

# BULLETIN.

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### STUDIES IN THE BOTANY OF CALIFORNIA AND PARTS ADJACENT.

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#### II.

##### 1. *Three New Genera.*

##### **BEBBIA**, *Helianthoidearum.*

Heads homogamous, discoid. Involucre campanulate; bracts imbricated, appressed, striate. Receptacle chaffy throughout; bracts lanceolate, partly embracing the akenes, equaling those of the involucre, persistent. Corollas tubular, 5-toothed, deep yellow. Akenes turbinate, slightly obcompressed, the angles (2 lateral and 1 dorsal) obtuse. Pappus a single series of long, slender, strongly plumose, persistent awns or stout bristles. Much branched, suffrutescent plants of the dry southwestern districts, with few and mostly opposite leaves, and scattered heads. *Carpophorus* § *Kuhnioles*, Gray, Proc. Am. Acad. viii. 632; Bot. Cal. i. 301, and Syn. Fl. ii. 113.

The long, plumose awns or bristles of the pappus, and the striate bracts of the involucre are the only characters

which suggest any affinity of these plants with the Eupatoriaceæ; for the corollas are neither purple nor even ochroleucous, but deep yellow; and authors appear to have overlooked altogether the shape of the akene, which is wholly that of the Helianthoideæ. The style-tips, moreover, are those of that tribe, and not of the one to which the Atlantic genus, *Carphephorus* belongs. Both the striate involucre, and the plumose pappus are found in other Helianthoid genera. Yet the place for this genus is not near either *Blepharipappus* or *Blepharizonia*, whose involucral scales are uniserial. It is nearer to the subtribe Verbesineæ by its much imbricated involucre, as well as by the roughness of its herbage, sunflower-like odor and general habit. Doubtless it ought to constitute a distinct subtribe, to come in between those here named. The genus is dedicated to Mr. Michael S. Bebb, of Rockford, Illinois, an able botanist, to whom all students of the science on the Pacific Coast are indebted for the careful elaboration of our species of the difficult genus *Salix*, in the second volume of the Botany of California.

**B. juncea.** *Carphephorus junceus*, Benth. Bot. Sulph. 21; Gray, Proc. Am. Acad. viii, 632, Bot. Cal. i, 301, and Syn. Fl. ii, 113.

This plant grows in perfection on Cedros Island, in arroyos near the sea, where it commonly attains the height of six or eight feet, its lithe, woody stems supporting themselves amid the branches of *Rhus Lentii*, or more frequently uniting with the similar looking *Antirrhinum junceum* to form large, impenetrably dense reedy masses as broad as high. The stems are nearly leafless and rather smooth, and the heads solitary and a good deal larger here than within the limits of the United States; but this southwestern form is the type of the species. The following may eventually prove distinct, namely:

Var. **aspera.**

Only a foot or two high, very rough, with a short, somewhat hispid pubescence; heads smaller and numerous; in-

volucral bracts narrower and less striate; pappus fully equaling the flowers. Southeastern borders of California, and adjacent Arizona.

**B. atriplicifolia.** *Carphophorus atriplicifolius*, Gray, Proc. Am. Acad. v. 159; Bot. Cal. l. c. and Syn. Fl. l. c.

**MIMETANTHE**, *Scrophularinearum*.

Calyx campanulate, 5-cleft, the tube somewhat 5-sulcate, neither angled nor ribbed; lobes unequal, the uppermost largest. Corolla tubular-funnelform. Stamens 4, didynamous. Style glabrous; stigma bilamellar. Capsule oblong-ovate, rather acuminate, equaling the calyx, not gibbous at base, minutely glandular, chartaceous, dehiscent by the whole of the upper suture, by the lower only to the base of the apical acumination, both valves in dehiscence strongly reflexed in so far as separated; placentæ borne on the middle of the valves, many seeded. Seed minute, oblong-ovate, yellowish, under the microscope favose-reticulate and glandular. *Herpestis*. § *Mimuloides*, Benth., in DC. Prod. x, 394; Gray, Bot. Cal. i, 569; Syn. Fl. 279; Greene, Bull. Cal. Acad. iii, 122. A villous and glandular annual of the Pacific Coast, with a sickening, solanaceous odor, the small yellow corolla simulating that of *Mimulus*, but the plant in all other respects unlike that genus. The peculiar dehiscence, with the singular bending back of the valves, will hardly be observable in herbarium specimens, which are almost always too young to show it; but in autumn or midwinter, when the foliage and calyces are decayed, and the capsules alone persist upon the dead stems and branches, this character becomes conspicuous. There is but a single species, ranging from Lower California as far down as All Saints Bay at least, northward to Washington Territory (*vide* Brandegee), namely:

**M. pilosa.**—*Herpestis*, Benth. in Comp. Bot. Mag. ii, 57. *Mimulus exilis*, Dur. and Hilg. Pac. R. Rep. v. 12, t. 12. *M. pilosus*, Watson, Bot. King, 225; Gray, l. c.; Greene, l. c.

**CLEVELANDIA.** *Scrophularinearum.*

Calyx tubular-campanulate, 4-cleft. Tube of corolla slender; limb bilabiate, upper lip short, spreading, bifid, lower with three spreading lobes, neither saccate nor plicate. Stamens 4, didynamous, wholly included within the corolla-tube; anthers 2-celled, the cells unequal. Style filiform, stigma entire. Capsule oblong, loculicidally 2-valved, the valves bearing the placenta on their middle. Small annual of the southern part of Lower California.

**C. Beldingi.** *Orthocarpus Beldingi*, Greene, Bull. Cal. Acad. iii. 123.

The characters of the corolla and stamens forbid, as Dr. Asa Gray has suggested, the placing of this plant in *Orthocarpus*. The genus is dedicated to Mr. Daniel Cleveland, of San Diego, whose intelligent field labors in Californian Botany have well earned this acknowledgment.

2. *Miscellaneous Species, Mostly New.***Eschscholtzia elegans.**

Annual, a foot or two high, branching above the base, glabrous and very glaucous: leaves finely dissected, their ultimate divisions linear, long and parallel or shorter and divergent: torus cylindrical, the two margins closely approximate, the inner one erect and hyaline: petals 4—8 lines long, rotate-expanding, their margins hardly meeting, greenish yellow when fresh, turning toward orange in drying: seed slightly elongated, apiculate, raphe-obvious, reticulation distinct or obscure.—*E. Californica* var. *hypecoides*, Gray, of Watson's list, as to the plant of the south part of Guadalupe Island, not of Bot. Cal.

Var. **ramosa.**

Shorter, stouter, more branching and leafy: leaf-lobes shorter and divergent: corolla smaller, reddening less in drying: seeds nearly globular and distinctly reticulate.

The type is common in the middle and southern parts of the island. The variety was found under high cliffs near the landing at the northeast end. The foliage in both forms is strikingly beautiful. The erect, compact, tree-like habit of the variety is peculiar. Very likely it deserves the rank of a species. Nothing much like either form is known on the main land. The nearest relatives are *E. minutiflora*, Watson, and *E. rhombipetala*, Greene.

**Eschscholtzia peninsularis**, Greene,

Is the common species all about San Diego. It is strictly annual and flowers from February to the beginning of May.

**Eschscholtzia Californica**, Cham.,

Does not appear in the southern part of the State except at considerable altitudes in the mountains. Mr. Parish has observed it at San Geronimo Pass, and it has been collected by the writer at Tehachapi Pass and on Guadalupe Island. In all these localities it is the same robust, large-flowered perennial so well known from San Francisco to the borders of British Columbia.

**Eschscholtzia Parishii**.

Annual, slender, less than a foot high, glabrous and glaucous: stems simple or sparingly branched: peduncles terete, very slender: torus turbinate, no spreading rim, the two margins similar and approximate: petals widely spreading, broad and overlapping each other, apparently light yellow: fruit not seen.

Eastern slope of Mt. San Jacinto in the Southern part of the State, collected by the Parish Brothers (No. 759) in April, 1882. In habit resembling *E. peninsularis*, but with the torus and corolla (but not the quadrangular peduncles) of *E. tenuifolia*. The different corolla, the long, slender peduncles and the leaves (mostly radical) are in the way of its being included in *E. elegans* of Guadalupe, to which it is apparently most related.

**Lupinus Guadalupensis.**

Annual, near *L. nanus*, but stouter and more villous: stem a foot or two high, branching from about the middle: leaflets 7—9, oblanceolate, an inch long, villous on both sides: petioles three inches long: bracts much exceeding the calyx: upper calyx-lip 2-cleft: corolla a half inch long, bluish-purple: pod two inches long, 6—8-seeded.

High plateau of Guadalupe Island, in good fruit, but nearly past flowering the 23d of April. A coarser plant than *L. nanus*, with shorter branches, none of them from the base of the stem.

**Lupinus Ludovicianus.**

Suffrutescent, stout, branching, a foot or two high: very villous-hirsute on the branches and petioles, and throughout, even to the bracts, calyx and legume densely white-tomentose: petioles stout, firmly erect, 2—3 inches long: leaflets 7—9, broadly oblanceolate, obtuse, 8—10 lines long: flowers purple, of medium size, subverticillate, in a short-peduncled, rather dense raceme: bracts short: calyx-lips sub-equal, broad, entire: keel strongly falcate, surpassing the other petals, somewhat woolly-ciliolate: pod an inch long, 5-seeded.

Mountains above San Luis Obispo, July, 1885; Mrs. Curran. The species is nearest *L. niveus* of Guadalupe Island, but has pubescence of a very different character, and is, moreover, a stouter, less graceful plant.

**Hosackia (Euhosackia) argyræa.**

Densely appressed-silky: stems numerous from a perennial root, rigid and nearly prostrate: stipular glands small, hidden by tufts of white hair: leaflets a half inch or less long, oblong-obovate, very obtuse, about five on a well developed, broad rachis: peduncles an inch long, about 2-flowered: calyx-teeth broadly lanceolate, half the length of the tube:

corolla a half inch long, salmon color, changing to orange in drying: pod terete, silky-pubescent, an inch long.

Lower California; collected in the Cantillas Mountains, October, 1884, by Mr. C. R. Orcut; also at Cape San Quentin, May, 1885, by the writer.

**Hosackia (Euhosackia) mollis.**

Densely soft-pubescent, with short, spreading hairs: root perennial: stems numerous, rather slender, a foot long, or nearly so: stipular glands small: leaflets 3—5, narrowly oblong to linear, acute, palmately crowded on a very short rachis: peduncles an inch or two long, erect; umbels about 2-flowered, the subtending bract when present narrowly linear: calyx-teeth linear-subulate, longer than the tube: corolla a half inch long: light yellow, drying reddish: pod an inch or more in length, terete, velvety-pubescent.

Grassy places among the lower mountain districts of the southern parts of New Mexico and Arizona, and in adjacent Mexico. Lemmon, No. 2669, Huachuca Mts. Also collected by Rusby, the writer, and others.

**Hosackia (Syrmatium) ornithopus.**

Densely silky: stems erect-spreading, a foot high, from a suffrutescent base, much branched above: leaflets 5—7, oblong, 3—6 lines long, acute at each end: umbels numerous, 12—20-flowered, on short, erect, simple-bracted peduncles: calyx-teeth subulate, half as long as the tube: pod thrice the length of the calyx, rostrate-attenuate, strongly curved upwards, strongly pubescent, 2—3-seeded: seed slightly curved.

Frequent in the middle of Guadalupe Island, and no doubt the *H. argophylla* of Mr. Watson's list. Dried specimens would hardly show the peculiar erect-spreading habit: but fruiting ones could hardly with their long exserted, curved pods, resembling bird's claws, be confounded with *H. argophylla*. The pubescence of the calyx is denser, and spreading, not appressed as in that species.

**Hosackia (Syrmatium) disticha.**

Canescent, with a short, appressed, silky pubescence: root perennial: stems stout, 2—3 feet high, erect and recurved; branches short, strictly in two ranks: stipular glands minute: leaflets 3—5, obovate, acute: umbels very short-peduncled, 2—3-flowered: calyx-teeth subulate, half the length of the tube: corolla 3—4 lines long, reddish, turning dark brown: pods (immature) nearly an inch long including the slender beak.

Cape San Quentin, Lower California, May 10, 1885. A well marked species; the tall tufted stems not at all decumbent, but erect at base, the upper portion, with its distichous branches, gracefully curving downwards.

**Astragalus fastidiosus.**

*Inflati*: tomentose-canescens, a foot high, suffrutescent at base: stipules triangular-subulate, deflexed: leaflets in many pairs, oblong, retuse, 3—6 lines long: racemes short, on peduncles exceeding the leaves: calyx-teeth sharply subulate, half as long as the campanulate tube: corolla greenish white: pod an inch long, of parchment-like texture, oblong-ovate, acuminate above, at base tapering to a short, included stipe.—*Phaca fastidia*, Kellogg, Hesperian iv. 145, with fig. *Astragalus Coulteri* (?), Bull. Cal. Acad. iii. 136.

Fresh specimens, collected by the writer recently on Cedros Island, settle negatively the question of the identity of this plant with *A. Coulteri*, Benth. Dr. Kellogg's figure is faulty. The racemes are shorter and denser than represented, and the pods are not erect, but deflexed.

**Astragalus anemophilus.**

*Inflati*: perennial, white-tomentose throughout, leaflets numerous, somewhat crowded, obovate or oblong, acutish, 3—6 lines long: peduncles rather stout, twice the length of the leaves; raceme short and dense: calyx-teeth triangular, acute one third the length of the short-cylindrical tube:



corolla small, greenish: pod purplish, soft-pubescent, thin-bladdery,  $\frac{3}{4}$  inch long by  $\frac{1}{2}$  inch thick, obtuse at both ends, neither suture intruded, not stipitate.

Cape San Quentin, Lower California, May 10, 1885, growing on the tops of the bleakest sand-hills, near the sea, exposed to the incessant winds of that point of the coast; the stems, of uncertain length, alternately buried and uncovered by the loose shifting sands.

#### **Lyonothamnus asplenifolius.**

Leaves opposite, minutely stipulate, coriaceous, pinnately parted into 3—5 linear-lanceolate, remote segments, which are two inches long, and pinnatifid with many rounded lobes: calyx, corolla, stamens, etc., as in the typical species: carpels two, ovate, and, although not yet mature, almost woody, each (perhaps parting into two valves when mature) about 4-seeded: seeds pendulous, membranaceous-winged.

Santa Cruz Island, off Santa Barbara; Mr. Barclay Hazard, 1885. A most beautiful tree, with ample, fern-like, shining foliage, and a red-brown bark, easily torn off in long strips. The inflorescence and young foliage show some of the soft pubescence, which is more plentiful on *L. floribundus*. The fruit of this species, although not yet ripe, as well as the stipules, confirm the genus in *Rosaceae*, and show it to be rather too near *Vauquelinia*; really a section of it.

#### **Ænothera (Chylismia) Cedrosensis.**

Branching from the base, a foot or two high: hirsute-puberulent and slightly viscid-glandular: leaves simple, ovate or more elongated, somewhat cordate at base, repandly toothed, short-petioled: calyx-tube narrowly funnel-form, a half inch long: petals 2—3 lines long, cream-color, changing to rose: capsule an inch long: pedicel only a line or two long: seed ovate and a little angular.

Collected on Cedros Island by Dr. Veatch, in 1859, and recently by the writer, in a single specimen, on a hillside

near the watering place for vessels, on the eastern shore. The species is nearest *Æ. cardiophylla*, Torr.

***Enothera* (*Sphærostigma*) *crassifolia*.**

Frutescent, 3—5 feet high, parting above into numerous spreading, virgate branches: leaves fleshy, glabrous, and very glaucous, oblong-lanceolate, an inch or two long, entire, sessile: calyx-tube short-obconic: petals an inch long, light yellow, the lower portion streaked with crimson, the whole drying deep orange: capsules glabrous, more than an inch long, much contorted: seeds ovate-oblong, smooth, purple-dotted.

Cape San Quentin, Lower California, May 10, 1885. A tall and graceful shrubby species, with a very beautiful corolla.

***Petalonyx linearis*.**

Shrubby, a foot or two high, very rough, branches numerous, erect: leaves linear to linear-oblong, an inch long, 1—3 lines wide, entire, obtuse, sessile: floral bracts ovate, cordate, obtuse, crenate-toothed at base: spikes 2—4 inches long: petals white, 2—3 lines long: filaments and style a half inch: capsule a line long, 3-nerved at base.

Cedros Island, May 1, 1885. Common in cañons of the middle of the island, on the eastern side. The foliage and inflorescence are smoother than in *P. Thurberi*, Gray, the branches rougher. Mr. Orcutt also finds the same at St. Tomas, on the peninsula.

***Echinocystis* (*Megarrhiza*) *macrocarpa*.**

Nearly glabrous: leaves about 6 inches broad, with a closed sinus, 5-cleft to the middle or below it, the divisions slightly 3—5-lobed, mucronate: fruit ovoid-oblong, 3—5 inches long, usually densely echinate with spines which, though stout are rather soft, the longest often exceeding 2 inches, 14-seeded, 12 of the seeds arranged ascendingly

or imbricately, in four cells, the other two lying horizontally across the base of the fruit, both attached to the same side: seed obovoid, 9 lines long, light brown, encircled by a dark, marginal line.—*Megarrhiza Californica*, Watson in Bot. Cal. i. 241, as to the plant of Bigelow from Cocomungo.

A species most distinct from *E. fabacea*, Naud. (*M. Californica*, Watson) which has a globose, 4-seeded fruit, with seeds of twice the size of those of the present species, and which appears to inhabit only the central portions of the State. *E. macrocarpa* takes its place from perhaps Santa Barbara, or a little farther northward, down the peninsula as far at least as Cedros Island.

Concerning the fittest generic name for these plants, it seems to the writer best to conform to that adopted by all European authorities; although if the tropical and South American species referred to *Echinocystis* should not present any clear gradations between such seeds as those of the original *E. lobata* and these turgid ones of the Pacific North American species, one might fairly regard the latter group as constituting a real genus; but *Megarrhiza* could not stand as the name for it, when there is another which has the priority by more than twenty years.

There is one species which does not appear yet to have obtained recognition under *Echinocystis*, namely:

***Echinocystis* (*Megarrhiza*) *Gilensis***, *Megarrhiza Gilensis*, Greene, Bulletin Torr. Club, viii. 97.

Inhabiting the region of the upper Gila River in Arizona and New Mexico; resembling in its slender habit and small leaves and fruit, the eastern type of *Echinocystis*, but with the turgid, immarginate seeds, and perennial root of the Pacific sub-genus.

***Pentachæta* (*Eupentachæta*) *paleacea*.**

A span high, with very numerous filiform branches: involucres small, scales in two series, pubescent, setaceous-tipped: corollas of ray and disk yellow: akenes nearly linear;

pappus-bristles 5, slender, with a thin, triangular palea at base.

Santo Tomas, Lower California, July 1885. C. R. Orcutt. A peculiar species in respect to the paleaceous pappus; in other respects much like *P. aurea*, although a great deal smaller, and more diffusely branching.

#### **Aplopappus junceus.**

Near *A. spinulosus*, but more slender, sparingly leafy, the stems tufted, and two feet high, from a woody base: leaves linear, the lowest broader and pinnatifid, the upper often only three-toothed at apex, lobes and teeth all spinulose-tipped: heads few and corymbose, a half inch high: involucre turbinate, glandular-scabrous, not at all pubescent; scales setaceous-tipped: rays numerous, light yellow: akenes conspicuously nerved. *A. gracilis*, Gray Syn. Fl. ii. 130, as to the plant of the "southern border of California."

San Diego County; Cleveland, Mrs. Curran, and on the peninsula as far down as S. Tomas, Orcutt, 1884-5. Very clear of *A. gracilis*, by its suffrutescent, tall, reedy stems, turbinate involucre and distinctly nerved akenes. It is more related to the more easterly species, *A. spinulosus*, but that, also, like *A. gracilis*, has hemispherical involucre, and both are canescent, this nearly glabrous.

#### **Lessingia adenophora.**

Erect, a foot or two high, and much branched: radical leaves wanting in the specimens: lower cauline ovate-oblong, an inch long, sessile by a broad base, sharply toothed; upper broadly ovate, acute, more or less cordate-clasping; all floccose woolly on both sides, the glabrate margins, especially of the upper, closely beset with stipitate glands: heads 3-4 lines long, 5-8 flowered, terminating slender branchlets: outer involucreal scales stipitate-glandular, the inner sharply acute and with barbellate margins: corollas purple: style-appendages bearing a tuft of hairs, but no

cuspid: akenes not compressed, strongly 5-angled: pappus short, arranged in five separate bundles, which are more or less united at base, or sometimes completely joined into a flat, barbellate awn!

Near Epperson's, in Lake County, 1884; Mrs. M. K. Curran. In aspect much like *L. ramulosa*; but with its broad, glandular marginal leaves it also appears distinct enough at sight; but the character of the pappus is very remarkable.

#### *Lessingia nemaclada*.

A foot or two high, paniculately parted into slender branches and numerous filiform branchlets: leaves lightly floccose above, beneath, as are the involucre, minutely glandular-roughened: involucre solitary, terminating the branchlets, 3—5-flowered, their scales with spreading tips: style-appendages with prominent, subulate tip: pappus of few or many awn-like bristles, which are sometimes united at base, as in the preceding.

El Dorado and Colusa Counties, 1883—4; Mrs. Curran. Evidently a common species in those parts of the State; not likely to pass into the preceding, the involucre of which have appressed scales, and whose style-tips are without cusp. Readily distinguishable from equally slender states of *L. ramulosa* and *L. leptoclada* by its pappus. These two species will form a separate group in the genus.

#### *Lessingia Parryi*.

Somewhat woolly throughout: stems 2—10 inches high, erect and, as compared with *L. nana*, very slender; heads solitary, or few and spicately arranged at the ends of the branches, 12—18-flowered: involucre 12—18-flowered, its bracts as in *L. nana*: corollas pink: pappus rufous: style-appendages bristly, but without pointed tips.—*L. nana*, var. *caulescens*, Gray, Syn. Fl. ii. 163. Found in oak openings above Keene Station, Kern County, in September, 1881, by

Dr. C. C. Parry; also in the same neighborhood in 1884, by Mrs. Curran. This and *L. nana* form a group by themselves, well marked by the peculiar, cartilaginous-aristate, inner scales of the involucre. The stemless habit signifies nothing. Even *L. ramulosa* I have found in the same condition, and it is perhaps rare in *L. nana*, most of our specimens of which have branches 3—5 inches long. These are very stout, rigid and depressed or prostrate. This character, together with its denser wooliness, larger heads, and the deep sultan-red of both the corolla and pappus, the brilliant coloring of the latter being as fresh in our 20-year-old specimens as in those collected last season, are of specific value in this genus. In the slender, erect *L. Parryi*, the corollas are pink, and the pappus only reddish brown. This should come in before *L. nana*, as being intermediate between that and *L. ramulosa*.

#### **Franseria camphorata.**

Shrubby at base, a foot or two high, with spreading branches; canescent-tomentose throughout, resinous, and with a strong camphorate odor: leaves sharply triangular-ovate in outline, bipinnatifid: sterile racemes rather loose, their involucre very sharply toothed, on pedicels 3—4 lines long; fertile involucre densely glandular-pubescent, globose, with short, stout, spine-tipped tuberculations, mostly 3-seeded.—*F. bipinnatifida*, Gray, Proc. Am. Acad. xi. 115.

Collected by the writer on Guadalupe, and also in a less tomentose state on Cedros, 1885. A most distinct species: the 3-seeded involucre small and bony, their spiny tuberculations not flattened.

**Lasthenia (Hologymne) Coulteri.** *L. glabrata*, var. *Coulteri* Gray, Syn. Fl. i, Part ii, 324.

The discovery of the new genus *Crockeria*, a plant wholly undistinguishable from the common *Lasthenia glabrata*, except by the akenes, is an event which naturally raises the value

of characters of the fruit in the entire group to which they belong. But specific rank for the plant above named might have been defended independently of *Crockeria*. Although there is not the least difference between them as regards habit, foliage or flower, the akenes in *L. glabrata* and *L. Coulteri* are considerably more unlike than is indicated in the Synoptical Flora. In *L. glabrata* they are dark green, perfectly smooth and shining, and bear a very conspicuous, yellowish, globular tubercle (enlarged style-base?) at the apex. Those of *L. Coulteri*, besides being narrower, with less acute angles, are of a grayish hue, without luster, glandular-muriculate throughout, with a depressed terminal disk which cannot well be called a tuberculation. The plant thus proposed as a new species, appears to be confined to the salt marshes of San Diego County. *L. glabrata*, Lindl., is common everywhere, on a great variety of soils, towards the sea, in the central and northern portions of the State. *Crockeria chrysantha*, Greene, was found in a subsaline marsh of the remote interior, near Tulare, in Kern County. It may be found elsewhere when our collectors have learned never to judge any plants of this little group by the outward appearance, but always to bring a good lens to bear upon the akene before passing them by uncollected. A skilled botanist would easily mistake any one of the three here named for one of the others, without such precaution.

#### **Senecio ammophilus.**

Annual; a span high, stout, glabrous: leaves thick and succulent, the lowest oblanceolate, entire, an inch or two long; cauline auriculate-clasping, pinnately parted into oblong or linear, entire, obtuse segments: heads few or solitary at the ends of the numerous decumbent branches: rays rather short, deep yellow: akenes cinerous-pubescent.

Cape San Quentin, Lower California, on bleak sand hills near the shore, growing with *Abronia maritima*. Very near *S. Californicus*, but differing in its depressed habit, very

fleshy herbage, strongly saline and hard to dry, and its longer, less canescent akenes.

#### **Senecio Cedrosensis.**

Shrubby, about a foot high, much branched above; branchlets and foliage somewhat pubescent and glandular: leaves an inch or more long, oblong-lanceolate, deeply pinnatifid, the short lobes deeply toothed: heads in threes, or solitary at the ends of the branchlets, less than a half inch high: involueral scales narrow, acuminate: flowers not seen.

Rocky summits of the northern part of Cedros Island, 1885. The specimens are not in flower, but the peculiarities of habit and foliage mark strongly enough a new species. The leaves are like those of *Pedicularis Canadensis*.

#### **Stephanomeria coronaria.**

Annual or biennial, resembling *S. exigua*, but the numerous white-plumose pappus-bristles deciduous above the abruptly paleaceous base, leaving a crown of setose scales: akenes clavate, sharply 5-angled and quite smooth, with no traces of corrugation.

Santa Lucia Mountains, August, 1885, T. S. Brandegee.

#### **Hieracium Brandegei.**

Perennial, a foot or two high, paniculate from near the base: leaves spatulate-oblong to ligulate-lanceolate, entire, crinite-hirsute, and with some close, white, stellular tomentum, the latter extending to the branches and the glandular involucre: flowers yellow: akenes short-columnar: pappus nearly white.

Santa Lucia Mountains, T. S. Brandegee.

#### **Malacothrix (Malacolepis) insularis.**

Annual, glabrous, a foot or two high, corymbosely paniculate above, leafy below: leaves oblong-lanceolate in outline, laciniate-cleft to the middle, two inches long, sessile



and somewhat clasping: involucre hemispherical, less than a half inch high, scales narrower and less scarious than in *M. Coulteri*: corolla yellow: akenes obtusely 5-angled and 15-ribbed: one or two of the pappus-bristles persistent; those of the receptacle sparse and short.

Coronados Island, near San Diego, May 16, 1885. Interesting as a second species of a peculiar section of the genus, and singular in being restricted to a small island only seven miles distant from the main land, a strange limitation of an annual composite; yet perhaps not so remarkable when we consider that the pappus, all but one or two bristles, is deciduous.

***Malacothrix altissima.***

Glabrous; stout and strict, 3—6 feet high from an annual root: stem leafy and simple up to the broad terminal, leafless, corymbose panicle: leaves of broadly lanceolate outline, 2—3 inches long, rather loosely laciniate-cleft or coarsely toothed: involucre campanulate, a half inch high; calyculate bracts numerous, subulate: summit of immature akenes with a broad white border: none of the pappus-bristles persistent.

Mountains of Kern County, near Tehachapi Station, July, 1884, Mrs. Curran. The largest species of the genus, and of the same group as the two following which are suffrutescens, and very clearly distinct from each other, as Mr. Nuttall, the discoverer of them, could not fail to see at a glance, namely:

***M. saxatilis*, Torr. & Gray,**

Which is a strictly maritime species; leaves not only entire, but of that succulent texture which is so common in sea-side plants, and akenes one half as long only, as in the following.

***M. tenuifolia*, Torr. & Gray.**

Foliage finely laciniate-parted, and not at all fleshy. Confined to the mountain districts back from the sea. *M.*

*saxatilis* var. *tenuifolia*, Gray, Syn. Fl. 423. But for the fact that this mountain plant is there separated into two species, *M. saxatilis* and *M. tenuiflora* are best defined in that excellent old book, Torrey and Gray's Fl. N. Am. vol. ii. p. 446-7.

### **Nemacladus capillaris.**

A span to a foot broad and high, very diffuse, the branches almost capillary, glabrous throughout: radical leaves spatulate-oblong; cauline linear-subulate, minute: pedicels capillary, divaricate or a little recurved: calyx-tube slender, long-turbinate, adnate to the lower half of the ovary, teeth ovate, obtuse, half as long as the tube, a little surpassed by the rounded summit of the 7-12-seeded capsule: corolla very minute, white: staminal tube distinct: seed oblong-oval, 10-striate, with numerous transverse lines forming distinct, elongated reticulations.

Mohave Desert, 1884, Mrs. Curran; also a single specimen from Mr. Cleveland, probably from Lake County, 1882.

In this largest, yet most finely capillary species, the mature calyx and capsule are pyriform, and do not exceed a line in length. The staminal tube though permanent is short, to correspond with the exceeding minuteness of all the other floral organs. It is clear, however, that the filaments in this, as in each of the following new species, and in the *N. longiflorus*, Gray, are long-monoadelphous, that is, united for nearly their whole length into a filiform tube. In the original *N. ramosissimus*, Nutt., they are joined firmly, for a very short distance only, just beneath the anthers. In *N. rigidus*, Curran, they are similarly united, but so slightly that the earliest growth of the ovary forces them asunder, so that before falling away they become entirely distinct and free. The seeds in all the species appear to furnish good characters. I have described them as seen under a magnifying power of about twenty diameters.

**Nemacladus rubescens.**

Glabrous, like the preceding, and very similar in foliage and habit: pedicels divaricate or somewhat ascending: calyx-teeth twice as long as the very short tube which is adnate to the base only, of the globose, 20—40-seeded capsule: corolla apparently open-campanulate, without tube, from light rose-color to dark rose-red: staminal tube elongated, equaling the calyx in length: seed oblong, with undulating striæ.

Reno, Nevada, and Mohave Desert; Mrs. Curran, 1884. Most of the Californian "*N. ramosissimus*" of earlier collectors appears to belong here; but the greatly elongated staminal tube and the beautifully undulate-striate seeds will at once distinguish it from that species.

**Nemacladus montanus.**

Radical leaves spatulate-oblong, entire; whole plant glabrous, or with some villous hairs on the inner portion of the base of the pedicels and on the stem opposite: pedicels firmly ascending: calyx-teeth lanceolate, subequal and equaling the turbinate tube, which is adnate to the lower half of the 7—12-seeded capsule: corolla rather large, white, open-campanulate: staminal tube elongated: seed large, ovate-oblong, with longitudinally compressed, zigzag reticulation.

Mountain districts of the central portions of the State: Butte County, Elisha Brooks; Lake County, D. Cleveland; Yo Semite Valley, Mrs. Curran. In respect to the paucity of the seeds, the species is like *N. capillaris*, but the reticulation of them is widely different.

**Nemacladus pinnatifidus.**

Glabrous throughout: radical leaves linear-lanceolate, once or twice pinnatifid, the cauline coarsely toothed: pedicels divaricate, abruptly bent upwards beneath the calyx: calyx-tube short-turbinate, the lanceolate teeth surpassed by the rather acute 15—25-seeded, oval capsule: seed short-oblong, flattened at each end, with longitudinally compressed, favose reticulation.

All Saints Bay, Lower California; collected by the writer, April 16 and May 16, 1885. Mr. Parish's 939, from S. Bernardino Mountains, 1881, is manifestly the same in a very immature condition. In this and the next the corolla is open campanulate, nearly regular, and so small as hardly to surpass the calyx.

***Nemacladus tenuissimus.***

Somewhat cinereous-puberulent throughout, or almost glabrous, very slender: radical leaves elongated linear, remotely dentate, the cauline entire: pedicels capillary, deflexed and appearing secund: calyx-teeth ovate, less than half the length of the turbinate tube, which is adnate to the base of the globose, obtuse 10—20-seeded capsule, which exceeds the calyx: seed short-oval, the favose reticulation very slightly compressed.

All Saints Bay, May 16; also in San Diego County, in the Jamul Valley, C. R. Orcutt.

***Pholisma depressum.***

Stems solitary, completely covered by the rhombic-ovate, or sometimes oblong, closely imbricated scales; flowers in a depressed, barely convex head, an inch or two broad: sepals 6, linear-filiform, minutely glandular-ciliolate: corolla tubular-funnelform, 6-lobed, lilac-purple: stamens shorter and style longer than in the typical species.

Cape San Quentin, Lower California, May 10, 1885. The fruiting specimens of the preceding year show the head to have attained, in maturing, a perfectly globose shape; but the mass of flowers appears nearly flat as it lies on the sand. This species is parasitic on roots of *Aplopappus Berberidis*.

***Gilia (Leptodactylon) Veatchii*, Parry in herb.**

Shrubby and stout, a foot or two high, compactly branching, densely glandular-pubescent, viscid and very fragrant, leaves crowded, spreading, very rigid, acerose, those of the

sterile branchlets commonly all opposite: corolla ochroleucous inside, bronze-purple without, lobes a half inch long, oblanceolate, the broad apex abruptly pointed: anthers linear-oblong, a little exerted from the throat: ovules 4—6 in each cell.

Cedros Island, common on stony hills, forming compact rounded masses a foot or two in breadth and height. First collected in fruit by Dr. Veatch in 1859; obtained in flower by the writer, April 30, 1885. The species is more like the northern *G. pungeus*, than *G. Californica*, but is very distinct from both.

**EUCRYPTA**, *Nuttall, Pl. Gamb. in Journ. Acad. Philad. Ser. 2, i. 158.*

Calyx 5-parted, the sinuses naked. Corolla small, tubular-campanulate, without appendages. Capsule globose, 8-seeded, 2-valved, each valve in dehiscence liberating 2 oblong seeds, and long retaining concealed in a false cell formed by its wall and the placenta, as many meniscoidal ones. Seeds corrugated or smooth; testa not reticulate. Erect, paniculately branching, viscid Pacific-coast annuals, with small racemose flowers. *Ellisia* ? *Eucrypta*, Gray, Proc. Am. Acad. x. 316; Bot. Cal. i. 505; Syn. Fl. ii. 157.

These plants are not at agreement with *Ellisia* in habit. But if they were, capsules of such remarkable structure, and with seeds of two sorts so strikingly dissimilar, neither sort answering to those of *Ellisia* or of any other Hydrophyllaceous genus, must, it seems to the writer, establish strongly enough a genus which was long ago well defined by an eminent authority. The name (meaning "well hidden") is very admirably appropriate; for the pair of flattened seeds (rarely by the abortion of one ovule, solitary) which lie between the wall of the valve and its placenta, are so closely sealed as to have escaped the detection of that great botanist, the late Mr. Bentham, into whose hands one or both of the species fell at an earlier date than that of Mr. Nuttall's treatment of them, and who therefore described

the plant as if it had been a real *Ellisia*. Mr. Nuttall's two species seem good, and are now capable of clearer definition than he gave them.

***E. chrysanthemifolia*.**

One to three feet high, stoutish and widely branching, very leafy; leaves ample and twice or thrice pinnatifid; racemes short and close, not much surpassing the leaves; calyx not stellate-spreading or accrescent in fruit; the lobes ovate, acutish: corolla light blue: free seeds, oblong-oval, corrugated, the concealed ones thin-menisoid, smooth. *E. foliosa*, Nutt., l. c. *Ellisia chrysanthemifolia*, Benth. Trans. Linn. Soc.; A. DC. Prod. ix. 292; Gray, l. c. in part.

Common from San Francisco to San Diego, and on the islands to Guadalupe. Mr. Nuttall's specific name for this plant is good, but must yield before the prior one of Mr. Bentham.

***E. paniculata*, Nutt., l. c.**

More slender than the last and less viscid: leaves fewer and mostly once pinnatifid: racemes loose and elongated, forming an ample panicle: calyx in fruit accrescent and spreading; segments oblong-oval, obtuse: corolla yellowish: free seeds more strongly corrugated than in the last; the concealed ones less menisoid and with distinct traces of corrugation.

Probably not common in California. The specimens now in hand are all from Lower California where they were collected by Mr. Orcutt recently; the collector not unnaturally taking them for a new species of *Ellisia*.

***Phacelia floribunda*.**

Annual; a foot or two high, widely branching; soft-hirsute throughout, and minutely glandular; leaves two or three inches long, one-third as wide, loosely bipinnately parted, the ultimate lobes crenate: spikes very numerous, crowded

at the ends of all the branches: calyx-lobes small, foliaceous, pinnately 3—5-parted: corolla minute, pale blue, stamens scarcely exerted, capsule 2—4-seeded: seeds very dark, closely and deeply pitted. *P. phyllomanica*, var. *interrupta*, Gray, Proc. Am. Acad., xi. 87. Syn. Fl. ii. 161.

Lower parts of Guadalupe Island. In no wise resembling the gigantic half shrubby *P. phyllomanica*, Gray, of the upper precipices, except as regards the pinnately-parted calyx-lobes.

***Eriodictyon crassifolium*, Benth.**

Densely tomentose-villous, the hairs straight: corolla salverform, twice as long as the calyx, densely villous outside: seed finely about 10-striate, with innumerable minute transverse lines. Bot. Sulph. 45. DC. Prod. x. 183.

Common in the neighborhood of San Diego.

***Eriodictyon tomentosum*, Benth. l. c.**

Very densely white or yellowish-tomentose, the hairs matted: corolla scarcely exceeding the calyx, only 2—3 lines long, somewhat urceolate, the inflated throat contracted under the minute lobes: seed-coat nearly smooth (indistinctly favose).

Newly collected by Mr. Brandegee in Monterey County, where it is common.

This and the preceding were unfortunately confounded by Dr. Torrey, in the Botany of the Mexican Boundary, and his view has been adopted by Dr. Gray, Proc. Am. Acad. x. 331. Bot. Cal. i. 518, and Syn. Fl. ii. 176, but no two species of the genus are more distinct. The former is more akin to *E. glutinosum*, as the seeds show, than to *E. tomentosum*.

***Eriodictyon sessilifolium*.**

Six or eight feet high, the branches very leafy up to the flowers, glandular and sparsely hirsute: leaves glabrous and glutinous above, glandular and hirsute on the veins beneath,

and somewhat tomentose between the veins, lanceolate-oblong, acutish, 3—5 inches long, coarsely serrate, margins of serratures revolute, all closely sessile by a broad, truncate or somewhat cordate-clasping base: calyx villous: corolla tubular-funnelform, a half inch long, villous outside, lilac-purple: seed unknown.

All Saints Bay, Lower California, April 16, 1885; but there are other specimens in the herbarium of the Academy, ticketed "Southern California, May, 1876, J. M. Hutchings," so the species occurs somewhere doubtless within the limits of the State.

**Eriodictyon Lobbii.**—*Nama Lobbii*, Gray, Proc. Am. Acad. viii. 37; Bot. Cal. i. 517; Syn. Fl. ii. 175.

Specimens from Donner Lake, collected last year by Mrs. Curran, present us with mature fruit, hitherto unknown. The capsule is 4-valved and 4-seeded, therefore precisely that of *Eriodictyon*, to which genus the plant conforms otherwise in its shrubby habit, resinous viscosity and wooliness, as well as in the attenuation of the sepals; for, in *Nama*, these enlarge upwards. The seed is of the same size as in other species of *Eriodictyon*, and is closely and minutely pitted.

#### **Heliotropium (Euploca) Californicum.**

Annual, with numerous stout, erect-spreading branches a foot long: strongly strigose; hispid throughout: leaves ovate, an inch long, short-petioled: corolla a half inch broad, not angulate lobed: anther-tips firmly coherent: nutlets smooth and glabrous.

Mohave Desert, June, 1884. Mrs. Curran. This is doubtless the "*H. convolvulaceum*" of Bot. Cal. i. 521, said to have been collected near Soda Lake by Dr. Cooper. It is evidently a good species, of which the abundant rigid and harsh pubescence, broad leaves, small corolla with a quite even (not in the least angular) border, and glabrous nutlets, are



quite sufficient characters. It is a question whether this second species, so strictly conformed to the original *Euploca* in habit, does not call for the reinstatement of another Nuttallian genus.

**KRYNITZKIA**, Fischer & Meyer.

‡ *Eukrynitzkia*, Gray.

**K. rostellata.**

Near *K. oxycarya*, but smaller and more slender, the lower leaves and branches opposite: calyx a line and a half long, rather equally hispid with spreading bristles which are straight at tip: nutlet solitary, smooth and shining, ovate-lanceolate, sharply acuminate, subterete, truncate at base, ventral groove bifurcate, and with a small, triangular, open scar.

Lake and Colusa Counties, 1884. Mrs. M. K. Curran.

**K. sparsiflora.**

Near the last species, but only a span high, with few slender branches inclined to be opposite; spikes few flowered, almost filiform: calyx less than a line long, clothed with short, ascending, hooked bristles: nutlet solitary, equaling the calyx, ovate, acute, smooth and shining, compressed, the ventral groove forked at the base but entirely closed.

Collected in 1884, by Mrs. Curran, the locality uncertain, but very likely the same as that of the preceding.

**K. ramosissima**, Gray, partly.

Annual, stoutish, rigid and densely paniculate-branching, a few inches to a foot high: leaves linear-oblong, mostly a half inch long, apparently fleshy, and the smallest subterete, beset with a few coarse, hispid hairs: spikes leafy-bracted: calyx setose-hispid and more or less white-villous; nutlet solitary, ovate-acuminate, brown, smooth and shining, ventral face flat, the groove closed and without any bifurcation, or opening at base.—Proc. Am. Acad. xx. 277, in small part

only; the *Eritrichium racemosum*, Watson, (which is of  $\frac{2}{3}$  *Pseudokrynitzkia*) and the plants of Guadalupe and Cedros Islands being all excluded.

Mohave Desert, Mrs. Curran, 1884. We have also received the same from Mr. Orcutt. That this and the two following were confounded as one species is not unaccountable but that the shrubby *Pseudokrynitzkia* which Mr. Watson well named under *Eritrichium*, should have become associated with these, is rather inexplicable.

#### K. Cedrosensis.

Near the last but stouter and only sparingly branching, the branches decumbent or ascending; leaves larger and less setose: spikes leafy-bracted, short and somewhat glomerate at the ends of short branchlets: calyx villous-hispid but not setose: nutlet solitary, smooth and shining, mottled with darker brown, ovate-acuminate, the ventral face very flat or even a little concave by an introflexion of the sharp lateral angles, the groove open near the base, and with a distinct but short bifurcation.—*K. ramosissima*, Gray, l. c. in part.

Cedros Island, April, 1885. Dr. Gray's cited specimens from the same locality are probably identical, although none are to be found in our collection from Dr. Veatch. The nutlets are very unlike those of the last, and the habit of the species is quite characteristic.

#### K. maritima.

Erect, a span to a foot high, intricately and compactly branching: leaves linear, an inch long, setose with short bristles: spikes elongated, with only here and there a leafy bract: calyx a line long, short-bristly, not villous: nutlet solitary, hardly a half line long, dark brown and shining, ovate-lanceolate in outline, ventral face flat, the closed groove terminating in a triangular or roundish scar. *K. ramosissima*, Gray, l. c. as to the plant of Guadalupe Island.

First collected by Dr. Palmer, in 1875, and again by the present writer, April 26, 1885. This and the preceding all fall into line with *K. oxycarya* and *K. microstachys*, with which they agree in the character of a solitary, smooth and shining nutlet.

**K. foliosa.**

A span or more high, erect, simple, and very leafy below, parting above into numerous ascending branches: spikes in threes, an inch or more long, bractless, crowded: calyx rigid, and armed with short but very stiff subulate bristles: nutlets four, dull brown, muriculate, ventral groove open at base, the short bifurcation not divaricate.

Guadalupe Island; apparently collected by Dr. Palmer, as well as by the writer, and referred to *K. muriculata*, to which it bears little resemblance, except as to the nutlets; and even these differ from those of that species in the character of the basal part of the groove.

**K. denticulata.**

A foot or two high, stout and erect, often with some decumbent branches, very strongly hispid-hirsute throughout: foliage sparse: spikes loose and elongated, mostly in threes: calyx small, its lobes short-lanceolate, hispid, with rufous bristles: nutlets four, dark brown, sharply muriculate, triangular-ovate, with rather obvious, minutely denticulate lateral angles, and an indistinct dorsal ridge, the ventral groove closed, and forked at base.

Western Nevada, 1884, Mrs. Curran. The species may not be rare, and could have been referred, possibly, to *K. muriculata*, but it is very distinct, and the nutlets are, for a *Krynitzkia*, quite peculiar, the back of them suggestive of affinity with *Plagiobothrys Kingii*, which inhabits the same region.

§ *Piptocalyx*.**K. circumscissa**, Gray.

Depressed and diffusely branched: leaves alternate: spikes short, glomerate: nutlets a half line long, light gray, minutely puncticulate, ventral suture divaricate-forked at base. Proc. Am. Acad. xx. 275.

Ranging from Washington Territory to the Southern part of California, and eastward in Nevada. The plant of Nevada and California is many times larger than the original *Lithospermum circumscissum*, H. & A. of the far north, and has a very different pubescence, but the light gray puncticulate nutlets are everywhere the same, and so it may not be well to separate these two; but the following is very distinct, namely:

**K. dichotoma**.

Erect and dichotomously branching, 2—6 inches high: leaves opposite: calyces in the forks of the branches, and along the internodes where they are subtended by a solitary bract: nutlets twice as long as in the last, but not thicker, acuminate, light brown with darker spots, very smooth and shining, basal forking of ventral groove short and not divaricate.

Eastern base of the Sierra Nevada, between Boca and Verdi, 1884; Mrs. Curran.

These plants, with their peculiar habit and circumscissile calyx, appear to call for that subgeneric rank, even in *Krynitzkia*, which was accorded to Dr. Torrey's *Piptocalyx* in the Botany of California.

‡ *Pterygium*, Gray, l. c. in part.

\* *Nutlets winged*.

**K. pterocarya**, Gray, l. c. in part.

One nutlet of the 4 commonly wingless: wings of the

three bright white, terminating at the base of the nutlet, not crossing it; ventral face of nutlet muricate.

Common from Southern California to Washington Territory, and for some distance eastward.

#### **K. cycloptera.**

Nutlets all winged: wings brownish, not abruptly narrowing and ending on each side of the nutlet below, but continuous across the base of it: ventral face not muricate.

Arizona, at Tucson, Pringle, and probably eastward into New Mexico.

This clearly distinct species was, I judge, mixed with the original *Eritrichium pterocaryum*, Torr., for he had plants from far eastward, collected by Wright & Bigelow; but the figure in Bot. Wilkes' Exp. is made from the preceding.

\* \* *Nutlets not winged.*

#### **K. oxygona**, Gray, l. c. 276 in part.

Nutlets sharply angled, and sparsely muriculate.

Mohave Desert. Pringle, 1882.

#### **K. Mohavensis.**

Nutlets not sharply angled, very smooth and shining, with no trace of muriculation.—*K. oxygona*, Gray, l. c. as to the plant of Mrs. Curran.

Muriculate and smooth nutlets are surely inadmissible in the same species, hence the necessity of separating the two last.

The above four species appear to constitute a most natural section of *Krynitzkia*, all being annuals, with a peculiar habit, light green herbage, broad calyx-lobes, and nutlets of a distinctive shape. The presence or absence of wings is shown by the first species, not to be of sub-generic value. The intrusion of *K. holoptera* and *K. setosissima* under *Pterygium* appears to me to be artificial, and destructive of this otherwise well marked section, and I would rigidly exclude them.

§ *Pseudokrynitzkia*, Gray.

**K. racemosa.** *Eritrichium racemosum*, Watson in Gray, Proc. Am. Acad. xvii. 226; *Krynitzkia ramosissima*, Gray l. c. xx. 277, in part, must retain its specific name, which, for the plant described originally, can hardly be considered inappropriate.

The calyces are on pedicels as long as themselves, at least, and the species is a suffrutescent *Pseudokrynitzkia*, whose nutlets are light gray and muriculate, extremely unlike those of the annual *Eukrynitzkias*, which I have distinguished on page 203, preceding.

**Convolvulus luteolus**, Gray.

It is this species, and not *C. occidentalis*, which has the shrubby character described in Bot. Gaz. vii. 93. The following is entirely distinct from it.

**Convolvulus fulcratus.**

Only a foot or two high, not shrubby, feebly, if at all twining, soft-pubescent throughout: bracts foliaceous, and, like the leaves, sagittate: corolla pale yellow: capsule and seed not seen. *C. luteolus*, var. *fulcratus*, Gray, Bot. Cal. i. 534; Syn. Fl. ii. 216.

Foothills of the Sierra, from the central parts of California down to the peninsula, where it has lately been collected by Mr. Cleveland. Remarkably unlike the tall, woody climber with perfectly glabrous foliage, and small, almost subulate bracts; and there are no intermediate forms.

**Convolvulus macrostegius.**

Suffrutescent, the trailing or climbing stems, with their herbaceous flowering branches 6—15 feet long: glabrous throughout: leaves triangular-hastate, 2—3 inches long, and as broad at base, on petioles of about the same length: peduncles 6—8 inches long, usually 3-flowered, a pair of large, loose membranaceo-foliaceous bracts inclosing all the buds, the lateral flowers each similarly bracted within the outer

bracts: corolla pale yellow, the broad limb only surpassing the bracts: fruit unknown. *C. occidentalis*, Watson, Proc. Am. Acad. xi. 118, not of Gray.

Guadalupe Island, in the crevices of basaltic cliffs, and also spreading over rocky declivities at lower elevations. The peduncles are often 5-flowered, each bud, even then, foliaceous-bracted, save that the exterior pair of general bracts always serves as the involucre of the central flower; or, in other words, this one is otherwise bractless.

### ***Physalis muriculata.***

Less than a foot high, branching, and more or less decumbent: root perennial: herbage soft-pubescent and slightly viscid: leaves thin, ovate, repand, an inch long, on slender petioles of equal length: corolla small, greenish, with darker spots at base: fruiting calyx oval, muriculate, especially along the prominent, purplish angles.

Lower California, at Cape San Quentin, May 10, 1885.

### ***Nicotiana petuniæflora.***

Two or three feet high, stout, viscid-pubescent and somewhat hispid-scabrous: radical leaves oblong-lanceolate, 3—4 inches long on slender petioles; cauline linear-lanceolate, longer than the radical, on shorter petioles: calyx-teeth triangular-lanceolate: corolla an inch and a quarter long, salverform, white changing to bronze-purple; limb three-fourths of an inch broad, with very shallow, scarcely noticeable, rounded, or even retuse lobes.

Guadalupe Island. Placed under *N. Bigelovii*, by Mr. Watson (Proc. Am. Acad. xi. 117), and under *N. attenuata* by Dr. Gray (Syn. Fl. ii. 243), but not properly referable to either, the characters of the handsome, vespertine corolla being quite peculiar, and the hispid pubescence not appertaining to those species.

**Diplacus arachnoideus.**

Somewhat viscid throughout, the calyx and young foliage whitish arachnoid-tomentose: leaves lanceolate, entire or sparingly toothed, subcoriaceous: calyx more than an inch long, distinctly widened below the middle and contracted above it; teeth triangular-lanceolate: corolla more than two inches long, nearly white, drying pale buff; tube narrowly funnelform; lobes quadrate-oblong, slightly toothed: pod with no apical tuberculation.

A most beautiful species, with large corollas almost white, found only by the writer, at All Saints Bay, Lower California, April 16, 1885.

The pale-flowered species of the mountains back of San Diego, and of the northern part of the peninsula, collected by Messrs. Cleveland and Orcutt, are *D. longiflorus* and *D. leptanthus*, both excellent species, the former readily distinguishable from all others by the deeply sinuate-cleft corolla-lobes, the latter differing from *D. glutinosus* by its linear, entire, coriaceous leaves, and capsule without apical tubercle. Of the five southern species recognizable, only *D. puniceus* and *D. stellatus* have the tubercle. *D. arachnoideus* is readily distinguished from all the old species by its cobwebby pubescence.

**Diplacus stellatus**, Kellogg, Pro. Cal. Acad. ii. 18; Greene, Bull. Cal. Acad. iii. 95,

Was found again, by the writer, on Cedros Island, last May. The corolla is like that of *D. glutinosus* in form and color, but only half as large. The pubescence is chiefly a dense, short yellow tomentum. The pod has the tuberculation. The species is, in my opinion, well confirmed.

**Verbena lilacina.**

Suffrutescent, much branched, erect, 2—4 feet high, sparingly short-hirsute and somewhat scabrous; branches stout, 4—6-angled, sparingly leafy: leaves bipinnatifid, the divis-



ions remote, the ultimate lobes linear-subulate, acute: inflorescence depressed-capitate, becoming spicate in fruit: bracts setaceous-attenuate, shorter than the calyx: calyx-teeth equal, subulate-setaceous: corolla small, pale lilac, very fragrant: nutlets small, light brown, nearly smooth, retrorsely hispidulous on the commissure.

Cedros Island, May 1, 1885. Common in gravelly arroyos not far from the shore.

### *Monardella thymifolia*.

Shrubby, much branched, a foot high, soft-pubescent: leaves ovate, entire, 2—4 lines long, on petioles of less than a line: heads small, 15—25-flowered: bracts herbaceous, ovate, rather acute, parallel-veined, their margins hirsute-ciliate: calyx-teeth lanceolate, pubescent: corolla 5—7 lines long, purplish, tube much exerted, somewhat trumpet-shaped, twice as long as the limb.

Rocky ravines, near the summits of Cedros Island, May 1, 1885. More decidedly shrubby than any other known species, growing in compact, rounded masses a foot or two thick.

### *Salvia* (Echinosphece) *Bernardina*, S. B. Parish, in herb.

Suffrutescent, several feet high, somewhat puberulent or glabrate: leaves rugose and green above, paler beneath, lanceolate, 2 inches long, pinnately lobed, the lobes crenate: numerous verticillastrate heads an inch in diameter: calyx naked within, its arcuate upper lip tipped with three aristiform teeth, which are commonly united almost to the end into two or one, greatly surpassing the two singly aristate lobes of the lower: corolla purple, surpassing the calyx.

Near San Bernardino, 1885; S. B. Parish.

That this singular plant, altogether resembling an *Audibertia*, should have been found at this late period in the history of San Bernardino botany, in a single specimen, goes to confirm a suspicion which the aspect of the speci-

mens suggests, that it may be a hybrid product of *Audibertia stachyoides* fertilized by *Salvia Columbarice*. The structure of the corolla is that of the *Salvia*, even to the polliniferous lower anther-cell.

**Salvia (Calosphace) Cedrosensis.**

Shrub 1—3 feet high, branches white-tomentose, the hairs branching: leaves green and not rugose above, white beneath, ovate, with cuneate, truncate or cordate base, crenate, 6—10 lines long, on short petioles: flowers in short, rather dense, naked racemes: calyx funnelform, four lines long, striate-veined, the three very short lobes entire, mucronate-pointed; pedicel less than a line long: corolla deep blue, twice the length of the calyx: filaments naked: style villous above.

Cedros Island, April 28, 1885. Common at middle and higher elevations. Related to *S. ballotæflora* and *S. platycheila*.

**Polygonum (Avicularia) Austinæ.**

Erect-spreading, branching from the base, a span high, glabrous except the minutely scabrous angles of the branches near the joints: leaves ovate-lanceolate, acute, sessile, a half inch long, the floral much reduced: stipules short-campanulate, not lacerate: flowers in all the axils, mostly a pair in each: pedicels very short, abruptly deflexed: sepals obtuse, completely and closely investing the rather narrowly ovate, smooth and shining akene.

Modoc County, on the northern border of the State, on sage-brush plains; Mrs. R. M. Austin, 1884-5. The species closely resembles *P. Engelmanni* (see page 126), but has broader leaves, entire stipules, and a thrice larger nutlet, which does not, in maturity even, at all surpass the perianth.

**Pterostegia fruticosa.**

Shrubby, diffusely branched, firmly erect, 2—4 feet high,

densely leafy: branchlets short-jointed, tomentulose at the joints: leaves glabrate, fleshy, obovate-spatulate, entire, obtuse or retuse, 2—5 lines long: involucre firm-hyaline, reddish, with darker reticulate veins, 5—7 lines long, deeply cleft into two entire, reniform lobes: wings reniform, entire, unequal, one of them one-third, the other two-thirds the length of the involucre: akene ovate-lanceolate, two lines long, sharply triquetrous: perianth a half line long, persistent.

Cedros Island; first collected (in a small fragment, with one involucre) by Dr. Veatch, long ago. It is the commonest bush on all the lower and middle elevations of the island; a hard, brittle-wooded evergreen, almost the only thing to give a look of verdure to the sunburnt slopes at the dry season of the year.

#### ***Pterostegia galioides.***

Shrubby, a foot or two high, diffusely branched, the branches slender, weak and reclining: foliage and branchlets minutely and sparingly pubescent: leaves linear-spatulate, a half inch long, hardly a line wide, acutish: involucre thin-hyaline, white, with reddish reticulation, scarcely lobed (the folds when spread presenting a merely obcordate outline of the whole), a half inch long: wings equal, erect, bladdery-inflated, nearly an inch long: akene broadly lanceolate, three lines long: persistent sepals half a line.

A weak under shrub, with the aspect of a *Galium* climbing up among the branches of depressed masses of *Rhus integrifolia* on the bluffs of Cape San Quentin, Lower California. This and the preceding species must be reckoned among the most remarkable additions to Pacific American botany that have been made for some years. There is nothing in the aspect of either of them to suggest at first any close relationship with the little prostrate herb, *P. drymarioides*; nevertheless, an examination of the involucre reveals no character by which either of them could be generically separated

from that plant. The flowers of both are unknown, and the species are described from such fruit as could be picked up from the ground, under the bushes which produced them. It may well be that *M. macroptera* of Magdalena Bay, further down the peninsula, partially fills the hiatus between these and our common little annual, for that is described as having a root probably perennial, fleshy leaves, and a large, peculiar involucre.

### Agave Sebastiania.

Acaulescent: leaves numerous, ascending, thick, glaucous, about a foot long, ovate-lanceolate, widest above the middle, tapering into a stout spine two inches long: marginal spines remote, divaricate or deflexed: scape very stout, 6—10 feet high; panicle short and crowded, its branches stout, ascending: umbels many-flowered: flowers yellow; corolla one and a half inches long, the tube broad funnel-form, two-thirds as long as the segments; stamens more than twice the length of the corolla, a little exceeded by the style: capsule linear, prismatic, three inches long.

Cedros and Natividad Islands; also (according to the seal hunters) on the peninsular shores of the beautiful bay of Sebastian Viscaïno. It is more like *A. Parryi* of New Mexico than any other, but very distinct from it, and a much larger plant than its nearest California relative, which is *A. deserti*.

### 3. Notes on Guadalupe Island.

The Island of Guadalupe lies about midway of the great peninsula of Lower California, and at a distance of about one hundred miles from its coast. It is twenty miles or more in length by eight or ten in breadth, and is of volcanic origin. A tract of land so large, rising out of the sea at so considerable a distance from the continent, would be expected to prove an interesting field for studies in natural history.

The first naturalist to visit Guadalupe was Dr. Edward Palmer, who was landed there in the month of February, 1875, remaining until May. A most interesting account of the vegetation of the island was published, from Dr. Palmer's notes and specimens, by Mr. Sereno Watson, in the beginning of 1876, in the eleventh volume of the Proceedings of the American Academy of Arts and Sciences.

So intelligent and so zealous a collector as Dr. Palmer, passing there so many weeks, at so favorable a season of the year, would not be likely to leave much for succeeding explorers to do. Nevertheless, I was made very glad last winter by the prospect of an opportunity of making myself the second scientific voyager to—

“This sweet lone isle amid the sea.”

Sailing from San Diego toward evening on the 16th of April, on board a little sloop of ten tons' burden, with one fellow naturalist and two seamen, we made our sail of three hundred and thirty miles in about fifty hours, anchoring in the late twilight, close under the two thousand feet of perpendicular cliffs that rise abruptly from the ocean to form the northeastern shore of Guadalupe.

The early morning light disclosed at a very short distance from our moorings, a narrow line of beach under the cliffs, and on this beach a line of low cabins, their walls made of boulders, and their roofs consisting of a thatch of palm leaves. The dwellers in this rude maritime village are a band of some forty Lower California soldiers, who have been stationed there since the beginning of 1884, by the Mexican Government, to prevent the wholesale slaughter of the goats, of which there are many thousands still on the island, notwithstanding the fact that for some two or three years prior to 1884, many a cargo of goat skins and tallow had been taken to San Diego.

Our first labor, upon landing, was that of climbing to the summit of the island, a distance of five or six miles, by a

steep, zigzag trail; for Guadalupe is simply a large table-land about three thousand feet high, its volcanic, rocky sides being in most places too precipitous for even a goat to climb, and almost wholly barren. The plateau is interrupted by a central ridge, some points of which rise a thousand feet higher; but the table-land section of the island is pleasant ground, with a considerable breadth of open, grassy plain, some miles of cypress woods, and several springs of excellent water; although there are no streams that flow after the winter rains have ceased. Our long and slow ascent from the beach to the camping place, near the principal spring on the island, occupied the first half day, but was far from being a tedious or uninteresting pilgrimage. Our blankets and provisions were borne on the shoulders of a half dozen of the Indian soldiers; and we were free to range about and examine the new forms of plant life which began to appear as soon as we had, by zigzag climbing, risen out of the cañon where our trail began. The gentler declivity now leading to the plateau was covered with the really very handsome *Senecio Palmeri*, a shrub three or four feet high, with snow-white foliage and fine clusters of yellow blossoms. Erect, half-shrubby plants of lower growth, namely, *Sphaeralcea sulphurea* and *Hosackia ornithopus*, were also quite abundant, together with a fine, wild morning glory, which spread its long trailing branches abroad among the rocks, and was just putting forth its earliest creamy-white corollas. The latter are almost half hidden by their large, leafy involueral bracts, and the plant is in no wise referable to the *Convolvulus occidentalis* of California. It has been described on a preceding page as *C. macrostegius*. All four of the conspicuous plants that first meet the eye of the botanist here, are peculiar to the island. Another plant of these same middle altitudes is not so new; but the failure of my predecessor in this field to either collect or make a note of its presence on the island, I cannot account for. I refer to *Brodiea capitata*, which is found exceedingly common, not

only at this point, but also on the table-land, all about the spring, and differing rather strikingly from the rankest California specimens in its much greater size. Its leaves, in Guadalupe, are an inch broad, and its scape not seldom more than three feet high.

Our abode, for the week of our sojourn, was taken up in one of the palm-thatched cabins which the soldiers have constructed near the springs for their own convenience, while hunting goats on these elevated meadow-lands. The cabins stand in the midst of a fine cypress grove, and we were soon familiar with the characteristics of this peculiar species. A near relative of the Monterey cypress (*Cupressus macrocarpa*), it is nevertheless of a very different aspect, with its smooth, scaly bark and short, conical head. It is still more distinct from *Cupressus Arizonica*, with which it has nothing in common but the glaucescent foliage. The tallest specimens of *Cupressus Guadalupeensis* do not exceed fifty feet in height, and their trunks near the ground are three feet, more or less, in thickness. This tree appears formerly to have occupied almost the entire plateau of the northern half of the island; but now, upon the greater part of this tract, only the fallen trunks, far gone in decay, remain. The cause of its destruction I cannot guess. Guadalupe has never been inhabited except very temporarily by shipwrecked or seal-hunting sailors, or fugitives from Mexico. It is easy to conceive that fires might have devastated any part, but there is no evidence that the fallen trees were destroyed by flames. If they had been their decay would have been less rapid, and charring would remain visible upon the last relics of the wood. A cedar tree (*Juniperus Californica* var. *osteosperma*, Engelm.), which appears to have covered, in former times, the south part of the island, is now upon the very verge of extermination. Only ten years ago Dr. Palmer observed it, "all over the middle of the island \* \* \* forming groves about fifteen feet high." In this year of 1885 there were remaining, of the grove in

the middle of the island, only three trees that were not quite dead; and on these three, only a few tufts of green twigs gave the feeble sign of nearly exhausted vitality. Only on a southeastern cliff, hanging over the sea, did I find a tree vigorous enough to be bearing some well formed fruit. It is possible that a succession of very dry years may have wrought this havoc among these arboreal products of Guadalupe. Whether this be the cause or not there is, however, no one to tell us; but, at all events, the botanist on Guadalupe ten years hence, will hardly be likely to find this juniper surviving for enumeration on the list of living plants. The other forest trees of the island are a good sized pine, some groves of which adorn a considerable length of that very high and narrow ridge which makes the northeastern extremity of land, and an oak, of which there are not to exceed a half dozen individuals. The pine resemble a *Pinus insignis*, or "Monterey Pine," but has smoother cones, and its leaves are in pairs instead of threes. It is otherwise the same, and was named by the late Dr. Engelmann *P. insignis*, var. *binata*. The oak is a large, very handsome tree, with rounded head, large, dark evergreen leaves, and acorns larger than in perhaps any other species. It does not in any way resemble, as a tree, our *Quercus chrysolepis* of California, with which Dr. Engelmann would have compared it; but it has been published as distinct, under the name of *Q. tomentella*, Engelm.

The climate of Guadalupe appears to be colder in winter than that of the coast regions of even the central part of California, a circumstance owing, no doubt, to its lying more directly in the path of winds and currents that come down from arctic seas; and yet there flourishes in the cañons a tall and handsome palm, which bears an edible fruit, and is the sole product of the island which looks-tropical. The herbaceous vegetation, consisting chiefly of annual species, must vary greatly in both quantity and variety in different years, according as the winter rains are scant or copious. The



present year must have been one of unusual drought; for the entire plateau of the southern half of the island was a sunburnt waste, with hardly a leaf of living verdure; and yet the sere stems of the preceding year's growth were knee high everywhere, showing that the rains on Guadalupe in 1884 must have been as unusually copious as they were in the southern parts of California for that year. The northern half of the island is less dependent upon actual rainfall, so constant and so heavy are the fogs that envelop all its higher and more fertile altitudes. The vicinity of the springs, the district of highest fertility, would naturally, in the absence of all human occupants, become the favorite pasture ground for the destructive flocks of goats. The presence of the small garrison must already have had a favorable effect upon the vegetation of this very best part of the island. A detail of soldiers is sent here daily with donkeys and water-casks, after the supply of water for their encampment on the beach five or six miles below; and as often as twice a week a certain number encamp here under the cypress trees to hunt goats on the ridges and mesas above. Consequently the timid flocks never come near these freshest of all pastures, and a rank vegetation is the result. Twelve of the fifteen species which I have added to the former list of Guadalupe plants were found in this particular district.

These general observations may be concluded with two or three remarks upon the fauna of the island. Of indigenous quadrupeds I saw nothing larger than mice; but these were very abundant, yet hardly more plentiful than a certain natural enemy of theirs which has become naturalized, namely, the domestic cat. From almost any little clump of bushes, or from behind any rock, the herbalist may startle into most swift, precipitous flight a large, sleek, handsome, well fed feline. The rocky places abound not only in mice, but in a species of wren, that is tame and confiding beyond the habit of any wild bird one meets with elsewhere; and on

the mice and the wrens the cats, by whatever chance they became adventive on this lonely shore, have fared well, multiplied freely, and reverted to the original wildness of their prehistoric progenitors. Birds are numerous, especially in the dense cypress woods which crown the very highest middle region of the island, above the springs, where the morning air is resonant with varied song. Of reptiles I met with only two or three small lizards. In the moist parts of the plateau are plenty of shallow and tepid pools, fed by springs, but not even a tadpole was visible; and both soldiers and seamen assured me that none of the toad or frog race were ever seen or heard on Guadalupe. Most other islands off the coast of Mexico are commonly reported to be alive with snakes; but no one charges this remoter and more oceanic pile with harboring serpents of any sort; and during my seven days of incessant rambling and climbing, I did not see one.

In the subjoined list of plants, the species marked \* were not noted by Dr. Palmer, and are additional to Mr. Watson's list, published ten years since. Those marked † were not observed by me.

4. *A Catalogue of the Flowering Plants and Ferns of Guadalupe Island.*

\*MYOSURUS MINIMUS, Linn. In the middle of the island, and also at the north end, near springs. The specimens are large, and belong to a peculiar, very slender form, which is common in California, from San Francisco to San Diego.

RANUNCULUS HEBECARPUS, Hook. & Arn. Only in the shade of a large tree of *Quercus tomentella*, Engelm. Shorter and stouter than the Californian plant; the akenes more numerous.

CROSSOSOMA CALIFORNICUM, Nutt. Wood very brittle, exhaling a pleasant, birchy fragrance when freshly broken

\**ESCHSCHOLTZIA CALIFORNICA*, Cham. Root perennial: stems robust, two feet high: petals orange, two inches long. The true *E. Californica*, luxuriating in one place only, near the edge of a precipice, northeast of the cabins. Possibly of recent introduction.

*ESCHSCHOLTZIA ELEGANS*, Greene. (See page 182.)

*ESCHSCHOLTZIA ELEGANS*, var. *RAMOSA*, Greene. (See page 182.)

\**BRASSICA CAMPESTRIS*, Linn. A few plants near the cabins; the species apparently not yet well established.

†*BRASSICA NIGRA*, Boiss.

*SISYMBRIUM CANESCENS*, Nutt.

*SISYMBRIUM REFLEXUM*, Nutt.

†*LEPIDIUM MENZIESII*, DC.

*LEPIDIUM LASIOCARPUM*, Nutt.

†*THYSANOCARPUS ERECTUS*, Watson.

*OLIGOMERIS SUBLULATA*, Boiss.

*SILENE GALLICA*, Linn. Very common in, and in the neighborhood of, the lower cypress groves.

†*SILENE ANTIRRHINA*, Linn.

*STELLARIA NITENS*, Nutt. Under oak trees at the north end.

*CALANDRINIA MENZIESII*, Hook. Much smaller than in California; always prostrate; an albino state very frequent.

*CLAYTONIA PERFOLIATA*, Donn. Corolla smaller and more purple than in California.

*MALVA BOREALIS*, Wallm. Very common on the eastward slope.

LAVATERA OCCIDENTALIS, Watson, Proc. Am. Acad. xi. 124. Shrub larger than described; the large ones ten feet high.

SPHERALCEA SULPHUREA, Watson, l. c. 125. Stems ascending, or the lowest prostrate.

ERODIUM CICUTARIUM, L'Her.

ERODIUM MOSCHATUM, L'Her. Very little was seen of either species of the pin clover.

†RHAMNUS CROCEA, Nutt.

CEANOTHUS CRASSIFOLIUS, Torr. Only a small seedling plant, near the cabins. Dr. Palmer's locality for the shrub was not visited by the writer.

†CEANOTHUS CUNEATUS, Nutt.

RHUS LAURINA, Nutt.

LUPINUS NIVEUS, Watson, l. c. 126. Only one flowering specimen seen, and that almost inaccessible; but numerous seedlings of this, or else of an annual species with the same pubescence, were growing on level ground south and west of the cabins, where the goats no longer range.

\*LUPINUS GUADALUPENSIS, Greene. (See page 184.)

TRIFOLIUM PALMERI, Watson.

TRIFOLIUM MICROCEPHALUM, Pursh.

†TRIFOLIUM AMPLECTENS, Torr. & Gray.

HOSACKIA GRANDIFLOTA, Benth. A single plant, in a nearly inaccessible crevice. No trace of it left "among trees in the middle of the island."

HOSACKIA ORNITHOPUS, Greene. (See page 185.)

VICIA EXIGUA, Nutt. Not uncommon; the specimens thrifty.

ALCHEMILLA OCCIDENTALIS, Nutt.

†RIBES SANGUINEUM, Pursh.

TILLÆA MINIMA, Miers.

EPILOBIUM MINUTUM, Lindl. Two or three plants found in the locality indicated by Dr. Palmer.

†EITHERA GUADALUPENSIS, Watson.

†MENTZELIA DISPERSA, Watson.

\*MENTZELIA MICRANTHA, Torr. & Gray. Only on the beach, near the landing. Probably of recent introduction.

ECHINOCYSTIS GUADALUPENSIS, Naudin. The fruit of this species is conspicuously flattened laterally.

\*MAMILLARIA GOODRIDGII, Scheer. A single specimen, of fair size and in flower, toward the south end of the island.

\*OPUNTIA PROLIFERA, Engelm. Rather common on precipitous, rocky places near the sea, on both sides of the island, but especially plentiful near the landing; smaller than in California.

\*MESEMBRYANTHEMUM CRYSTALLINUM, Linn. On the beach at the landing.

DAUCUS PUSILLUS, Michx.

GALIAM APARINE, Linn.

†GALIAM ANGULOSUM, Gray.

CORETHROGYNE CANA. *Diplostephium canum*, Gray, Proc. Am. Acad. xi. 75. I find this shrub generically inseparable from *Corethrogyne detonsa*, Greene, Bull. Torr. Club, x. 41, and differing from it mainly in having thinner, entire leaves, smaller heads, and probably yellow corollas; for, although it was not found in flower by me, I have no reason to doubt the statement of so careful an observer as Dr. Palmer. If

this be the case, there will still be no need to propose a new genus, since, in the one standing nearest to *Corethrogyne*, separated from it indeed by the character of the corolla alone, namely, *Lessingia*, the flowers are, in some species, yellow, in others purple, (never, however, "white," as in Syn. Fl. ii. 54, they are said to be "in most species"). *C. detonsa* is still as imperfectly known as when published; and of *C. cana* I saw but one plant, but that one fully six feet high. Both these species are shrubby; but so is that commonest of all species, *C. filaginifolia*, Nutt., at least at base.

†MICROPUS CALIFORNICUS, Fisch. & May.

\*FILAGO CALIFORNICA, Nutt. A fine growth of this species about the springs, north of the middle portion of the island.

FILAGO ARIZONICA, Gray. Dry mesas toward the south end.

GRAPHALIUM SPRENGELII, Hook. & Arn. Only one plant seen.

FRANSERIA CAMPHORATA, Greene. (See page 192.)

†LEPTOSYNE GIGANTEA, Kellogg.

HEMIZONIA FRUTESCENS, Gray. Only one suffrutescent plant seen, and that on the precipice. It is common on the level ground and hillsides, and, in such places, strictly annual.

PERITYLE INCANA, Gray.

PERITYLE CALIFORNICA, Benth.

BÆRIA PALMERI, Gray.

†ERIOPHYLLUM CÆSPITOSUM, Dougl.

AMBLYOPAPPUS PUSILLUS, Hook. & Arn.

MATRICARIA DISCOIDEA, DC.

ARTEMISIA CALIFORNICA, Less.

SENECIO PALMERI, Gray.

MICROSERIS LINEARIFOLIA, Gray. Abundant and very rank about the springs and the cypress groves, where the goats do not now range.

MALACOTHRIX CLEVELANDI, Gray.

\*TROXIMON HETEROPHYLLUM, Greene. About the springs, in grassy ground; fine large specimens, of the ordinary form only.

SONCHUS OLERACEUS, Linn. Now very common on the eastward slope of the island.

GITHOPSIS SPECULARIOIDES, Nutt.

SPECULARIA BIFLORA, Gray.

\*ARCTOSTAPHYLOS —————? A single seedling plant of not more than two or three years' growth, found under a cypress; species apparently new.

DODECATHEON MEADIA, Linn.

ANAGALLIS ARVENSIS, Linn. Only one plant, on the top of the island.

†HESPERELÆA PALMERI, Gray.

GILIA DIVARICATA, Nutt.

GILIA MULTICAULIS, Benth. A very marked form with corolla, calyx and capsule twice as long as in the plant of California; the leaves also much more dissected.

GILIA PUSILLA, Benth. Agreeing with the South American type of the species; not with the var. *Californica*, Gray.

NEMOPHILA RACEMOSA, Nutt. Common in the middle of the island; and the name *N. aurita*, Lindley, in Watson's

list, must have been an error, for I saw no trace of that species. The two are indeed closely related, yet sufficiently distinct.

EUCRYPTA CHRYSANTHEMIFOLIA, Greene. (See page 200.)

PHACELIA PHYLLOMANICA, Gray. Shrubby below, and often more than six feet high; the largest species known.

PHACELIA FLORIBUNDA, Greene. (See page 200.)

EMMENANTHE PENDULIFLORA, Benth. Abundant, very large and handsome, far surpassing what one sees of this species in California.

HARPAGONELLA PALMERI, Gray.

†PECTOCARYA PENICILLATA, A. DC.

KRYNITZKIA MARITIMA, Greene. (See page 204.)

KRYNITZKIA FOLIOSA, Greene. (See page 205.)

CONVOLVULUS MACROSTEGIUS, Greene. (See page 208.)

SOLANUM DOUGLASII, Dunal. Two plants seen, in the cañon near the beach; perhaps the very same individuals seen by Dr. Palmer in the same spot; for this plant is a shrub, wrongly referred to as *S. nigrum*, which is annual.

SOLANUM XANTI, var. WALLACEI, Gray. Common on the plateau, in round, compact masses three feet and more in height and thickness. The dense villous and glandular pubescence, and large, pale corollas should apparently entitle this island plant to the rank of a species. True *S. Xanti*, as regards the plant of California, is usually quite glabrous.

†LYCIUM CALIFORNICUM, Nutt.

NICOTIANA PETUNÆFLORA, Greene. (See page 209.)

†LINARIA CANADENSIS, Dumont.

ANTIRRHINUM NUTTALLIANUM, Benth.



ANTIRRHINUM SPECIOSUM, Gray.

EUNANUS LATIFOLIUS, Greene.

†CASTILLERIA FOLIOLOSA, Hook. & Arn.

CALAMINTHA PALMERI, Gray.

†POGOGYNE TENUIFLORA, Gray.

PLANTAGO PATAGONICA, Jacq.

MIRABILIS CALIFORNICA, Gray. Seen only near the beach,  
on the eastern side.

CHENOPODIUM ALBUM, Linn.

\*CHENOPODIUM MURALE, Linn. A few plants near the land-  
ing; evidently a new comer.

ATRIplex PALMERI, Gray.

PTEROSTEGIA DRYMARIOIDES, Fisch. & Mey.

HESPEROCNIDE TENELLA, Torr.

PARIETARIA DEBILIS, Forst.

QUERCUS TOMENTELLA, Englm. (See page 218.)

†PHORADENDRON BOLLEANUM, Eichler.

CUPRESSUS GUADALUPENSIS, Watson. (See page 217.)

JUNIPERUS CALIFORNICA, Carr. (See page 217.)

PINUS INSIGNIS, Dougl., var. BINATA, Engelm. (See page  
216.)

\*BRODLEA CAPITATA, Benth. (See page 216.)

JUNCUS BUFONIUS, Linn.

ERYTHLEA EDULIS, Watson.

MUHLENBERGIA DEBILIS, Trin.

\**POLYPOGON MONSPELIENSIS*, Desf. Common about springs.

*AVENA FATUA*, Linn. Very little seen; apparently not established.

*MELICA IMPERFECTA*, Trin. Only one tuft, in a place inaccessible to goats.

†*STENOCHLOE CALIFORNICA*, Nutt.

*BROMUS MAXIMUS*, Desf. Abundant; not even goats are fond of it.

\**HORDEUM MURINUM*, Linn. A grass which goats will probably not prevent from overspreading all fertile parts of the island. Only a few tufts were seen, near the cabins on the plateau; but the seed is there, and it will hardly fail to become abundant.

*FESTUCA MICROSTACHYS*, Nutt.

*POLYPODIUM CALIFORNICUM*, Kaulf.

†*POLYPODIUM SCOULERI*, Hook. Dr. Palmer's gathering of it from "the trunk of a single oak" may have proved the extermination of the species on this island.

†*GYMNOGRAMME TRIANGULARIS*, Kaulf.

*NOTHOLENA NEWBERRYI*, Eaton.

†*PELLEA ORNITHOPUS*, Hook.

†*ASPIDIUM MUNITUM*, Kaulf.