, with stems a foot or two high, pale green from a minute pubescence, the inflorescence glandular. Lower leaves linear-lanceolate, pointed, inch or 2 long, tapering to the base, upper ovate, long-acuminate, heart-

shaped at the sessile base. Peduncles spreading forming an open thyrs. Calyx divisions linear-lanceolate tipped with a sharp recurving point. Corolla violet blue, inch long, the throat expanding above the short calyx, moderately 2-lipped, the border more than half inch across. Anthers shaped like a horse-shoe, ciliate across the slit at the top, with a tuft of hairs above the insertion of the filament on one side, sterile filament smooth. Millwood.

Pentstemon Jaffrayanus Hook. With many erect branches from an ascending or creeping, woody stem, glaucous and smooth throughout. Leaves oblong, oblanceolate, spatulate, an inch or less long, entire or slightly serrate, lower petioled, upper sessile. Peduncles 1-5, flowered, in a close panicle. Calyx divisions short, ovate, tipped with a recurved point, membranous on the margins. Corolla violet, $\frac{3}{8}$ inch long, dilating above the short tube to a broad throat, the two lips somewhat equal. Anthers shaped as the preceding, ciliate along the edges, opening by a slit at the top; sterile filament smooth. Kings River Cañon.

Pentstemon Bridgesii Gray. Stems many, from a woody base, slender, wand-like, 2 feet or more high, generally blooming from about the middle. Leaves lanceolate, inch or more long, acute, lowest tapering to a short, clasping petiole, upper sessile. Flowers scarlet or rarely yellow, panicked, with slender spreading peduncles 2-5 flowered, with the pedicels and calyx glandular, the latter with divisions triangular-ovate. Corolla inch long with narrow, cylindrical tube curving outwards near the base; upper lip erect, 2-lobed, lower 3-lobed, recurved. Filaments smooth, anthers obtuse at apex, arrow-shaped at base, opening by a slit along the ciliate top; sterile filament with smooth, clavate tip. Kings River Cañon, Bubbs Creek.

Castilleia montana Congdon. Perennials, with tall and slender stems, simple or with few slender branches, smooth or pubescent. Leaves lanceolate, long-pointed, sessile, 1-3 in. long. Flowers in short and dense spikes which lengthen in fruit, sessile or on very short pedicels, red, showy. Calyx cleft deeper before than behind, with two oblong divisions, each deeply parted into long, linear, pointed lobes. Bracts of lower flowers similar to the leaves, upper lobed. Corolla very slender, slightly curving, 1-1½ in. long, the upper lip as long as the tube, lower very short. This is the most showy *Castilleia* of the region. It was collected in General Grant Grove and along the trail up Bubbs Creek.

Castilleia Brooksii Eastwood. Perennial, branching from the base and with some short branches above, glandular, viscid throughout and pubescent with white, silvery hairs. Spikes

short; bracts unevenly lobed, with colored tips. Calyx equally cleft before and behind, the divisions shorter than the tube, each 2-cleft with unequal, triangular, 1-nerved, obtuse divisions. Corolla a little more than an inch long, with the upper lip longer than the tube, straight at first but later curving outwards, having 3 blunt teeth at top; lower lip with the sharply acute teeth incurved. The flowers are yellowish-red. On the trail up Bubbs Creek.

Castilleia disticha Eastwood. Perennial, 2 ft. or more high, branching from the base and with spreading branches above, somewhat viscid and pubescent with white hairs. Leaves linear, sessile. Flowers in spikes that become nearly a foot long, with the pods appressed to the stem, more or less distant, in two ranks. Divisions of the calyx and bracts colored at tip. Corolla red, with the upper lip as long as the tube, notched at apex; lower lip 3-toothed, the middle tooth much smaller than the lateral, thin. Converse Basin, Millwood, under the conifers.

There are several species of low, Alpine *Castilleias*, only one of which has been collected in sufficient quantity for satisfactory determination and description. It is desirable that they be collected at different stages and in all localities where they may be noted.

Pedicularis Grœnlandica Retz. Stems tall, simple, smooth. Leaves pinnately parted, lanceolate in outline, inch or two long, on short petioles, the divisions sharply toothed. Flowers in spikes 1-6 inches long, sessile. Calyx 5-toothed, much shorter than the capsule. Corolla red-purple, curved and ending in a long, slender, upwardly curved beak, the whole resembling an elephant's head and trunk; lower lip with 3 spreading divisions. Stamens 4, with oblong anthers not deeply arrow-shaped at base, filaments smooth. Capsule with the sides unequal, beaked by the base of the style, about $\frac{1}{4}$ inch long. This is common in swampy places near timber line. East Lake and Bubbs Creek.

Pedicularis attolens Gray. Somewhat like the preceding but with narrower leaves and more sharply toothed divisions. Stems 6 in. to 2 ft. high. Spike densely flowered, clothed with white wool, Calyx with recurved hooked teeth shorter than the woolly tube. Corolla somewhat like the preceding but with the beak not so long, the lower lip broad, 3-lobed. Stamens with baggy anthers, as long as the slender smooth filaments, included in the hood with the style extending through the beak. Capsule longer than the calyx with sides unequal, beaked on one side by the base of the

style. This is easily distinguished from the preceding by the closely flowered, woolly spike. In wet meadows, East Lake, Bullfrog Lake.

Pedicularis semibarbata Gray. Stems low, 1-several, from a tap-root, lowest leaves underground, scale-like, the others twice pinnately divided, the divisions sharply toothed, the petioles generally shorter than the blades, together 4-6 inches long, 1-3 inches wide, smooth except for some scattered woolly hairs. Spikes very short, sessile, much surpassed by the leaves; bracts leaf-like, often almost twice as long as the flowers. Pedicels very short. Calyx somewhat clothed with cottony wool, 5-cleft into unequal, triangular-acuminate lobes as long as the tube, with the apex recurved. Corolla yellowish, tinged with purple, inch or less long, the tube almost as long as the calyx; upper lip shaped like a hood, lower with rounded spreading lobes, the middle one longest, hairy without and within. Stamens in two pairs, with the anthers united, arrow-shaped at base, rounded at apex, the pointed bases together with the disk-like stigma projecting beyond the upper lip, the latter curving downward from the top. Capsule a little shorter than the calyx, with sides unequal, beaked by the style. Growing under the trees at Millwood and Converse Basin.

Mimulus Bigelovii Gray. Low, with slender, simple or widely branching stems, viscid with glandular hairs. Earliest leaves spatulate, narrowed to clasping petioles, about as long as the blades, together an inch; upper leaves ovate-lanceolate on very short petioles, serrate or entire. Flowers from the earliest becoming spicate, pedicels as long as the petioles. Calyx papery between the green but not strongly marked ribs, teeth triangular, sharply pointed, folded together. Corolla bright crimson, almost an inch long, the tube surpassing the calyx, border spreading, lower lip of 3 rounded lobes, upper twice as broad as each lobe of the lower. Capsule slightly surpassing the calyx, splitting into 2 pieces with half the placenta attached to each valve. When the corolla withers it is forced up by the enlarging capsule and persists, the tube is exerted and curves downwards at the throat. Horse Corral Meadows and Millwood.

Mimulus Whitneyi Gray. Viscid throughout, low, with spreading branches. Leaves lanceolate, acute, sessile, about an inch long. Flowers numerous, on very short pedicels. Calyx papery, ribbed but not channeled, becoming enlarged in fruit, with acute teeth, spreading outwards. Corolla yellow, with dark crimson blotches in the throat, the tube longer than the calyx,

the border of almost equal spreading lobes, rounded and entire, 1-1.5 in. in diameter. Common and very beautiful, growing in several places on the trail.

Mimulus Torreyi Gray. Low, branching diffusely from the base and also above, viscid throughout. Leaves near the base obovate-rhomboid, narrowed to a broad, short petiole, crenate-undulate; upper leaves lanceolate, ciliate on margin, inch or less long. Flowers from the earliest axils on very short pedicels, often perpendicular to the stem. Calyx papery between the broad ribs, half inch long, ovate in outline after the flower fades, teeth unequal, the upper longest and so oblique at apex. Corolla almost an inch long, tube thick and much exserted, funnel-form, border not widely expanded, the lobes almost equal, 2 hairy ridges in the throat. Capsule not as long as the calyx, pointed, splitting as the preceding. Seeds minute, orbicular, bristly under a lens. Millwood and in other places on the trail.

Mimulus Bolanderi Gray. Stems erect, from a few inches to more than a foot high, generally simple, very viscid. Leaves distant, ovate to oblong, narrowed to a sessile base, woolly and glandular, apex pointed. Flowers on very short pedicels in the axils. Calyx half inch or more long, broadening in fruit, folds conspicuous, teeth unequal, the upper one longest, pointed, $\frac{1}{3}$ as long as the tube. Corolla purple, about an inch long with included tube. Capsule as long as the calyx, parchment-like, pointed. Converse Basin, Millwood.

Mimulus Breweri (Greene). Slender annual, generally much branched, a few inches high, clothed with gland-tipped hairs. Leaves linear, entire, inch or less long, narrow, sessile but narrowed at base. Flowers in all except the lowest axils on erect, spreading pedicels generally much shorter than the leaves, about as long as the calyx. Calyx tubular, papery between the ribs, with equal, short, triangular teeth. Corolla very small, purplish with the tube included in flower, persistent on the top of the capsule in fruit and exserted. Capsule shorter than the calyx, the placenta united below and splitting above. General Grant Park, Millwood.

Mimulus cardinalis Dougl. Tall, coarse perennials, woolly and viscid. Leaves ovate to ovate-lanceolate, or oblong, 3-veined, sessile and clasping at base, acute. Flowers in the axils on long, erect, spreading pedicels, generally twice as long as the leaves. Calyx more than an inch long, 5-angled, with the teeth keeled, triangular acute, $\frac{1}{4}$ as long as the tube. Corolla large and very showy, scarlet, the two lips widely separated, the upper more or

less lobed, the lower reflexed, with 1 spreading division. Stamens and pistil exserted, the latter longer and extending beyond the calyx in fruit to a length equal to the calyx tube. This handsome species grows near water, and is found at Millwood and other places.

Mimulus primuloides Benth. Low, forming mats in wet meadows, clothed with glistening white wool. Leaves obovate to wedge-shaped, sharply serrate, about an inch long, generally crowded. Flowers few on each stem, often solitary at the top, pedicels capillary, 1-3 inches long. Calyx scarcely ribbed, the teeth very short, equal, acute. Corolla yellow, $\frac{1}{2}$ - $\frac{3}{4}$ inch long, widening from the calyx to the spreading border, with the lobes alike, notched. This is found in all the meadows. General Grant Park, Millwood.

Mimulus moschatus Dougl. MUSK PLANT. Perennial, with many weak spreading stems, viscid and slimy, woolly. Leaves ovate on very short petioles, the lower ones almost orbicular, entire, serrate, about an inch long. Flowers on slender pedicels shorter than the leaves. Calyx tubular, half as long as the corolla, with angled folds and almost equal teeth, triangular, pointed. Corolla yellow, half inch long, tube funnel-form exserted, border almost equally lobed with entire rounded divisions. Capsule shorter than the calyx. In swampy places near Millwood.

Mimulus moniliformis Greene. Stems simple or branching, erect, clothed with long, white, woolly hairs. Leaves near the root ovate-orbicular, on petioles half as long as the blades; upper leaves ovate to oblong, acute, on very short petioles, sharply toothed, erect, enfolding the stem. Flowers in the upper axils on slender pedicels as long as the leaves, erect. Calyx papery, with the folds green, tube $\frac{1}{4}$ inch long, enlarging in fruit, with short, triangular, almost equal teeth; corolla an inch or less wide, the tube widening to the throat, the exserted portion as long as that within the calyx, border not widely expanded, the divisions about equal. Capsule ovate, $\frac{1}{4}$ inch long, pointed. Seeds very small and numerous. This is said to have moniliform tubers on the roots. General Grant Park, Millwood, Bearskin Meadow.

Mimulus nasutus Greene. Perennial, the simple or branched stems from a few inches to 2 or 3 feet high, smooth or clothed with fine, irregularly appressed pubescence. Lower leaves on long petioles which clasp the stem at base, broad, oval or ovate, irregularly and sharply toothed, often with 2 lobes below the blade,

apex obtuse; upper leaves sessile, clasping, sometimes perfoliate at the inflorescence. Flowers racemose on pedicels much longer than the bracts, erect, spreading. Calyx papery, enlarging in age, the upper tooth longer than the others which are folded under. The calyx resembles a fist with the index finger pointing. Corolla yellow, varying greatly in size, sometimes spotted with brown, lower lip 3-lobed, longer than the 3-lobed upper. Capsule elliptical, included in the calyx. Those plants which grow where the soil is rich and moist become tall and luxuriant, with large flowers; those with small flowers are probably half starved. The peculiar calyx will always distinguish this species. Kings River Cañon, Millwood.

Mimulus acutidens Greene. Stems slender, almost smooth, angled, branching. Lowest leaves inch long, oblong, on short petioles, upper ovate sessile by a broad base, entire or sharply toothed. Pedicels thread-like, longer than the leaves, spreading, angled. Calyx wedge-shaped at base, pubescent, $\frac{1}{4}$ inch long, keeled ribs, teeth equal, spreading, broadly deltoid, acuminate. Corolla rose-color, with the tube almost twice as long as the calyx, widening upwards, border ample, the lobes about equal. Capsule linear-oblong, included in the papery calyx, not a line wide. Millwood.

Mimulus floribundus Dougl. Annual, much branched chiefly from the base with weak, slender stems, viscid, pubescent and woolly, a few inches to a foot high. Leaves small, ovate, about $\frac{1}{2}$ inch long, on short petioles, entire or sharply toothed. Flowers in all the axils on slender spreading pedicels surpassing the leaves. Calyx wing-angled, papery, teeth short, deltoid, equal. Corolla yellow, the tube as long as the calyx, the border of 5 almost equal roundish divisions. Stamens included. After the corolla falls the style is noticeably longer than the calyx, which is sometimes dotted and enlarged in fruit. Bubbs Creek, Millwood.

Mimulus montioides Gray. Low, slender, erect annual, simple or branched, glandular puberulent. Leaves linear, narrow, about an inch long. Pedicels thread-like, longer or shorter than the leaves, becoming almost perpendicular to the stem and holding the erect fruiting calyx like candelabra. Calyx tubular, elongating in fruit, ribs not keeled, teeth very short, broad, equal, mucronate, ciliate. Corolla yellow, twice as long as the calyx, half inch or more, tube funnel-form, exserted, border ample, spreading, with lobes about equal, lower lip bearded, upper hairy on the inside. Capsule included in the calyx, oblong-elliptical $\frac{1}{4}$ inch long. This beautiful species grows in General Grant Park and elsewhere.

Mimulus bicolor Hartweg. Low annual, a few inches high, slender, simple or branched, viscid. Leaves linear to lanceolate, inch long, entire or sparingly serrulate. Pedicels shorter or longer than the leaves, rather thick, erect, spreading. Calyx tube with dark red dots on the rounding ribs, teeth short, triangular, folded, with spreading tips. Corolla $\frac{3}{4}$ inch long, tube slightly longer than the calyx, border broad, spreading, upper lip white, lower yellow purple dotted; violet scented. Capsule not so long as the calyx, oblong-linear. This grows on moist banks, very abundant near Millwood.

Mimulus Palmeri Gray. Viscid, a few inches high, slender, generally simple. Leaves narrowly oblong to lanceolate, sessile and clasping but narrowed to the base. Pedicels slender, spreading, inch or more long. Calyx scarcely angled, teeth very short, broad, obtuse, purplish. Corolla inch long, with tube twice as long as the calyx, border spreading, scarcely 2-lipped, the lobes notched at apex, crimson, half inch across. Capsule included in the calyx. A delicate, beautiful species found at Millwood.

Veronica serpyllifolia L. Perennial, from slender, creeping rootstocks, erect, simple or branched, puberulent or smooth below. Leaves opposite, oval to broadly oblong, obtuse, minutely crenate, the lowest on short petioles, upper sessile and smaller. Flowers in a spike, raceme several inches long, on erect pedicels which are longer than the calyx. This of 4 unequal divisions, oblong, obtuse, shorter than the capsule. Corolla very small, blue, wheel-shaped. Stamens 2. Style and disk-like stigma as long as the broadly obcordate capsule. Bracts alternate, shorter than the pedicels. East Lake.

OROBANCHACEÆ. BROOMRAPE FAMILY.

Aphyllon fasciculatum T. & G. Stems light brown or yellowish without any green color whatever, a few inches high; leaves few, scale-like, ovate, sessile, short. Flowering stems clustered, with long peduncles. Calyx with spreading divisions as long as the tube. Corolla 2-lipped, about an inch long, the tube almost three times as long as the calyx. This is a parasite and fastens itself upon the roots of other plants. It was attached to sage-brush, and was collected on Bubbs Creek trail.

POLEMONIACEÆ. PHLOX FAMILY.

KEY TO THE GENERA.

Calyx papery or leathery at base only; seed-coats when wet becoming mucilaginous and sending out spirally coiled threads. Flowers crowded in heads; calyx, bracts and leaves with narrow, spine-tipped divisions. Navarretia.

Flowers in heads or scattered; calyx, leaves and bracts not spine-tipped. Collomia.

Calyx papery or leathery between the angles; seeds with or without mucilage and spinal threads when wet.

Stamens inserted on the tube at the same level.

Leaves alternate. Gilia.

Leaves opposite. Linanthus.

Stamens not inserted at the same level.

Leaves opposite, simple; seeds unaltered when wet. Phlox.

Lower leaves opposite, upper alternate; seeds when wet becoming mucilaginous but without spiral threads. Microsteris.

Calyx entirely green, without papery or leathery base or angles. Polemonium, Jacob's Ladder.

Navarretia divaricata Greene. Annual, low and branching, an inch or so high, with slender, naked stems, dark green, woolly-pubescent. Leaves with short, thread-like divisions; bracts wedge-shaped at base, with 3-5 divisions, very woolly. Calyx surpassing the corolla, $\frac{1}{4}$ in. long, the spine-tipped divisions unequal, the longest twice the length of the strongly-ribbed tube. Corolla magenta with slender tube, salver-form, very small. Pod obovate, with several seeds. General Grant Park.

Collomia grandiflora Gray. Annual, with stout, erect stems 1-2 feet high, having short, flowering branches or none, pubescent and glandular. Leaves lanceolate, 1-3 in. long, acute. Flowers in heads terminating the branchlets and stems, leafy at base. Corolla salmon-color, 1 in. long, salver-form, the border $\frac{1}{2}$ in. across. Kings River Cañon, Millwood.

Collomia linearis Nutt. Annual, branching near the top or simple, less than a foot high, pubescent and glandular. Leaves linear-lanceolate, pointed, sessile, increasing in size towards the summit. Flowers in heads on short peduncles, generally surpassed by the surrounding leaves. Corolla small, pink, salver-form, with the tube thread-like. Kings River, near Bubbs Creek.

Gilia gilioides Benth. Annual, with slender, weak, branching stems, glandular pubescent. Leaves once or twice divided

with lanceolate, entire or toothed divisions; upper leaves simple, tapering to a petiole. Flowers at first in few-flowered clusters, later becoming panicle. Divisions of the calyx narrowly linear, pointed, longer than the tube, glandular-villous. Corolla salverform, pink, with the slender tube twice as long as the calyx and limb very small. Pod globular, minutely pitted, surpassing the calyx tube. General Grant Park, Millwood.

***Gilia leptalea* Gray.** Annual, slender, with very slender, panicle branches, 2 or 3 in. to a foot or more high, viscid pubescent. Leaves narrowly linear, entire, pointed, about an inch long. Flowers $\frac{3}{4}$ in. long, terminating slender branches. Calyx small, with slender lobes as long as the tube. Corolla funnel-form, with the tube much longer than the calyx widening from the thread-like base to the funnel-form throat; divisions oblong. Stamens exerted from the throat of the corolla. Pod oblong. General Grant Park, Bearskin Meadow, Millwood.

***Gilia staminea* Greene.** Annual, branching, 1-2 ft. high, glandular and sparingly clothed with woolly hairs. Leaves in a cluster at base, with 7-11 slender divisions which are entire or lobed; petioles dilated at base; stem leaves few, similar but sessile. Flowers in heads which are somewhat paniculate on long and very slender peduncles, having sometimes a minute bract near the middle, bractlets none. Divisions of the calyx tipped with a short bristle, white or bluish. Corolla pale blue, the tube a little longer than the calyx; divisions obovate-oblong, narrow. Stamens with white anthers conspicuously exerted. Pods globular, as long as the calyx. Seeds developing mucilage and spiral threads. Kings River Cañon from the summit down, on the dry hill side.

***Gilia virgata floribunda* Gray.** Annual with several stems from the base, a few inches to a foot high, somewhat clothed with cottony pubescence which becomes dense on the inflorescence. Leaves with from 5-7 almost thread-like divisions with the apex spine-tipped. Flowers in heads terminating the stems and branches; bracts and calyx densely clothed with cottony wool at base, with linear spiny divisions. Corolla salverform, violet blue, almost an inch long, the divisions half as long as the tube which is twice as long as the calyx. Stamens and style conspicuously exerted from the corolla. Pod linear-oblong, with few seeds. Near Millwood and Converse Basin. A very beautiful species.

***Gilia pungens Hookeri* Gray.** Low and shrubby, forming perennial mats a few inches high. Stems densely clothed with clustered leaves; these palmately cleft with the divisions spine-

pointed, the longest less than $\frac{1}{2}$ in. Flowers solitary, terminating short branchlets surrounded by a tuft of leaves. Calyx almost as long as the corolla tube, with the divisions very short and spine-tipped. Corolla pink or white, salver-form, less than $\frac{1}{2}$ in. long, with the border 3 in. in diameter of obovate divisions. Only the tops of the anthers exerted from the throat of the corolla. This grows on rocky summits, and was collected at East Lake, Bubbs Creek, and on the summit above Kings River Cañon.

Gilia sparsiflora Eastwood. Annual with slender stems, branching above, a foot or so high, minutely glandular. Leaves few, terete from the infolding of the margins, about an inch long, tipped with a short bristle. Flowers few, solitary, or few in a cluster. Calyx densely clothed with white cottony wool, the divisions as long as the corolla tube, unequal, spine-tipped. Corolla salver-form, with some purple dots in the throat, less than $\frac{1}{2}$ in. long. Stamens exerted from the throat of the corolla. Pod oblong. Bubbs Creek.

Linanthus montanus Greene. Annual, with many branches from the base, or simple, about 6 in. high; stems sparsely leaved, pale with an appressed or spreading pubescence. Leaves clasping and united at base, pinnately divided into about 5 narrowly oblanceolate divisions, spine-tipped, hispid especially on the margins; bracts similar. Flowers crowded in heads, terminating the branches. Calyx $\frac{1}{4}$ in., with tube twice as long as the divisions, sparingly hairy and glandular, divisions very narrow, spine-tipped, with long, fine hairs on the margins. Corolla salver-form, with slender tube an inch long and spreading border $\frac{1}{4}$ in. across, pink with yellow throat and purple dots at base of the obovate lobes. Pod obovate, pointed at base. This beautiful little plant is abundant at Millwood and in many places along the trails.

Linanthus bicolor Greene. Tiny annuals an inch or so high, generally simple, hispid. Leaves in bunches, divided into linear, spine-tipped, 3-veined divisions, hispid on the margins. Flowers crowded into a head surrounded by bracts and leaves. Calyx with linear, spine-tipped divisions. Corolla pink or red, with thread-like tube which is about half an inch long; border small and spreading. Often very abundant; collected at Bubbs Creek.

Phlox occidentalis Durand. Perennial from creeping roots, branching, glandular pubescent. Leaves lanceolate, sessile and clasping at base, 1-2 in. long, pointed, often sickle-shaped. Flowers in cymes at the ends of the branches on pedicels half as long as the calyx. Calyx tubular, $\frac{1}{2}$ in. long, the tube half the

entire length. Corolla white or pink, salver-form, with broad, obcordate lobes forming the border which is $\frac{3}{4}$ in. wide. Ovary oblong-linear. Millwood, under the trees, blooming in the spring.

Phlox Douglasii Hook. Much branched from a woody base, forming mats. Leaves crowded, clasping at base, almost terete, spine-tipped. Flowers solitary, terminating short stems. Calyx about $\frac{1}{4}$ in. long, with the tube woolly pubescent as long as the divisions; these stiff, terete, spine-tipped, woolly-ciliate. Corolla salver-form, pink or white, the tube equaled by the calyx, the obovate lobes half as long. This covers the ground sometimes for yards in extent and grows not far below timber line. Bullfrog Lake.

Microsteris sp. Low, much branched, glandular-pubescent. Leaves, linear-lanceolate, entire, sessile, an inch or less long, pointed. Flowers small in the upper axils, on slender pedicels. Calyx divisions extending almost to the base, with membranous margins, spine-tipped, almost as long as the slender corolla. Corolla salver-form, pink or white, with small border of rounded divisions, the tube widening somewhat at the throat. Seeds flat, 3, margined, the embryo distinctly seen within the coats. Bubbs Creek.

Polemonium eximium Greene. MOUNTAIN VERBENA. Stems tufted from a tap-root, forming bunches varying in size, clothed at base by the dry, densely clustered bases of former leaves; glandular pubescent and viscid throughout. Leaves linear in outline, on long margined petioles dilated at base; twice compound, with the divisions minute and closely folded on each other; stem leaves with short petioles or none. Flowers crowded in a head terminating the stem, an inch or more in diameter. Calyx bell-shaped, with the divisions not quite so long as the purplish tube, oblong-linear, obtuse. Corolla bluish purple, salver-form, the tube a little longer than the divisions of the calyx; divisions orbicular, $\frac{1}{4}$ in. wide. This is the most showy plant above timber line. It is sweet scented and abundant, growing amid the rocks. Kearsarge Pass and Harrisons Pass.

HYDROPHYLLACEÆ. BABY-EYES FAMILY.

KEY TO THE GENERA.

LEAVES OPPOSITE.

Annuals.

Stamens not projecting beyond the corolla; calyx with a reflexed tooth or lobe between the divisions; corolla saucer-shaped or bell-shaped, with appendages on the inside; flowers axillary.
 Nemophila, Baby-Eyes.

Perennial.

Stamens unequal, inserted low down in the tube of the corolla; corolla tubular-funnel-form, without appendages within; flowers in cymes. *Draperia*.

LEAVES ALTERNATE.

Ovary 1-celled, corolla convolute in the bud.
 . . . *Hydrophyllum*, Water-Leaf, Bears-Cabbage.
 Ovary 2-celled, corolla imbricated in the bud. . . . *Phacelia*.

***Nemophila maculata* Benth.** Low, with decumbent stems branching chiefly from the root, soft hairy throughout. Leaves 3-5-lobed, wedge-shaped at base and tapering to a broad petiole. Corolla an inch across, sometimes less in starved specimens, white with a purple spot at the top of each division, veined with purple near the base. Stamens with purple anthers and ribbon-like filaments. Millwood.

***Nemophila insignis* Dougl.** BABY BLUE-EYES. Corolla blue, paler at the center, nearly an inch in diameter. Stamens short, with thread-like filaments and brownish anthers. Millwood; not common.

***Nemophila inconspicua* Eastwood.** This is a minutely flowered species found in the wet meadows.

***Nemophila quercifolia* Eastwood.** Another minutely flowered species with the leaves almost orbicular, lobed. This grows under the conifers near Millwood.

***Nemophila pulchella* Eastwood.** A small-flowered species with the flowers almost wheel-shaped, bright blue, numerous and conspicuous. Stems weak and branching, often supported by other plants. Near Millwood.

***Draperia systyla* Torr.** Stems many from woody roots, a foot or less high, leafy, with short branches, clothed with appressed white hairs. Leaves ovate, acute, inch or less long, with petioles generally shorter than the blades. Flowers in 2-3-forked short spikes, crowded, on slender pedicels. Divisions of the calyx

narrowly linear, not so long as the tube of the corolla but much surpassing the pod. Corolla pale violet, tubular-funnel-form, the lobes short and round without appendages at base of tube. Stamens unequal and unequally inserted, included in the corolla tube. Style 2-cleft at apex. Pod hairy, with thin membranous walls, containing 4 seeds. Millwood, in the shade.

Hydrophyllum occidentale Watsoni Gray. Perennial from fleshy, clustered roots, almost stemless, with the leaves mostly from the root, hispid throughout with white hairs. Leaves broad, pinnately divided into 5-9 parts, the upper ones running into each other; petioles thick, longer than the blades, together 5-8 in. long and almost as broad; lobes broadly oblong, 1 in. long, mucronate. Flowers in head-like clusters on long peduncles surpassing the leaves. Divisions of the calyx lanceolate, veiny, enlarging on age, about as long as the corolla and much surpassing the pod. Corolla bell-shaped, violet or whitish, $\frac{1}{8}$ in. long, with rounded lobes almost as long as the tube, the narrow appendages extending almost the entire length of the tube and folding inwards. Stamens and style exserted; filaments clothed with long hairs near the middle; anthers narrowly oblong-linear. Style 2-cleft. Pod globular, containing generally but one seed marked with a mesh-like veil. Millwood, in the shade, blooming in the spring.

Phacelia ramosissima Dougl. VERVENIA. Perennial, with long, spreading, decumbent branches, viscid pubescent and somewhat hispid. Leaves with 5-9, oblong, dentate to irregularly cut pinnate divisions; lower ones 6 in. long, somewhat diminishing upwards. Flowers almost sessile in short, dense, 2-3-forked, scorpioid spikes, terminating the branches. Calyx with oblanceolate, unequal, very narrow divisions loosely investing the capsule and surpassing it. Corolla tubular-bell-shaped, pale violet or whitish, larger than the calyx, the lobes rounded. Stamens and style smooth, exserted. The appendages on the corolla tube extend from the insertion of the stamens to the throat and are like the blade of a knife and attached the whole length. Pod oblong, pointed; seeds keeled on one side, with a central ridge on the other, pitted. General Grant Grove, Bubbs Creek.

Phacelia hydrophylloides Torr. Perennial, from creeping rootstocks, branching, about a foot high, viscid throughout and clothed with fine pubescence and longer hairs, rather weak and straggling. Leaves ovate to oblong, the upper entire, lower coarsely dentate or lobed or with one or two leaflets near the petiole. Flowers on short pedicels, crowded into clustered spikes

forming a head-like bunch, not elongating in fruit, terminating the stems, with peduncles distinct. Divisions of the calyx narrowly-linear, very hispid, as long as the corolla tube. Corolla violet-blue, open-bell-shaped, hispid externally, smooth within, lobes rounded, appendages extending from the insertion of the stamens almost to the throat, free at top. Stamens and style exerted; filaments smooth; style deeply 2-parted, hairy below the divisions. Pod elliptical, tipped with a short point, viscid pubescent, about as long as the calyx; seeds many, rich chestnut brown, glossy, irregularly angled, finely pitted. Converse Basin, Millwood.

Phacelia Eisenii Brandege. Annual, 1-3 in. high, branching from the base, clothed with stiff hairs. Leaves elliptical to oblong, on petioles of almost equal length, together about an inch, entire, obtuse. Flowers in short racemes on hair-like pedicels. Calyx with narrow, linear-oblong divisions, becoming very narrow towards the base, unequal, twice as long as the pod. Corolla blue, open-bell-shaped, somewhat surpassing the calyx. Stamens and pistil not exerted, smooth. Pod ovoid, pointed, minutely hairy; seeds 2, pitted.

Phacelia Purpusii Brandege. Annual, a few inches to more than a foot high, branching, hairy and glandular. Leaves oblong to ovate, an inch or two long, including the short petioles, 3-nerved from the base, obtuse or acute. Flowers all on one side of the spicate racemes, which sometimes lengthen to 8 in. in fruit; pedicels short. Calyx with leaf-like, spatulate to obovate divisions, tapering to a thread-like base, unequal, enlarging in fruit. Corolla violet, open-bell-shaped, a little longer than the calyx; appendages long, united at the base of the stamens. Stamens somewhat bearded at base, together with the 2-cleft style extending beyond the corolla. Pod hairy, pointed; seeds generally 6, brown, pointed at one end, deeply pitted. Millwood and Big Boulder Creek.

Phacelia mutabilis Greene. Biennial or perennial, with stems simple or branched from the base, 1-3 ft. high, erect, finely viscid pubescent and hispid, with long, spreading white hairs, green, not canescent. Leaves simple or compound; when the latter, with the upper leaflet much the larger, acute; petioles as long as the blades, together 3-5 in. Spikes from the upper axils, generally branched, peduncled, strongly scorpioid, elongating in fruit. Flowers on short, hair-like pedicels. Calyx with narrowly-linear divisions spreading slightly, dilated at the top, twice as long as the pod. Corolla pale lilac to white, tubular, with the divi-

sions rounded and tube as long as the calyx. Stamens and style much exserted, the former clothed with white hairs. Pod hispid, ovate-acuminate; seeds 4, brown, deeply pitted.

Near this is another form with canescent foliage, strongly veined, acuminate leaves, which are densely clustered at the base of the stem; spikes terminal and axillary of closely imbricated flowers, smaller in all their parts than the preceding; calyx divisions densely hispid and acute, equaling the tubular corolla, surpassing the rounded pod. The flowers are sessile and the spikes elongate but little; otherwise the same as the preceding. These were both collected on Bubbs Creek trail.

Phacelia sp. Leaves all simple, elliptical, acute, forming a tuft at base; petioles equaling the blade, together 1-3 in. long. Stems almost without leaves; spikes paniced, peduncled. Flowers crowded on pedicels half as long as the calyx, slender. Divisions of the calyx elliptical ovate, not veiny, pubescent and hispid with long, stiff, marginal bristles. Corolla whitish, veiny, tubular, surpassing the calyx; the divisions rounded. Bubbs Creek.

Phacelia sp. Leaves all basal, the upper leaflet elliptical, acute, the lateral lobes adherent for their entire length and tapering, so that they are cordate wedge-shaped in outline, canescent and hispid; panicle with 2-3 spreading branches. Flowers on short pedicels; calyx with ovate, lanceolate divisions, veiny and hispid, surpassing the whitish corolla and the pod. Bubbs Creek. *Phacelia mutabilis* as well as the form that follows might all be included under *P. circinata*. The material is not sufficient for satisfactory determination. It is very desirable that all the forms of this exceedingly variable group of species be collected in ample specimens.

Phacelia stimulans Eastwood. STINGING PHACELIA. Stems tall, from a branched caudex, becoming 2-3 feet high; erect, with few leaves on the stem, those at base in a tuft; viscid pubescent throughout and clothed with stinging hairs. Spikes loosely paniced, simple or forked, horizontally spreading. Divisions of the calyx oblong-spatulate, hispid, net-veined, shorter than the whitish corolla, surpassing the pod. Corolla tubular, with the lobes coming together in fruit and persisting, held to the calyx by the tangled stamens and style which are long exserted and the latter conspicuously white woolly. Pod ovate, pointed, hispid; seeds pitted, not glossy, brown, ovate. Kings River Cañon.

BORAGINÆÆ. BORAGE FAMILY.

KEY TO THE GENERA.

- Nutlets broad, flattened, roundish, covered all over with barbed prickles, much extended beyond the area of insertion, generally not all maturing; crests in the throat of corolla conspicuous; stout and coarse perennials, with blue, greenish, or purplish flowers. . . . *Cynoglossum*, Hound's Tongue.
- Nutlets erect and parallel with the style, armed on the sides and in ridges on the back with barbed prickles forming burrs; flowers similar to the preceding, blue, white or pink. Perennial herbs. . . . *Lappula*, Forget-Me-Not.
- Nutlets erect, smooth or warty, scar of insertion generally forked at base; flowers small, white, with crests in the throat of the corolla; annuals. . . *Cryptanthus*, White Forget-Me-Not.
- Nutlets oblique, with the scar of insertion raised and rounded, hollow or solid; flowers white, with crests in the throat of the corolla; herbage staining the paper violet; annuals.
. *Plagiobothrys*, Pop-Corn Flower.

***Cynoglossum viride* Eastwood.** Stems 1-several, from a woody root, about a foot high, densely leaved to the peduncle, pale gray with a closely appressed, white pubescence. Leaves oblanceolate, to linear and ovate, the lower ones on margined petioles 6 in. long, the upper sessile by a broad cordate-clasping base; mid-vein prominent. Flowers in head-like clusters at the ends of the 2-6-inch long peduncles. Calyx with obtuse divisions as long as the tube of the corolla, $\frac{1}{4}$ in. Corolla funnel-form, greenish, the short border surpassing the calyx. Nutlets generally more than $\frac{1}{4}$ in. in diameter. This blooms in May, and will be found in fruit in July. Converse Basin, Millwood.

***Lappula diffusa* Greene.** Stems several from a woody caudex, 1-2 ft. high. Radical leaves oblanceolate, on long margined petioles, 6 in. long and $\frac{1}{2}$ in. wide, pale with a closely appressed, white pubescence; stem leaves diminishing towards the top, clasping at base, obtuse. Flowers panicked loosely; pedicels generally longer than the calyx, which is open bell-shaped and $\frac{1}{2}$ in. long with narrow, obtuse divisions. Corolla salver-form, pink or blue, the tube surpassing the calyx and the border, $\frac{3}{8}$ in. in diameter; folds in the throat conspicuous. General Grant Park; not common.

***Cryptanthus geminata* Greene.** Annual, with the stems much branched, about a foot high, the branches slender, generally 2-forked. Flowers white, very small. Nutlets not all maturing, ovate pointed, smooth and glossy, light brown and mottled. Millwood.

Cryptanthe flaccida Greene. Stems rather stout, branching chiefly above, with slender, weak branches, 1-2 ft. high. Flowers minute, sessile, appressed to the stem in fruit; only one nutlet maturing, this similar to the preceding but more pointed.

Cryptanthe ambigua Greene. Annual, branching, 1-2 ft. high. Flowers white, chiefly at the ends of the branchlets, these usually 2-forked. Segments of the calyx long and linear, spreading at top. Nutlets shining, covered sparsely with little warts as well as minute papillæ. Kings River Cañon, Bubbs Creek, Millwood.

Cryptanthe vitrea Eastwood. Stems branching, less than a foot high; leaves and flowers dense. Corolla minute. Calyx becoming orbicular in fruit. Nutlets 4, with 3 ridges on the back, one central and one at each side, covered closely with glossy warts. Bubbs Creek.

Plagiobothrys Torreyi Gray. Branching from the base with slender, weak stems, ascending or procumbent. Flowers small, axillary, from almost all the axils. Nutlets keeled on the back and marked with glossy transverse ridges, pale gray, the apices coming together to form a Maltese cross. General Grant Park.

VERBENACEÆ. VERBENA FAMILY.

Verbena prostrata R. Br. Stems branching from the root, 1-2 ft. high, generally erect, clothed throughout with white, spreading hairs. Leaves opposite, with petioles clasping at base; the blades toothed or lobed. Flowers in a terminal spike, slender, elongating with age. Flowers blue, very small, about $\frac{1}{8}$ in. long. Near Bearskin Meadow.

LABIATÆ. MINT FAMILY.

KEY TO THE GENERA.

Flowers in terminal heads, having conspicuous involucre; corolla with upper lip 2-cleft and lower 3-parted into linear lobes; stamens 4, projecting beyond the corolla, unequal; annuals or perennials. Monardella, Pennyroyal.

Flowers in spikes at the ends of the stems; stamens 4, unequal; corolla with the upper lip 2-lobed at the top, lower 3-lobed with the middle lobe crenate; perennial herbs.

. Lophanthus, Giant Hyssop.

Flowers axillary; stamens 4, the lower pair with anthers 1-celled, the upper with anthers 2-celled; calyx helmet-shaped; corolla with an arched upper lip, lower lip entire; perennial herbs.

. Scutellaria, Skull-cap.

Flowers almost sessile, in scattered whorls; stamens 4, with all the anthers 2-celled; corolla with tube not dilated at the throat, upper lip arched, the lower spreading, 3-lobed; perennial herbs. . . . Stachys, Woundwort.

Annuals or perennials. Flowers in dense, usually 1-sided axillary cymes; corolla with slender tube, 5-parted, the divisions in bud forming a roundish ball which encloses the stamens; stamens 4, spirally coiled in the bud, conspicuously protruding from the open corolla. . . . Trichostema, Blue Curls.

Monardella odoratissima Benth. Perennial, from a woody root. Stems many from the root, generally simple, a foot or two high; whole plant canescent with a pale, close pubescence. Leaves opposite, ovate, more or less distant, varying much in size, on short petioles. Flowers in heads terminating the stems; calyx teeth clothed with fine, dense hairs within and without. Corolla lavender or rose color, 2-lipped, the upper lip entire, the lower 3-cleft. Stamens 4, extending beyond the corolla. This has a strong odor of pennyroyal. Bubbs Creek and Converse Basin, and General Grant Park.

Monardella lanceolata Gray. Annual, a foot or so high, with widely spreading opposite branches, few-leaved, slightly canescent; leaves lanceolate, an inch or so long, narrow, on short petioles. Heads terminating the branches, with bracts of the involucre ovate, tinged with rose color, marked with longitudinal veins crossed with veinlets. Calyx teeth hairy. Corolla rose color, longer than the calyx. Stamens 4, together with the style extending beyond the corolla. Millwood, Bubbs Creek.

Lophanthus urticifolius Benth. Stems tall, erect, simple or branching. Leaves distant, ovate, pointed, dentate, canescent, on short petioles. Blades 1-2 inches long, 1-1.5 inches wide. Flowers clustered in long spikes somewhat interrupted at the base, and with clusters often in the lower leaf axils. Calyx teeth white or rose color, membranous, narrowly pointed; upper lip of rose-colored corolla 2-lobed, lower 3-cleft, its broad, middle lobe crenate. Stamens 4, in two pairs which cross each other, much exserted. Millwood and Bubbs Creek.

Scutellaria siphocampyloides Vatke. Stems less than a foot high, clothed with glandular hairs; leaves linear-oblong, those at base cordate and toothed. Flowers purplish-blue; calyx with conspicuous spur; corolla tube slender, half as long as the whole, the lower lip not hairy on the inner side, only slightly pubescent. Bubbs Creek, Millwood.

Scutellaria Bolanderi Gray. Stems several from the root, leafy, with the leaves overlapping, ovate, sessile, an inch or less long, the lower crenate or dentate. Flowers shorter than the leaves ; corolla tube short, with a broad throat, whitish or cream color. Millwood.

Stachys albens Gray. Stems tall, generally simple, densely clothed with white wool. Leaves ovate-lanceolate, an inch or two long, almost sessile, crenate, distant. Flowers almost sessile in an interrupted spike, which is slender and wand-like with the bracts diminishing upwards. Calyx densely woolly ; corolla white with purple dots, smooth except for the hairy beard on the back of the upper lip. Millwood, Bubbs Creek, and Kings River Cañon in swampy places.

Trichostema oblongum Benth. Annual, with low, simple or branching stems, slender, hairy. Leaves ovate-elliptical, about an inch long, on very short petioles. Flowers in short clusters in the leaf-axils ; calyx divisions narrowly pointed, very hairy ; corolla dark blue, very small, scarcely longer than the calyx ; flowers almost sessile. Big Boulder Creek, Millwood.

RUBIACEÆ. MADDER FAMILY.

Galium tinctorium submontanum Wight. Erect, with slender branches, angles of the stem stiff-hairy. Leaves 4, 5, 6 in a whorl, with margins and midrib rough. Flowers with corolla 3-4 parted, very small, on pedicels that are hair-like and recurve in fruit ; fruit smooth. East Lake.

Galium sparsiflorum Wight. Perennial, with branching stems erect or reclining, a foot or two long, smooth. Leaves in 4's unequal, oval to ovate, $\frac{1}{2}$ in. or less long, mucronate, thin. Flowers minute, axillary or terminal on hair-like pedicels ; fruit smooth. Bubbs Creek, Converse Basin ; growing in shady places.

Galium subscabridum Wight. Perennial, erect, branching, a foot or so high, rather scabrous. Leaves oval to ovate, thin and somewhat papery, $\frac{1}{2}$ in. or less long, 1-nerved. Flowers solitary in the upper axils. Fruit smooth on recurved, rather stout pedicels. Millwood.

Galium pubens Gray. Stems many from creeping branches a foot or so high, densely hispid with white spreading hairs like small bristles ; leaves oval to ovate, $\frac{1}{4}$ - $\frac{1}{2}$ in. long and half as broad. Flowers reddish, almost sessile, generally 3 in a cluster. Fruit smooth. Bubbs Creek.

Galium triflorum Michx. Low annual, about 6 in. high, generally simple, hispid with sparse spreading bristle pubescence. Leaves linear, 3-7, $\frac{1}{2}$ in. or less long, sweet scented when dry; fruits covered with fine, hooked spines. Millwood.

Galium bifolium Watson. Annual, with slender stems, less than a foot high, smooth. Leaves linear-lanceolate, 2, opposite. Fruit clothed with hooked spines, recurved at the ends of the peduncles, solitary in the axils.

Galium multiflorum Kellogg. Perennial, from a somewhat woody base rough with a scabrous pubescence. Leaves ovate to orbicular, 4 in a whorl, 3-nerved, $\frac{1}{8}$ - $\frac{1}{4}$ in. in diameter. Flowers sessile or on short pedicels. Fruit densely clothed with white, straight bristles. East Lake.

Kelloggia galioides Torr. Perennial, from creeping, slender root-stocks, slender and branching, generally smooth, a foot or so high. Leaves opposite, with stipules. Flowers small, in panicles terminating the branches. Calyx tubular, with short tube and minute teeth; corolla reddish-purple, funnel-form, with spreading border, generally with 4 divisions, $\frac{1}{8}$ in. across. Fruit dry, covered with hooked bristles, separating into 2 parts. Near Millwood, and in other places under the conifers.

CAPRIFOLIACEÆ. HONEYSUCKLE FAMILY.

KEY TO THE GENERA.

SHRUBS OR WOODY VINES.

Style slender, stigma one.

Corolla irregular. *Lonicera*, Honeysuckle.

Corolla regular, berry with 2 seeds.

. *Symphoricarpos*, Snowberry.

TREES OR SHRUBS.

Style scarcely evident, stigmas 3.

Corolla regular, star-shaped, small; flowers numerous in compound cymes. *Sambucus*, Elder.

Lonicera involucrata Banks. Shrub from 3-several feet high, with light gray, shreddy bark on the older parts, the younger stems covered with yellow glands. Leaves on short petioles, ovate, pointed, glandular, ciliate, about 2 in. long. Peduncles less than an inch long, 2-flowered. Bracts 2, separate, forming an involucre which later encloses the two black berries. Corolla tubular-funnel-form, yellow but often tinged with red, $\frac{1}{2}$

in. long, with the lobes almost equal, glandular and hairy. The bracts are leaf-like, ovate, $\frac{1}{2}$ in. long, glandular and hairy, pointed, with the margin undulate and with fine teeth besides; they generally turn red and are enlarged when the berries are ripe. The berries are about the size of peas and are not edible. Bubbs Creek.

Lonicera interrupta Benth. Bushy with long, slender branches, scarcely twining. Leaves bright green on the upper surface, paler on the lower, the lower on short petioles, ovate to oblong, an inch or so long and almost as wide, upper leaves broader and united at base forming a perfoliate leaf. Flowers in interrupted spikes from the upper axils, yellow, 2-lipped, several in each whorl. Bubbs Creek and Kings River.

Symphoricarpos mollis Nutt. var. Shrub with diffuse stems and often trailing branches; stems dark brown, shreddy. Leaves paler on the lower surface, clothed on both sides with a soft pubescence, oblong to orbicular, on short petioles, generally irregularly lobed with obtuse divisions. Flowers small, but little more than $\frac{1}{8}$ in., bell-shaped, thick in texture, pink. Berries white, as large as peas. Converse Basin, and in other places on the trails.

Sambucus glauca Nutt. ELDER. Tree or shrub with compound leaves; leaflets unequal at base, oblong to elliptical, about 2 in. long, finely toothed, pointed. Flowers white in ample flat-topped panicles. Berries black, covered with a bluish bloom which rubs off. Kings River Cañon.

LOBELIACEÆ. LOBELIA FAMILY.

Nemacladus montanus Greene. Annual, about a foot high, with many stems branching diffusely, slender and zig-zag with the pedicels from the minute alternate leaves forming 2 ranks all along the stems, half an inch long, bent upward near the flower. Corolla minute 2-lipped, the lower lip 3 and the upper lip 2-parted. Filaments joined above the middle. Style incurved at tip, stigma 2-lobed. Pod 2-celled, splitting from the top, the seeds numerous. Millwood.

COMPOSITÆ. SUNFLOWER FAMILY.

KEY TO THE GENERA.

HEADS WITH BOTH RAY AND DISK FLOWERS.

Leaves opposite.

Entire plant clothed with cottony wool; heads medium, with the bracts of the involucre keeled; pappus of papery scales.

. Eriophyllum, Cotton-batting Plant.

Heads large, with conspicuous rays; pappus soft, white, hair-like.

. Arnica.

Heads large, with conspicuous rays which become reflexed and papery; persistent; pappus none; flowers glandular.

. Whitneya.

Leaves alternate.

BRACTS OF THE INVOLUCRE IN ONE ROW.

Rays not yellow.

Heads of medium size, with narrow rays; pappus fine, hair-like.

(There are some species without rays and some with the bracts of the involucre in more than one row.)

. Erigeron, Mountain Daisy.

Rays yellow.

Heads large, with reflexed rays; the disk flowers on a globular center; pappus of 4 or 5 papery scales.

. Helenium, Sneezeweed.

Heads small or medium, usually numerous; pappus abundant, soft and hair-like. Senecio, Groundsel, Old Man.

BRACTS OF THE INVOLUCRE IN MORE THAN ONE ROW.

Heads of medium size, with conspicuous rays; pappus fine and abundant, hair-like; rays purplish, blue or white; tips of the style long. Aster.

Similar, but with the rays narrower, pappus less abundant, and the style stipes short. Erigeron.

Heads small and numerous, with few and small yellow rays; pappus soft, white, hair-like. Solidago, Goldenrod.

Heads large, with large, reflexed, yellow rays; disk flowers on a large, cone-shaped center; pappus a chaffy crown cut into four irregular lobes. Rudbeckia, Cone-flower.

Heads medium, with short and narrow yellow rays; pappus of 4 papery scales, generally fringed; involucre glandular and woolly; Alpine plants. Hulsea.

Heads large, with conspicuous yellow rays and chaffy scales mixed with the disk flowers; pappus chaffy.

. Wyethia, Sunflower.

Heads large, with conspicuous yellow rays; pappus none; radical leaves large, on long petioles, arrow-shaped.

. Balsamorhiza, Balsam-root.

Heads medium, with conspicuous yellow or white rays; outer bracts of involucre entirely enclosing the seeds; inner ones surrounding the disk flowers; pappus of soft hairs and chaffy scales.

. Layia, Tidy-tips.

Similar to the above but with rays always yellow; without pappus.

. Madia, Tar-weed.

HEADS WITHOUT RAYS.

Disk flowers yellow or white, the outer ones enlarged so as to seem like ray flowers; pappus of papery scales; leaves alternate, more or less dissected.

. Chænactis.

Heads small, with the bracts of the involucre papery and woolly, in several rows; flowers minute, hidden by the abundant, fine, white pappus; entire plant clothed with cottony wool; leaves often tufted at base.

. Antennaria, Everlasting, Immortelles.

Shrubs; heads small, greenish, numerous; involucre bell-shaped; pappus none. Generally aromatic, with lobed or divided leaves.

. Artemisia, Sage-brush, Wormwood.

Low annuals, with linear, opposite leaves; entire plant glandular; bracts of the small involucre enclosing the seeds; disk flowers few, yellow.

. Harpæcarpus, Tiny Tar-weed.

Bracts of the involucre in more than one row, surpassing the disk; leaves sessile.

. Chrysopsis.

Bracts of the involucre in more than one row, shorter than the disk flowers.

. Erigeron.

Leaves and bracts of the involucre clothed with spines; heads large, never yellow, with the bracts of the involucre in many rows, one above the other; pappus abundant and conspicuous, white, soft and fine.

. Cnicus (Cirsium), Thistle.

ALL FLOWERS WITH RAYS.

Pappus fine, abundant and soft.

Leaves entire, chiefly from the base, clothed with long and abundant hairs; bracts of the involucre in one row.

. Hieracium, Hawkweed.

Leaves large, once or twice irregularly cleft, those from the base on long petioles; smooth or clothed with cottony wool; heads medium, with the bracts in one row.

. Crepis.

Leaves all from the root, generally cleft or lobed; heads large on long stems; bracts of the involucre in several rows; pappus soft and white, joined to the seed by a hair-like stem.

. Agoseris, Dandelion.

Eriophyllum croceum Greene. Perennial, with many stems from the root, about a foot high. Leaves wedge-shaped at

base and tapering to broad petioles, lobed or toothed from about the middle, exceedingly variable. Heads at the ends of long, almost naked peduncles, $\frac{1}{2}$ - $\frac{3}{4}$ in. across; rays short. Seeds of the ray flowers without pappus but tipped with pale yellow at each end; those of the disk flowers with the pappus forming a shallow cup, white-tipped at base, 4-angled. Millwood and Converse Basin, under the trees.

Arnica foliosa Nutt. Stems erect, about a foot high, leafy, grayish throughout from a white, cottony wool, glandular above. Leaves at the base narrowed to broad petioles, lanceolate, veiny, entire or toothed, 3-4 in. long; upper leaves sessile by broad, clasping bases, diminishing upwards. Inflorescence cymosely branching; peduncles varying in length from 1-3 in.; heads more than an inch across, the rays 3-toothed at apex, $\frac{1}{2}$ in. long. Seeds black, hairy with short, stiff hairs; pappus almost plumose under a good lens. Forks of Bubbs Creek, and in other places along the trail up Bubbs Creek.

There is another species which was collected by Miss Catherine E. Wilson near Bullfrog Lake; but the specimen is too poor for identification. It is a low plant with only one head, the leaves are all petioled, the rays are short and inconspicuous. It seems to be undescribed.

Whitneya dealbata Gray. Perennial, with several stems from the root, hoary throughout from a dense, white, matted pubescence, 1-2 ft. high, with the inflorescence branched. Leaves at base lanceolate on long petioles, about as long as the blade, together about 3 in., entire; stem leaves narrow, sessile, united at base. Heads 2-3 in. across, the rays 3-toothed at apex, becoming more than an inch long and almost half an inch wide. This handsome plant grows in the shade of the conifers, and was collected in Converse Basin.

Heleniastrum rivulare Greene (Helenium). Stems tall, stout, hollow, ribbed, 2-3 ft. high, lower part smooth, upper sparingly clothed with white, curly hairs. Leaves lanceolate, some more than 6 in. long, sessile, and with the blade running down the stem, dotted with minute black glands, entire. Heads on long peduncles, sometimes more than a foot long. Rays $\frac{1}{2}$ in. or more long, wedge-shaped, with 3 or 4 blunt teeth at apex; disk flowers tinged with reddish-purple, the disk becoming $\frac{3}{4}$ in. in diameter. This grows in wet places, and was collected at General Grant Park and along Kings River.

Heleniastrum Hoopesii O. Ktze. (Helenium). Stems stout, 1-2 ft. high, growing in clumps generally, clothed with

cottony wool which becomes thinner with age. Leaves on stem elliptical, sessile, 1-2 in. long, sparingly dentate on the margins, with apex mucronate. Heads cymosely clustered at the summit of the stem on long peduncles, $1\frac{1}{2}$ in. in diameter, rays 3-toothed at apex, $\frac{1}{2}$ in. long, $\frac{1}{8}$ in. or a little more in width; disk flowers yellow. This is a handsome plant when in full bloom. It was seen only near the forks of Bubbs Creek.

Senecio canus Hook. Stems perennial, about a foot high, branching, leafy, clothed throughout with dense, white, cottony wool. Leaves elliptical or oblong, on petioles about twice as long, together about 2 in., 3-nerved from the base, entire. Heads about $\frac{1}{2}$ in. across, with rays $\frac{1}{4}$ in. long, generally 3-toothed at apex, $\frac{1}{8}$ in. wide. Bubbs Creek, near the forks.

Senecio aureus L. Stems simple to the inflorescence, smooth, erect, 1-2 ft. high. Radical leaves on long petioles, broadly oblong, and scalloped to lobed and much narrowed; stem leaves few, sessile, once or twice lobed, an inch or two long. Peduncles long, leafy-bracted, with the bracts slightly clothed with cottony wool; heads about $\frac{3}{4}$ in. across, with short rays. This grows in the wet meadows, and was collected at Summit Meadow.

Senecio Fremontii occidentalis Gray. Stems many, from woody creeping roots, branching diffusely, with slender stems, leafy, almost smooth and somewhat glaucous, about a foot high. Leaves spatulate to oblanceolate, tapering to petioles, obtusely toothed or lobed, with petioles about as long as the blade, together 1-2 in. Heads about $\frac{3}{4}$ in. across, rays $\frac{1}{4}$ in. long sharply 3-toothed. This grew in clumps on the trail to Bullfrog Lake.

Senecio lugens Richards var. Stems stout, 1-2 feet high, with few leaves except at base, and heads cymosely paniced at the summit of the stem. Basal leaves from lanceolate to broadly ovate, tapering to broad petioles, the blades 2-3 in. long, 1-2 in. wide, irregularly toothed or jagged. Heads $\frac{1}{2}$ - $\frac{3}{4}$ in. wide, the rays $\frac{1}{4}$ in. long, toothed at apex; bracts of the involucre with black tips. The inflorescence is close when in flower, becoming spreading and open in fruit. Millwood, Bubbs Creek, Converse Basin.

Aster Durbrowi Eastwood. Stems erect from creeping root-stocks, $\frac{1}{2}$ -1 $\frac{1}{2}$ feet high, sparingly pubescent with white, woolly, rather curly hairs. Leaves rather distant, generally shorter than the internodes; those at base narrowly lanceolate on long, broad petioles, the stem leaves sessile. Heads about 1 $\frac{1}{2}$ in. across, with

lilac rays $\frac{1}{4}$ in. long ; bracts of the involucre green and leaf-like. This grows in the wet meadows and was collected at Horse Corral Meadow.

Aster Andersonii Gray (Oreastrum Greene). Stems erect from a tap-root, $\frac{1}{4}$ -1 ft. high, smooth, except near the head. Leaves chiefly at the base, grass-like, pointed, 2-5 in. long ; the few on the stems similar but shorter. Heads terminating the stems, solitary, an inch or more in diameter, with purple rays $\frac{3}{8}$ in. long, minutely toothed at apex ; bracts of the involucre often tinged with reddish-purple. This is common in wet places and was collected at Summit Meadow, Bullfrog Lake and Bubbs Creek. The plants at the higher altitudes were much smaller, with stems shorter and leaves narrower.

Erigeron frondeus Greene. Stems simple, a foot or so high, erect, somewhat rough pubescent. Basal leaves elliptical, lanceolate, on petioles about as long as the blades ; stem leaves ovate-lanceolate, sessile, sharply serrate. Heads few, 1-4, on long, bracted peduncles, 1-1 $\frac{1}{2}$ in. in diameter ; bracts of the involucre very narrow, glandular and hairy, in a single row ; rays white, very narrow, numerous, $\frac{1}{2}$ in. long. In meadows and moist places at the upper elevations. The only specimen from the region was collected by Miss Catherine E. Wilson, with the locality uncertain.

Erigeron salsuginosus angustifolius Gray. Stems erect, simple, from creeping root-stocks, about a foot high, almost smooth near the base but with an appressed pubescence above. Radical leaves linear-ob lanceolate, tapering, but without distinct petiole, 1-3 in. long, strongly nerved, pointed at apex ; stem leaves similar but broader and shorter and distinctly sessile. Heads few, 2-4, on long peduncles at the summit of the stem, 1-1 $\frac{1}{2}$ in. in diameter ; bracts of the involucre very narrow and pointed, glandular but not hairy ; rays rose color, generally 3-toothed with narrow, sharply pointed teeth. This beautiful *Erigeron* grows at the upper elevations, below timber-line. It was collected on the upper part of Bubbs Creek.

Erigeron Breweri Gray. Stems woody and much branched with slender, wand-like branches, erect, terminated with 1-3 heads, grayish-green with a close, rough, appressed pubescence. Leaves linear, sessile, the longest about an inch long, obtuse, becoming minute on the flowering stems. Heads $\frac{3}{4}$ inch in diameter ; bracts of the involucre in several rows, the smallest at base, with a keeled, green, central ridge ; rays purple, $\frac{1}{4}$ in. long ;

pappus tawny. Bubbs Creek, along the trail and at the junction with Kings River.

There is a variety of this, without rays and with smaller heads, which was collected on Bubbs Creek trail. The stems of this are quite leafy.

Erigeron compositus Pursh. Low, forming mats a few inches high, glandular and white hairy, the stems many from a creeping root. Leaves chiefly radical, the small blades palmately dissected at the ends of long and broad petioles, these varying to more than an inch in length, very hairy; the divisions of the blade obtuse, less than $\frac{1}{2}$ in. long, the entire blade about $\frac{1}{4}$ in. long and somewhat wider. Heads on sparingly leafy stems surpassing the radical leaves, 1-2 in. long; bracts of the involucre of the same length but in two rows, narrow, tipped with purple; rays almost thread-like, slightly surpassing the disk, pink or white. This is an Alpine species and was collected only on Harrisons Pass.

Chrysopsis Breweri Gray. The specimen was collected by Mr. T. S. Brandegee in General Grant Park, and is too young for accurate determination. It may be a new species. Stems 1-2 ft. high from a half-woody base, glandular and slightly hairy, branching above and with several stems from the base. Leaves ovate, obtuse, sessile, 1-2 in. long, thin, entire or with few teeth. Heads small, at the ends of slender, leafy branchlets. Bracts of the involucre in several rows, parchment-like, tapering to slender points, ciliate on the margins; rays none; pappus abundant.

Solidago multiradiata scopulorum Gray. Stems low, less than a foot high, sparingly pubescent, leafy, terminated by a close and short panicle of cymose heads. Basal leaves oblanceolate, tapering to margined petioles an inch or so long, entire or slightly toothed, ciliate; stem leaves ovate-lanceolate, sessile, $\frac{1}{2}$ inch or less long. Heads $\frac{1}{4}$ - $\frac{3}{8}$ in. in diameter; bracts of the involucre lanceolate, obtuse, nerved, ciliate; rays narrow, $\frac{1}{2}$ in. long. Bubbs Creek.

Rudbeckia Californica Gray. Stems stout, 3 ft. or more high, with few leaves and terminated by large heads on naked peduncles, 1-2 ft. long. Leaves at base ovate-lanceolate on long petioles almost as long as the blades, together 6-9 in. long, undulately toothed, wedge-shaped at base, obtuse or pointed at apex, hairy with a fine, closely appressed white pubescence; stem-leaves similar but more pointed and with much shorter petioles, the uppermost becoming linear. Bracts of the involucre

lanceolate-ovate, acute, varying in size; rays $1\frac{1}{2}$ in. or more in length, $\frac{1}{2}$ in. wide, 3-toothed at apex; cone-like center $1\frac{1}{4}$ in. long; disk flowers brown. This grows in the wet meadows along Kings River. The specimen which was collected is too young for satisfactory determination, and more fully developed specimens ought to be collected so as to show variation if there is any. The specimens are quite different in foliage from the type.

Hulsea algida Gray. Stems several, from woody roots, about 6 in. high, rather stout, woolly, glandular, terminated by solitary heads almost $1\frac{1}{2}$ in. in diameter. Leaves linear, sessile, generally folded, toothed or entire, those at base sheathing the stem, twice as long as the stem-leaves, 2-3 in. Involucre densely clothed with white wool, with narrow, pointed bracts of about the same length in several rows, often purple at tip; rays $\frac{1}{4}$ in. long, pointed, but little surpassing the broad, densely flowered disk. Found only above timber line, collected on Kearsarge Pass and Harrisons Pass.

Wyethia foliosa Congdon. Stems 1-several, from a thick, woody root, ashy throughout from a close, white, appressed pubescence. Leaves lanceolate on broad petioles about half as long as the blade, together 6 in. or more long, with the margin wavy or entire. Heads solitary at the end of the stem on a long peduncle, $1\frac{1}{2}$ in. in diameter; involucre with the bracts tapering to a point, of different lengths; rays about $\frac{1}{2}$ in. long, obtuse or toothed at apex. Pappus a crown of chaffy scales and 2 long awns, one reaching almost to the divisions of the corolla of the disk flowers. Converse Basin.

Balsamorhiza deltoidea Nutt. Leaves mostly at base, large, arrow-shaped, the blades a foot or so long, 6-8 in. wide at base, on petioles about half as long, clothed with a fine pubescence. Flowering stems 1-2 ft. high with few large heads terminating long, naked peduncles, a foot or more long; stems with but few leaves and these small, 1-2 in. long. Bracts of the involucre ovate, pointed, in more than one row, $\frac{1}{2}$ in. long. Heads 2 in. in diameter, with the yellow rays $\frac{1}{2}$ in. long, toothed at apex. Bubbs Creek, in dry places, on the hill above Kings River. This blooms soon after the snow melts, and in July is likely to be found only in fruit.

Madia villosa Eastwood. Annual, erect, $1\frac{1}{2}$ ft. high, simple except at the inflorescence, glandular and thickly clothed with fine, white, spreading hairs. Leaves linear, sessile, nerved, 1-3 in. long, obtuse, rather thickly clothing the stem. Heads $1-1\frac{1}{2}$ in. in diameter, the yellow rays 3-lobed half way to the base with

linear lobes, often with a brown-purple spot at base, disk flowers yellow, with purple anthers. Bubbs Creek, Converse Basin.

Layia glandulosa H. & A. Annual, with erect stems simple below, branched at the inflorescence, often purplish, hairy and clothed with hairs tipped with black glands. Lower leaves pinnately-lobed, linear in outline, the lobes short and blunt; upper leaves inclined to be entire. Heads from 1 to almost 2 inches in diameter; rays white, 3-lobed at apex; pappus consisting of some chaffy scales and some soft, abundant white pappus which becomes interlaced. This was collected on dry hills along Bubbs Creek. It was almost past blooming in early July.

Layia elegans T. & G. This is similar to the preceding but is more diffusely branched, the heads are smaller and the rays entirely yellow. Bubbs Creek, on dry hills.

Harpæcarpus parvulus Greene. Annual, low, a few inches high, branching diffusely with numerous very slender stems, glandular and white-hairy throughout, the glands on the flowers black. Leaves linear, less than an inch long, $\frac{1}{8}$ in. wide. Heads minute with but few flowers, $\frac{1}{8}$ in. high; the bracts of the involucre form ribs and contain the only seeds. Converse Basin, Millwood.

Chænactis glabriuscula DC. Annual, with stem generally simple, with 1-3 heads terminating long, almost naked peduncles, smooth except for some minute cottony wool. Leaves once or rarely twice divided with linear lobes as wide as the axis. Bracts of the involucre narrowly oblong forming a bell-shaped involucre; heads $\frac{1}{2}$ in. high; outer flowers with broadly expanded corolla limb appearing like ray-flowers, $\frac{1}{4}$ in. long, yellow. Bearskin Meadow.

Chænactis Douglasii H. & A. Perennial, branching, 1-1½ ft. high, more or less clothed with cottony wool, often reddish. Leaves once or twice pinnately divided with short, blunt lobes. Heads panicled, almost $\frac{3}{4}$ in. high, on peduncles 1-2 in. long. Flowers white, the outer ones with limb not expanded; pappus silvery white, akenes black. Bracts of the involucre and peduncles glandular. Bubbs Creek.

Antennaria alpina Gærtn. Low and forming mats, densely clothed with white, cottony wool. Flowering stems 2-3 in. high from amidst a bunch of short, leafy, non-flowering stems. Leaves spatulate, $\frac{1}{2}$ in. long, $\frac{1}{8}$ in. wide, tapering at base; leaves on flowering stems narrower, lanceolate, pointed. Heads sessile and forming a globular head $\frac{1}{4}$ - $\frac{1}{2}$ in. across; bracts of the invo-

lucre with white, thin, papery tips, the lower part black, very woolly at base, sometimes greenish. Pappus dense, white and soft. This grows only above timber line, and was collected on Harrisons Pass.

Antennaria argentea Benth. Matted at base, the flowering stems a foot or more high, slender, densely clothed with white wool and terminated by a corymb-like panicle of white heads. Leaves linear to oblanceolate, tapering to margined petioles, 2-3 in. long, $\frac{1}{4}$ in. wide at base, diminishing upwards. Heads $\frac{1}{4}$ in. high, the bracts of the involucre in many ranks, white and membranous, silvery; pappus very abundant, white. Kings River Cañon.

Artemisia dracunculoides Pursh. Perennial, with many stems in clusters, branched, smooth, 2-4 ft. high. Leaves simple and linear or lobed at apex with linear lobes. Heads in spreading panicles about a foot long, small, on recurved, hair-like pedicels; bracts of the involucre green, with papery margins; the entire head $\frac{1}{2}$ in. in diameter; the involucre bell-shaped, enclosing the brownish-green flowers. Bubbs Creek.

Artemisia tridentata Nutt. BLACK SAGE, SAGE-BRUSH. Shrubby, with spreading woody stems, entirely clothed with a white, closely appressed, silvery pubescence. Leaves wedge-shaped, tapering to a base, an inch or so long, with generally 3 rather deep teeth at apex. Bubbs Creek.

Cnicus Tioganus Congdon. Without a stem and the heads closely clustered and surrounded by the leaves like eggs in a nest, or with a short, thick stem, the leaves clustered around the sessile heads in the same manner. Leaves about 6 in. long, narrow and very spiny, whiter on the lower than the upper surface from the more dense, cottony wool. Heads $1\frac{1}{2}$ in. high, with the bracts of the involucre smooth except for the ciliate margins; spines yellow, not very rigid. Flowers pink or white. This grew in a wet place on the trail up Bubbs Creek.

Cnicus Californicus Gray. Stems 2-3 ft. high, leafy, especially at base, densely clothed with white, cottony wool; the heads terminating the branches. Lower leaves lobed, with the divisions tipped with short spines; upper merely wavy, spiny-ciliate, whiter on the lower than the upper surface. Involucre an inch broad at base; heads $1\frac{1}{2}$ in. high. Bracts short and tipped with short spines, ciliate and somewhat clothed with cotton. Flowers white or rose color. Bubbs Creek.

Besides these there are several undetermined forms which in

the present knowledge of the genus it seems impossible to decide upon. One is related to *Cnicus occidentalis* and another to *C. Drummondii*. All were collected on the trail up Bubbs Creek.

Hieracium albiflorum Hook. Stems simple except for the panicked heads, 1-2 ft. high, smooth. Leaves chiefly radical, forming a rosette at base of stem, oblanceolate to obovate, sessile, 2-3 in. long, clothed with long, brownish hairs; stem leaves few, oblong-lanceolate, acute, sessile. Heads $\frac{3}{8}$ in. high, with the bracts of the involucre thin, hairy and glandular, about equaling the pappus; flowers white, with the rays 4-toothed; the styles and stamens conspicuously exserted; pedicels slender and smooth, an inch or less long. Converse Basin, under the trees.

Hieracium horridum Fries. Low, a foot or so high, with many stems from a tufted base, very leafy below the inflorescence, woolly and glandular. Leaves oblanceolate, obtuse, tapering to a broad petiole, 2-4 in. long, $\frac{1}{2}$ in. wide, densely clothed with long, tawny-white silky hairs, having the appearance of plush. Panicle of the main stem branching from below the middle, ample with numerous heads, $\frac{1}{4}$ in. long; bracts of the involucre long, pointed, clothed with few long hairs, with short, black hairs appressed, and with hairs tipped with yellow glands, about equaling the tawny pappus; rays lobed at apex, yellow. Millwood and Bubbs Creek.

Crepis intermedia Gray. Stems several, from a woody root, 1-2 ft. high, more or less clothed with cottony wool, stout, hollow. Leaves broad with jagged lobes; the upper ones narrow and entire, 3-5 in. long, the broadest about 3 in. across the widest part. Involucre $\frac{1}{2}$ in. high, the bracts few, with membranous margins about equaling the pappus; flowers yellow, the rays $\frac{1}{4}$ in. long; seeds $\frac{1}{2}$ in. long, strongly ribbed. Bubbs Creek.

Crepis acuminata Nutt. This is similar to the preceding, but is generally taller and smoother; the leaves are deeply pinnately divided once or twice into long, narrow, sickle-shaped divisions ending in a long, slender point; leaves at the root a foot long, 4 in. wide including the petioles which are as long as the blades. Heads much narrower, with the smoother involucre consisting of only 5 bracts; flowers fewer and smaller. This grew in the same locality as the preceding, and both are to be found in dry places.

Agoseris retrorsa Greene. Leaves pinnately divided, with reflexed linear lobes, the terminal lobe narrowly linear and pointed, often half the entire length of the leaf, sometimes much

broader and shorter and the divisions less pronounced; entire leaf 3-4 in. long and about an inch wide, clothed with cottony wool. Heads solitary at the ends of long, naked stems, slender; the inner bracts of the involucre $1\frac{1}{2}$ in. long, very slender and pointed, often tinged with reddish purple. Flowers yellow, with narrow rays, purplish on the lower side; pappus conspicuous, on a thread-like stem $\frac{1}{2}$ - $\frac{3}{4}$ in. long, as long as or longer than the white pappus.

This varies extremely from slender plants 6 in. high to stout ones from a branched caudex, 2 ft. or more. The leaves and heads in the latter are also much larger. Millwood, Bubbs Creek.

Agoseris (probably new species). Leaves oblanceolate, from entire to sparingly lobed or toothed, about 6 in. long, $\frac{3}{4}$ in. wide, slightly pubescent with cobwebby hairs. Heads terminating slender, weak stems; involucre from $\frac{1}{2}$ - $\frac{3}{4}$ in. long, hairy and glandular, especially at base; flowers yellow, with the rays scarcely exerted; pappus white, on a hair-like stem. The material is too young for accurate determination. Under the red-woods, near Big Boulder Creek.

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