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OBSERVATIONS ON THE COMPOSITÆ.—I.

By EDWARD L. GREENE.

THE history of this largest of the Families of Flowering Plants is coeval with the beginnings of systematic botany. Exactly three centuries have passed since Zaluzian named and defined the Class of "COMPOSITÆ;" and a little more than a century later Vaillant, the first great specialist in this family, gave an acceptable system of the genera. Both these founders excluded the Cichoriaceæ, or lettuce tribe, and the Carduaceæ, or thistles, as separate natural families; and so did nearly all authors, except Adanson and Linnæus, down to the beginning of the present century. The three Orders, severally represented by the thistles, the lettuce-worts, and the true Compositæ (Corymbiferæ of Vaillant, Jussieu and others) will, I think, ultimately be accepted as perfectly natural and entirely distinct and legitimate families. Of my reasons for accepting the Cichoriaceæ as a separate Natural Order, I gave a statement some three or four years since (Pitt. i. 297, 298).

To the philosophy and the classification of the Compositæ, in the most comprehensive use of that name, the most important contributors within the present century have been Cassini, DeCandolle, Lessing, Bentham and Baillon. In North America where representatives of the order excessively abound, the following names, Rafinesque, Nuttall, Elliott and Gray, are conspicuous among those who elaborated new materials, as these were gathered, and who proposed the greatest number of new species and new genera. But only the mere foundations of a rational and consistent classification, and of a valid and stable nomenclature for our Compositæ, seem yet to have been laid; and doubtless the most careful and diligent labors of several generations of specialists yet to come, will be necessary to the establishing of the foundations and the rearing of a good superstructure; for in

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America especially, the field is very vast, the forms multifarious and intricate, and the characters of groups often obscure and uncertain; and the present writer, though enjoying the advantage of a far more extensive field knowledge of these plants than has been in the possession of any of his predecessors, approaches the task of reviewing the genera with much diffidence and with some fears; but at the same time with none of that convenient conservatism—if weak and nerveless timidity be not its fitter designation—which agrees to things established because they are established, even when convinced that the establishment rests on a phytological absurdity, or an authorial piracy.

The series of papers here inaugurated will be given mainly to the delimitation of American genera and species, and to the correction of their nomenclature; taking up the tribes, for convenience sake, in about the order given in Bentham and Hooker's *Genera Plantarum*.

For the nomenclature of genera, we are not disposed to recognize any particular initial date. Even the year 1700, which is the one involving less of injustice and untruthfulness than any other, can not be fixed upon without transgressing repeatedly the fundamental law of priority; for many good botanists before Tournefort had established new genera by clear diagnoses, or good figures of their types, or by unmistakable known equivalents. While, however, we are strongly disposed to take up, in general, the oldest names, paying no particular deference to the years 1753, or 1737, or 1735, or even 1700, we can not but regard some points in the Linnæan reform as well taken: for example, that of the rejection of such comparative names as those ending in *oides*; a good proposition which even such a classicist as Adanson could not but approve and give second to. At this point, however, it may be well to remark, that Dr. Kuntze's proposal to alter such names so as to end in *odes*, seems a wise one, and, with the consent of a world's congress, one might like to follow that precedent.

Tribe I: VERNONIACEÆ.

MORE closely allied to the Asteroideæ than to any other group, and resembling them considerably in general appearance, and characters of involucre; they differ in being destitute of ligulate or ray corollas, in having sagittate anthers, subulate style-branches, and flowers never yellow, but varying from white to red and purple or blue, throughout the forty genera. In general appearance many of the species are analogous to Eupatoriaceæ, while certain others so simulate the genus *Serratula*, of the Cynarocephalæ as to have been actually so referred when they were new and had been subjected to no more than a superficial examination. The most conspicuous and common Vernoniaceous plant of the United States was named *Serratula Noveboracensis* by Dillenius, and accepted as a good member of that genus by the "immortal Linnæus" himself.

But the excellent floral distinctions by which all these are kept far apart from *Serratula* and other thistle-like plants, are now well known to every student of the Compositæ.

No other suborder is so feebly represented in North America as this of the Vernoniaceæ; and we have but three genera; one of them monotypical, namely *Stokesia*. This also was first published as a veritable thistlewort, under the name of *Carthamus lævis* (Hill. Hort. Kew. 57. t. 5 (1769)); but was proposed as the type of a genus by L'Heritier some eighteen years later, who gave it a new specific name. It should be called STOKESIA LÆVIS (Hill), rather than *S. Cyanea*, L'Her.

The principal genus of the suborder, *Vernonia*, is one of those which fell under the bibliographical inspection of Dr. Kuntze, with the result that place is given by him, in his *Revisio Generum*, to the name *Cacalia* instead. This was given by Burmann, in 1737, and, had it not been an old name, long applied to a different genus, it would have become the valid name of this one. The same thing, substantially, is true of Hill's synonym, *Behen*, which also antedates *Vernonia* by more than twenty years; so that VERNONIA being the first

new name ever assigned the genus, must, by the simple law of priority, be retained as the only valid one. In the nomenclature of the American species as given in the Synoptical Flora, I have noted but one manifest error, the suppression of the earliest name for a species belonging to the Arkansas flora.

V. CRINITA, Raf. New Flora, n. 932 (1836): *V. Arkansana*, DC. Prodr. vii. 264 (1838). A comparison of the descriptions leaves no doubt concerning the identity.

NOVITATES OCCIDENTALES.—I.

By EDWARD L. GREENE.

***Pulsatilla multiceps*.** Dwarf, with multicapitous caudex whose branches are densely clothed with persistent petioles of former seasons: leaves ternately dissected into oblong-cuneiform divisions: scapes slender and very short: involucre leaves cleft to the middle only, or somewhat more deeply, into two or three lanceolate segments: sepals villous on the outside, about $\frac{1}{2}$ inch long, lavender-color: fruit unknown.

Porcupine River, northern Alaska, J. Henry Turner, 1891. In habit, character of involucre and size of flowers quite distinct from all, even the most northerly Alaskan states of the common *P. hirsutissima*; neither answering to any of the European species of the genus.

***Potentilla scopulorum*.** Stems only a foot high, erect, from rather slender and proliferous horizontal rootstocks; herbage hirsute-pubescent and somewhat glandular, but not heavy-scented: leaves erect, of thinnish texture; leaflets in about 5 pairs, the lowest very small, all deeply incise-toothed: cymes contracted: corollas nearly an inch in diameter, pale yellow.

Open pine woods of the Colorado Rocky Mountains, at middle elevations, and very common; by its horizontal and

proliferous rootstocks so multiplying underground as to form broad masses. The flowers are strikingly large and showy. The species is, of course, an analogue of *P. glandulosa* of the Pacific Coast, though very distinct. In habitat it seems restricted to Colorado and New Mexico; the *P. fissa*, Nutt., of Montana and Idaho being more like *glandulosa*, though also very likely quite distinct from both.

Potentilla ambigens. Stout and tall, 2 feet high or more, the stem and petioles densely villous-hirsute: radical leaves firm, erect, a foot long, of about 5 pairs of oblong or linear-oblong deeply and regularly serrate leaflets, two inches long or more; cauline similar, but smaller: flowers small, yellow, in a loose and ample cymose panicle.

Moist meadows along Bear Creek, above Morrison, Colorado, July, 1889: associated with *P. arguta* and *Pennsylvanica*, and apparently rare; at all events, during all my former years of residence in Colorado I met with no such plant.

POTENTILLA PLATTENSIS var. (?) **leucophylla.** Lowest leaves nearly as in the type, though more pubescent, the succeeding and somewhat larger ones, white with a dense and fine silky tomentum which extends in a degree to floral leaves and calyx.

Independence Lake, in the Sierra Nevada, Calif., 26 June, 1892, C. F. Sonne. Certainly a most remarkable plant, in view of the abrupt transition from the pale green and nearly glabrous leaves of true *P. Plattensis* to such as are as white-tomentose as ever seen in any member of this genus. A plant almost like this is in Mr. Pringle's collection of 1881, from somewhere towards Mt. Shasta.

Potentilla Micheneri. Stems only 6 or 8 inches high, tufted from a strong tap-root: leaves linear, 3 or 4 inches long, with about 15 pair of crowded but not imbricated small leaflets, these 5 to 7-parted into oblong entire obtuse segments: younger leaves and reddish stems somewhat villous; cyme terminal, contracted, or even compact when young: petals

cuneate-obcordate, exceeding the calyx, white: stamens 10, all with oblong-petaloid white filaments, the alternate ones smaller.

Southern flanks of Mt. Tamalpais, 1 June, 1892, C. G. Michener. By the distinctly obcordate petals this becomes a notable accession to the *Horkelia* group of this genus.

***Sanicula nemoralis*.** Erect, rather slender, a foot high, from a perpendicular root: leaves mostly radical, bipinnately 3 to 7-parted, the divisions decurrent upon the rachis as a narrow entire wing: the several ascending branches bearing compound umbels with elongated rays: flowers few in the head, yellow: fruit small, broader than long, the whole surface covered with uncinata prickles which are strongly fistulate-enlarged or inflated from the base to near the middle.

My types of this are two good specimens collected by Bolander at the Big Trees and in the Yosemite Valley, and preserved in the herbarium of the University at Berkeley. I think these represent what has been called a yellow-flowered state of the Coast Range species, *S. bipinnatifida*; but they surely represent something as distinct as need be.

***Sanicula septentrionalis*.** Erect, slender, simple or sparingly branching, scarcely a foot high: leaves few and small (1 inch long); radical of rounded general outline (as broad as long), the ternate-lobed leaflets obovate; cauline relatively longer and of more deltoid outline: umbels small, of only 2 or 3 short slender simple rays: flowers yellow: fruit prickly throughout.

Type, a plant from Vancouver Island, June 4, 1887, Macoun, distributed under the name *S. Nevadensis*; but that is a low and stout, almost diffuse plant, of totally different habit, and large angular much dissected foliage, to which such a plant as this can not be joined even as a variety, upon any recognized principles of phytography.

***Sanicula saxatilis*.** Stems many, depressed, a foot long, from a fleshy napiform root of the size of a walnut; leaves ternately pinnate, the ultimate segments broad, coarsely

toothed: flowering branches repeatedly dichotomous, with heads (pedicellate) in all the forks: involucels small, of very unequal foliaceous entire or toothed bractlets: petals salmon-color; anthers yellow; sterile flowers on long pedicels: fruit strongly tuberculate, the tubercles of the upper part ending in a broadly subulate incurved point.

Deeply imbedded, as to the root and main stem, in loose rocks, at the summit of Mt. Diablo; only a single plant found; allied to *S. tuberosa*, but root and foliage altogether different, as also the whole habit.

Senecio Blochmanæ. Tufted perennial; stems erect, 3 or 4 feet high, simple and leafy up to the fastigate-corymbose summit; herbage glabrous, heavy-scented: leaves linear-filiform, entire, 2 to 4 inches long, recurved or deflexed: heads cylindrical, $\frac{1}{2}$ inch high or more; rays 5 to 8, light yellow: achenes hoary with a short strigulose pubescence; pappus copious, very white and soft.

Plentiful along the Santa Maria River, San Luis Obispo Co., Calif., Mrs. Blochman; flowering in October and November.

Microseris indivisa. Stoutish, the many scapes 1 to $1\frac{1}{2}$ feet high: leaves ascending, 6 inches long, mostly oblanceolate and entire, some of the earlier coarsely and saliently toothed: heads very large (the flowers and achenes more than 100): outer row of achenes silvery-silky, the others glabrous, chestnut-brown, all about 2 lines long, bearing a pappus 5 lines long, the bristles 5, whitish, barbellulate and persistent, the base dilated into a small triangular-lanceolate palea.

Plains of the Sacramento, about Elmira, Vacaville, etc.; nearest *M. aphantocarpha*, a species of the seaboard, with more slender, shorter, scarcely even scabrous, fragile and deciduous pappus of mostly 2 or 3 bristles, (these with broadly ovate paleaceous base), and leaves always deeply pinnatifid.

STUDIES IN THE CALIFORNIAN
UMBELLIFERÆ—I.

By WILLIS L. JEPSON.

Angelica Californica. Caulescent, 4 feet high, roughish-puberulent on the leaves and ends of the rays, the stem glabrous: leaves biternate or quinate, then once pinnate or partially bipinnate: leaflets broadly ovate, 2 inches long, the terminal mostly 3-lobed at summit, the lower often lobed or divided at base, all irregularly serrate with the serratures mucronulate: peduncles bearing at or near their middle broadly dilated bracts: rays 40 to 50, unequal, 1 to 6 inches long; pedicels sub-equal, 3 lines long: flowers white: fruit (nearly mature) oblong, 2 to $2\frac{1}{2}$ lines wide, 4 to $4\frac{1}{2}$ lines long, dorsal and intermediate ribs winged, lateral wings less than width of the body; oil tubes 3 in the intervals (some often obscure or wanting), two on the commissural face, laterally disposed.

Gates Cañon, Vaca Mountains, June 20, 1892. In habit and general appearance this comes nearest *A. tomentosa*. In leaflet character it strikingly resembles some forms of that species, although the leaflets are always smaller and usually much thinner. *A. tomentosa* is, besides, hoary-tomentose, has equal rays, and solitary depressed oil-tubes in the intervals.

LEPTOTÆNIA CALIFORNICA, Nutt., var. **platycarpa**. Caul-
escent, 4 feet high, glabrous throughout, leaves biternate,
then pinnate, petioles dilated: leaflets cuneate-obovate, 3-
lobed, or the terminal 3-parted, the lobes coarsely toothed;
rays equal, 2 to 3 inches long, pedicels subequal, five lines
long: flowers yellow: fruit oblong-ovoid, 5 lines wide, 7
lines long, broadly winged, emarginate at both ends; oil
tubes, 6 on the commissural face, 3 in the intervals.

Collected at nearly two thousand feet altitude in Gates
Cañon, Vaca Mountains; in flower March 25, in fruit, June
20, 1892. Ranked as a variety by reason of its greater

size, more leafy stem, larger and more broadly winged fruit. There is a sharp cut about the leaflets in all stages not visible in specimens that represent well the type. Some of the oil-tubes, especially the lateral on the commissural face and those of the lateral intervals, branch and anastomose giving, in cross-section, the appearance of additional oil-tubes. An oil-tube surrounds the body of the fruit in the wing on the commissural face. One carpel of the pair has a strong longitudinal ridge; the face of the other is usually concave and the carpel empty.

Peucedanum robustum. Acaulescent, glabrous, 2 feet high, with 1 to 3 peduncles; leaves ternate, then pinnate; leaflets broadly ovate or oblong, sessile, sparingly serrate or toothed above: peduncles and rays dilated at summit; rays 15 to 21, unequal, $\frac{1}{2}$ to 8 inches long, pedicels sub-equal, 2 lines long: fruit $2\frac{1}{2}$ to 3 lines wide, $4\frac{1}{2}$ to 5 lines long, the wing half as broad as the body; oil-tubes broad, solitary in the intervals, six on the commissural face, the lateral in pairs; no involucre nor involucels.

Plains of the Sacramento, east of Cannon's Station; in flower and in immature fruit, May 14, and in mature fruit, June 18, 1892. Most nearly allied to *P. leiocarpum*, first collected by Douglas, "near Fort Vancouver on the Columbia," over five hundred miles north of the station in Solano County where the species under consideration was gathered. The differences do not however rest on geographical distances. *P. leiocarpum* has narrower petiolulate leaflets, longer and narrower fruit with narrower margins, fewer oil-tubes, and longer pedicels—these exceeding the mature carpels. In the original figure and description of that species (Hook. Fl. Bor.-Am. i, 263, t. 93) there is given no hint of the strikingly dilated peduncles and rays described by Nuttall and characteristic of the Californian plants referred to *P. leiocarpum*. As far as the illustration is concerned, this may be because the figure was drawn from a sterile specimen—such are said to be without this remarkable dilatation—but the plant was grown at Kew, and therefrom were drawn a figure and des-

cription of the immature fruit. The leaves in my plant make little show alongside of the tall and very stout peduncles. The petioles of the earlier are broadly dilated and enclose later ones which are simply ternate, on very long petioles (often 8 inches long) dilated only at the base.

PEUCEDANUM HASSEL. C. & R. Collected on the summit of the Vaca Mountains, June 20, 1892, three hundred and fifty miles north of the original locality in Los Angeles county. My specimens agree well with those from the first station, the only difference being that the leaflets are smaller and thicker. The plant is sub-accaulescent, 16 inches high; the very broad-winged fruit 7 lines wide and 8 lines long; oil-tubes 4 on the face and 4 on the back, with occasionally an additional one in one of the lateral intervals.

THE MOUNTAIN REGION OF CLEAR LAKE.

By WILLIS L. JEPSON.

It has been known for at least a decade that the mountain region about Clear Lake was an area of considerable botanical interest. A few collectors have been there within that period, chiefly during the dry summer season, and have returned with new and valued plants. Henry Bolander and Dr. Torrey were there long ago but apparently brought away few of the plants that give a local color to the collections since made. Such rarities in herbaria as *Astragalus Clevelandi*, *Ceanothus divergens*, *Chorizanthe Clevelandi*, *Enothera hirtella*, *Lessingia adenophora* and *Solanoa purpurascens* come from these mountains and the valleys lying between them; and *Potentilla Bolanderi*, *Linum Clevelandi*, *L. drymarioides* and *Navarretia mitracarpa* are not known from beyond the borders of Lake County.

Clear Lake is in the heart of the Coast Range, seventy miles north of the Bay of San Francisco. It is some twenty-two miles in extreme length and is girt about by ridges which

lie for the most part in a northerly and southerly direction. To the north and to the south of the lake are clusters of mountain peaks situated in the main ridges and in the transverse ridges which join them. The group to the north includes Mt. Sanhedrim, Mt. Hull, Snow Mountain, Big Horse Mountain and Elk Mountain, all lying about the headwaters of the south fork of the Eel River, which empties into the Pacific Ocean, and of minor streams which finally flow over the plains of the Sacramento to the river of that name. Again, to the south of the lake are a number of other peaks more scattered. The nearest is Uncle Sam Mountain, of volcanic formation, the next is Mt. Hannah, while Pluton Peak, Geyser Peak, Mt. St. Helena and others are much further south. These groups of peaks, especially in their summer vegetation, possess exceptional interest. Some of the plants, as has been indicated, are peculiar to this region, while others of wide distribution or common occurrence elsewhere are to be found only in limited areas or in peculiar soils or situations. So that each mountain plateau, each "chaparral" ridge, each valley or each marsh displays in its vegetation certain distinctive floral aspects or characteristics which may be only in part due to purely local plants.

The dividing line between the counties of Napa and Lake follows the ridge beyond the Knoxville mines. This is a vantage point of observation. Just to the east is the abrupt western wall of the inmost Coast Range ridge bounding the valley of the Sacramento. That is a dividing line of local importance in plant distribution in the Coast Range. The eastern slope of the ridge is more gradual, and the vegetation of the yellow foothills at its base is affected by the characteristics of the Sacramento Valley. From the various turns in the grade of the wagon-road, one may see stretching away to the south and southwest, a series of purple-hued ridges terminated on the horizon by the huge shoulders of Mt. St. Helena, the great landmark of all this country. That mountain is the headquarters of a local plant district, the

northern outskirts of which there is no difficulty in tracing along the lower slopes of Mt. Hannah and on the volcanic ridges in the neighborhood of Uncle Sam Mountain. Just beyond this Knoxville ridge one meets for the first time with plants indicative of what I have termed the "Clear Lake Region." The composition of the "chaparral," or dense brush of the higher mountain slopes, is similar to that of other portions of the Coast Range; *Adenostoma*, *Cercocarpus*, *Ceanothus* and *Arctostaphylos* abound. There are, besides, bunches of *Garrya Fremonti*, scattered individuals of *Ceanothus divergens*, *Quercus dumosa*, var. *bullata*, in abundance, and occasionally *Rhamnus ilicifolia*. Here, too, I met for the first time the yellow blossoms of *Capnorchis chrysantha*, while the marshy spots about springs were bright yellow and ashen gray, with the colors of *Senecio Clevelandi*, and *Stachys albens*. *Erythraea trichantha* grows too in rather moist places, and there are in the driest soil, such more common plants as *Linum Californicum* and *L. spergulinum*, *Hypericum concinnum*, *Eriogonum dasyanthemum*, *Galium Andrewsii*, and *Gnaphalium Californicum*.

A considerable elevation is reached again on the slopes south of Uncle Sam Mountain. The "opens" in the "chaparral" blush with an amount of color unusual in the Coast Range in the last days of July. There is *Hypericum anagalloides*, the beautiful scarlet *Silene Californica*, *Eriogonum vimineum*, very common, *Clarkia rhomboidea*, *Mentzelia micrantha*, *Eriophyllum caespitosum*, *Gomphocarpus cordifolius*, in fruit, *Phacelia ramosissima*, *Emmenanthe penduliflora*, *Antirrhinum virga*, *Penstemon azureus*, *Eunanus Bolanderi*, in a rank bushy form a foot and a half in height, and *Verbena prostrata*; while on the "bottle-stone" or obsidian formation, grows *Chorizanthe Clevelandi*, *Oxytheca hirtiflora*, a *Nemacladus* of uncertain species, *Scutellaria Bolanderi*, and *Quercus Wislizeni* in a shrubby form.

One or two small marshes border the shores of Clear Lake

near its upper end. There one finds *Rumex persicarioides*, *Ludwigia palustris*, the orange-colored flowers of *Nymphæa advena*, *Brasenia peltata*, *Cœnanthe Californica* and *Alisma Plantago aquatica*. Some of the fertile valleys which border the lake shore and retreat into the hills are watered by surface and underground streams. Annuals and herbaceous perennials form extensive thickets four to ten feet high. There are such native plants as psoralea, epilobium and artemisia; such introduced weeds as sweet-clover, parsley and catnip. Supremely graceful oaks, eighty to one hundred feet in height, with slender trunks and only slightly diverging main branches, flourish in the rich well-watered soil. Over some of these the California grape-vine has hung its drapery of foliage, forming beautiful tall columns ten feet or more in diameter.

North of Upper Lake a wagon-road crosses the ridge of Elk Mountain to the water-shed of the south fork of Eel River. In the pine forests grows *Erigeron inornatus*, *Campanula prenanthoides* and *Brodicæa Ida-Maia*. Many other plants are found only around mountain springs. Such are *Lotus Torreyi*, *Agrimonia Eupatoria*, *Potentilla elata*, *Sidalcea Oregana*, *Hypericum Scouleri*, *Habenaria elegans*, *Gyrostachys gemmipara*, and *Lilium pardalinum*.

One finds throughout this region well-marked local plant districts with distinctive features, even in areas of similar topographical features. The high slopes about Uncle Sam Mountain are strikingly different from similar altitudes to the north of the lake, and as different, too, from the ridges of the Vaca Mountains, fifty miles southeastward. There was, however, little diversity in the plants of stream beds; everywhere on a circuit of three-hundred miles I found *Eriogonum virgatum*, *Mentzelia lævecaulis*, *Chrysopsis Oregana*, *Senecio eurycephalus*, *Nicotiana attenuata*, *Verbascum virgatum*, *Mimetanthe pilosa* and *Trichostema laxum*. The flora of the foot-hills likewise changes little and is pretty constantly composed of *Croton setigerus*,

Boisduvalia densiflora, *Hemizonia pauciflora*, *Gnaphalium palustre* and *Trichostema lanceolatum*.

A few of the plants not noticed above, find place in the following annotated list, chiefly those deserving mention by reason of constant peculiarities or extension of range.

Trifolium roscidum, Greene, Fl. Fr. 31. Springs on Big Horse Mt.

Glycyrrhiza glutinosa, Nutt., in T. & G. Fl. i, 298. Near Blue Lakes.

Ceanothus Parryi, Trel. Proc. Cal. Acad. 2d. ser. i, 109. South of Uncle Sam Mountain.

Linum adenophyllum, Gray, Proc. Am. Acad. viii, 624. Little Squaw Valley, south fork of Eel River.

Polygonum Parryi, Greene, Bull. Torr. Club. viii, 99. Gravelly bed of the Eel River near Hullville. Hitherto reported only from the Sierra Nevada.

Polygonum Californicum, Meisn. in DC. Prodr. xiv, 100. With the preceding.

Oxytheca hirtiflora, (Gray) Greene, Fl. Fr. 153. With larger bracts than in the type; the involucre less deeply cleft and only 2-flowered. Obsidian ridges near Uncle Sam Mountain.

Ludwigia diffusa, var. *Californica*, Greene, Fl. Fr. 227. In marshes near Lakeport.

***Streptanthus hesperidis*.** Annual, only 6 inches high, glabrous in every part, few-branched from near the base, the branches more or less divaricate: radical leaves unknown, floral elliptic or oval, cordate-clasping: flowers disposed in a somewhat flexuous raceme; calyx regular, sepals acute, the tips recurved, apices of the lateral with scarious margins; upper petals white, lower dark purple, with purple veins and white margins: upper pair of filaments wholly connate, bearing reduced but polliniferous anthers; middle pair slender, lowest much broader: silique 2 inches long, torulose; seeds oblong, somewhat flattened, over $\frac{1}{2}$ line long.

Knoxville grade to Lower Lake, July 28, 1892. One of

the smaller *Streptanthi*. Its place in the genus will be near *S. tortuosus*, Kellogg. The leaves usually bear near their apex 2 or 3 callous-tipped denticulations. The species is named in allusion to the resemblance which the knotted pods bear to those of *Hesperis*.

Lepidium intermedium, Gray, Pl. Wr. ii, 15. Scott Valley.

Argemone munita, Dur. & Hilg. Pac. R. Rep. vol. v, t. 1. Sand-banks of the Eel River.

Cornus glabrata, Benth. Bot. Sulph. 18. Fork of Middle Creek, near foot of Elk Mountain grade.

Cephalanthus occidentalis, Linn. Sp. Pl. i, 95. Blue Lakes.

Lessingia adenophora, Greene, Bull. Cal. Acad. i, 190. Plentiful on the mountains near Knoxville.

Arctostaphylos elegans. A shrub 10 or 12 feet high: leaves bright green, glabrous, obovate and elliptic, acute or obtuse, 1 to 1½ inches long, both surfaces somewhat rugulose, petioles 3 lines long: inflorescence glabrous, the rachis dilated upward, pedicels 3 to 5 lines long, bracts deltoid-ovate 1 to 1½ lines long, the upper portion jointed and deciduous: flowers unknown; fruit depressed-globose, more or less umbilicate, 4 lines high, 6 lines broad, of variously angular rather than orbicular outline viewed from above, 2 or 3 of the 5 or 7 drupelets consolidated.

Covering the undulating obsidian slopes south of Uncle Sam Mountain, July 29, 1892. Nearly all my specimens show leaves with dark purple veins and reticulations.

Fraxinus Oregana, Nutt. Sylva, iii, 59. t. 99. This ash, with alder and laurel, fringing water-courses in Scott Valley. Handsome trees, 70 to 90 feet high.

Asclepias eriocarpa, Benth. Pl. Hartw. 323. Putah Cañon and northward in the hills for forty miles. Not previously known north of Monterey.

Gilia capillaris, Kellogg, Proc. Cal. Acad. v, 46. Credited hitherto only to the Sierra Nevada and northward,

Linanthus filipes, (Benth.) Greene, Pitt. ii, 255. South fork of the Eel River.

Navarretia tagetina, Greene, Pitt. i, 137. Pericarp thin, transparent, indehiscent; seeds two, agglutinated, notably pitted. The characters of the mature fruit, now known, will cause the transfer of this to the first group, "Pericarp hyaline and indehiscent," in the monograph of *Navarretia*, Pitt. i, 130. South fork of the Eel River.

Navarretia mellita, Greene, Pitt. i. 134. Near Kelseyville.

Navarretia atractyloides, H. & A. Bot. Beech. 368. Near Lower Lake.

Lemmonia Californica, Gray, Proc. Am. Acad. xii, 162. On the ridges south of Uncle Sam Mountain. The original station is the "desert region of San Bernardino County."

Navarretia mitracarpa, Greene, Pitt. i, 135. Near Uncle Sam Mountain.

Pentstemon Lemmoni, Gray, Bot. Cal. i, 557. One of the most common and widely distributed of *Pentstemon*s in the mountains of Solano, Lake and portions of Napa and Sonoma.

Pentstemon corymbosus, Benth. in DC. Prodr. x, 593. On rocky cliffs near base of Elk Mountain grade.

Pogogyne Douglasii, Benth. Lab. 414. Very abundant; empurpling meadows in Big Valley.

TWO NEW CALIFORNIAN PLANTS.

By F. T. BIOLETTI.

Gnaphalium bicolor. ^{1 m.} Shrubby at base, about 2 or 3 feet high, branching, leafy up to the inflorescence; very strongly scented: cauline leaves about 2 inches long, acute, linear-lanceolate, with broad, cordate or somewhat auricled, slightly decurrent base; floral leaves smaller, cordate-acuminate; upper surface of leaves deep green, densely covered with short glandular hairs, a little wool only at the base of the mid rib; lower surface and stems densely white-woolly: glomerules compact, arranged in somewhat fastigiate, loose or close panicles; heads $2\frac{1}{2}$ lines long, about 75-flowered; involucre pearly becoming sordid; outer bracts oval, acute,

scarious; inner ones with ovate-oblong scarious limb narrowed to a broadly linear, green-herbaceous base.

Common in low thickets among the coast hills about San Diego, according to Prof. Greene. Distinguished readily from *G. leucocephalum* by its suffrutescens character, its very different leaves, and dense glandular indument. Its green-herbaceous inner bracts and peculiar spicy odor are also very characteristic. The description is drawn up from dried specimens from San Diego and from a plant growing in the Garden of Native Plants at the University of California.

Collinsia Franciscana. From $\frac{1}{2}$ to $2\frac{1}{2}$ ft. high; low and erect or tall and reclining on neighboring plants: glabrous below, minutely viscid pubescent above: leaves ovate or ovate-lanceolate, the upper sessile, the lower shortly petioled: flowers from 1 to 3 in the axils of the leaves and bracts, or 5 to 6 in the axils of the uppermost bracts: pedicels from slightly shorter to two or three times as long as the calyx lobes, much elongated in fruit: corolla 8 to 12 lines long; upper lip white, purple spotted at base; throat a fourth longer than wide, closed at the mouth and almost glabrous within or scantily hispidulous; upper filaments slightly bearded; gland subulate, the abortive anther yellowish and glabrous, the filamentous portion thicker, about a third as long, white and hispidulous: calyx lobes but slightly exceeding the ovary: seeds 8 to 12 in each cell, rugulose.

Abundant in several localities in the San Francisco peninsula; hitherto passed over as *C. bicolor* which it resembles in its large size and showy flowers. In character, however, it approaches more nearly to *C. sparsiflora*. It is in a way intermediate between the long-pedicelled, few-flowered group and that with many and sessile flowers. From *C. bicolor* it is readily distinguished by its accrescent pedicels, closed throat and bluish color, while its large and sometimes numerous flowers, its succulent texture and numerous seeds, make it impossible to confuse it with any species in the long-pedicelled group.

TERATOLOGICAL NOTES.

LEPTOSYNE MARITIMA, Gray. Interesting cases of different degrees of reversion have recently come to our notice in the flowers of *Leptosyne maritima*, growing in the botanical garden of the University of California. The plants in question produced a profusion of the normal flowers during the summer and early autumn, but after the early autumnal rains, the heads were observed to be more or less reverted. At the date of writing (Dec. 12) the bracts of the involucre are in most heads only slightly abnormal, but the *paleæ* of the receptacle are much elongated and foliaceous, though entire. The ovary and adherent calyx-tube are slenderly prolonged, sometimes to the length of three-fourths of an inch; the corolla is not very different from its normal development except in being of a greenish color; the anthers, which are wholly distinct from each other, are represented only by small scarious appendages upon the somewhat elongated filaments. But the most interesting feature is exhibited in the style, which often protrudes an inch beyond the orifice of the corolla and shows all degrees of bifurcation, from a slight cleft at the apex to complete division. The style-branches are often divided after the manner of the true foliage, the segments varying from three to five in number. In color these transformed styles are nearly as dark-green as the ordinary leaves. In one head pronounced proliferation occurs between the style-branches, the shoot thus produced bearing in some cases six or seven organs which are entire, though leaf-like in other respects. It was observed that in most cases where proliferation occurs, the style-branches also are entire.

Masters, in his "Vegetable Teratology," mentions *Coreopsis* among the plants in which median floral proliferation has been observed, but we are not aware that the phenomenon has hitherto been recorded in our own very closely allied plant.

TROPÆOLUM MAJUS, Linn. Unusually good examples of reversion in the flowers of this species were recently sent to the herbarium of the University from Napa, Cal., by Miss Cornwell, a former student of botany here. Reversion in the flowers of this species is said to be not uncommon, still we think it is not often that the petals are replaced by perfectly peltate leaves of the ordinary type, as is the case in our example. The pistil is represented by three petiolate leaves, which, however, are scarcely peltate. These three leaves grow from the apex of a stipe which projects about three-eighths of an inch beyond the place of insertion of the other transformed floral organs.

Tropæolum is not mentioned by Masters among the plants in which phyllody of pistils has been noticed.

MARSHALL A. HOWE.

REVIEWS AND CRITICISMS.

A Peculiar Case of Plant Dissemination. By EDWARD L. BERTHOUD. Bot. Gaz. xvii, 321-326.

To deduce wise-sounding conclusions from the premises of a very few facts, though not a new mode of exercise for the human mind, is becoming notably prevalent, if not actually within the domain of modern science, at least along the borders of that realm. During the past year I seem to have noticed that an increased number of speculators along the scientific border-land, have managed to figure somewhere as scientific writers. The article above named furnishes a remarkable case in point, and will repay inspection. The writer's leading proposition may be given in his own words: "I can show to some extent that, between the Missouri River and the Rocky Mountains, the American buffalo has been an efficient agent in plant dissemination."

It is everywhere known that, through the settlement of any new country by a civilized people, domesticated animals

become in various ways vehicles for the chance introduction of foreign plants and weeds into the flora of such country. This is a thing which has been repeatedly established by authentic record. Nor is it impossible that even the American buffalo may have been the means of a wider dispersion of some species of plants; and it were to be wished that Mr. Borthoud had been in a position to give us some evidence; but I have read this paper again and again in earnest but fruitless search for any proof of what he undertook to demonstrate. I fear that he did not appreciate the difficulties of the situation before he began to write. If the case had been this, that the buffalo had begun to traverse the regions in question some ten or twenty or even fifty years before the advent of the botanists, then might one with some reason look for some exceptional and introduced species along their trails, and around their wallows. But, if up and down those vast stretches of country those native herds had ranged, as every one will grant they may have done, during ten thousand years anterior to the coming of Mr. Berthoud, it seems likely that about all which they could accomplish in the way of dispersing plants might easily have been done several thousands of years before, not Mr. Berthoud, but his remotest human progenitor, father Adam. Whatever species had planted themselves along the trails made in far off ages of the past, may well be believed to have spread over the whole country, by gradual adaptation to new surroundings, if not before Adam's time, at least before our day by some hundred generations. Nevertheless, the writer of the paper under notice speaks of having found, only about thirty years ago, along the buffalo trails, many plants "generally or altogether foreign to a prairie country;" and he gives a list of twenty names of such. This list, if it had been definite and correct, would have furnished a problem of some sort, though perhaps no very difficult one, and one the solution of which might have been made without a thought of the wild animals. But, as a list of twenty or twenty-five names, this one is so framed as to be incapable of giving the

slightest support to any hypothesis whatever. It is (1) too indefinite; for he names genera only, rather than species, for the most part. But (2), in so far as he ventures to mention species, what he says of their natural distribution is not true. In the third place (3), he gives names of plants which I dare say neither he nor any one else ever saw in that country at all. Fourthly (4), the paper abounds in evidence that the writer does not know with certainty any genera or species of the country about which he is writing; and lastly (5), he makes statements regarding recent introduction of plants into Colorado, which any botanist well acquainted with the country may boldly contradict.

I shall now proceed to state, with brevity, the grounds upon which I make these five serious accusations against this pretentious but worse than worthless article; taking them up in inverse order. My fifth charge is warranted by the astounding assertion that "*Rhus glabra* * * at the foot of our Rocky Mountains, has been introduced since 1860." This well known shrub, never found at all by roadsides or on the plains anywhere, was observed by me as early as 1870, in the most wild, secluded, and pathless places among the foothills of Colorado, where it was as much at home—as surely indigenous—as it could have been said to be in the thickets of New York or Wisconsin that same year. It is an indubitably native shrub, all the way from Wyoming down to the borders of Mexico, along these mountains; and this statement of mine no botanist acquainted with the region is likely to gainsay. It were as reasonable to expect a colony of eastern oaks, or one of hickories, in Colorado, as to suppose that *Rhus glabra* is now there as a recent acquisition. My fourth criticism has this warrant. The writer proposes to have found, among the plant remains embedded in a pad of buffalo hair, "seeds and pappus of *Helianthus*," and "hispid twigs of *Euphorbia*." The essential character of *Helianthus* is the absolutely caducous nature of the pappus. The student early learns that even in the laboratory he must handle a *Helianthus* head with care, lest the scant

and fugacious pappus-scales elude him; and so our author must be mistaken when he believes himself to have seen "seeds and pappus" of a plant of this genus embedded together in a buffalo pad. He really does not know the genus which he has ventured to call by this name. Also, seeing there is no known American *Euphorbia* with "hispid twigs," the writer may have mistaken perhaps a *Mentzelia* or a *Phacelia* for an euphorbiaceous plant. If he knows the meaning of "hispid" he does not know *Euphorbia*; albeit the buffalo country abounds in species of that genus, few if any of which are other than indigenous, many of them peculiar to it. In support of my objection number three, I quote his placing of *Asclepias Syriaca* among plants observed by him along buffalo trails. It does not grow there, and never did; at least, not in Colorado, where Mr. Benthoud made his observations. But, granting that the writer actually knows the genus *Asclepias*—a concession which we should be fully warranted in withholding—two species are common on the plains, and indigenous there, namely, *A. speciosa* and *A. Jamesii*, neither of which has ever been confused with *Syriaca* by any botanist, or can be. Nor can I here omit a suggestion of the absurdity of supposing that *Asclepias* seeds, with their perfectly balloon-like native means of transportation to the ends of the earth, almost, on any steady breeze, should be helped to get abroad in the world by the hair-pad of a buffalo. Under the second heading against this writer's assertions I give the following names taken from his list: *Lippia cuneifolia*, *Chenopodium album*, and *Martynia proboscidea*. The claim is made that these species are foreign to the region. Such a statement respecting the first of them is even more amazing than the proposition that *Rhus glabra* was not in Colorado prior to 1860. It is one of the most characteristic plants of exactly the buffalo regions; one of the certain evidences, to the wayfarer, that he has reached the borders of the Great Plains, or is in their midst. Of the commonest *Chenopodium*—and they are excessively prevalent all over that land, both near to and far from the

“trails”—the same may be said. They so strikingly differ from the introduced type, that now all botanists admit them to the rank of distinct species, native to the country. *Martynia* surely belongs only to the more southerly part of the country in question, and, although within the range of the buffalo, has not been carried by them to the northward of New Mexico; all this, upon the not well warranted supposition that when the writer mentions *Martynia* he speaks of something which he knows. Returning to our first point of difficulty with Mr. Berthoud's statements, we repeat: it is wholly futile to use generic names, such as *Plantago*, *Amarantus*, *Stipa*, *Elymus* and *Epilobium*, and say of these, as genera, that they do not belong to prairie countries. It is simply untrue. These genera do find representation in all prairie lands. For example, of *Plantago* three species are thoroughly native in different parts of the region under examination. These are *P. gnaphalodes*, *P. eriopoda*, and a form or subspecies of *P. major* which botanists everywhere readily distinguish from that introduced and well domesticated Old World type, which has followed civilized man in his westward march. The two first named are found nowhere to the eastward of the buffalo range. One of these, *P. eriopoda* is found upon the plains only at the distant north, beyond the British boundary; it is in Colorado, nevertheless, but only near the summits of the higher mountains, whither it is perfectly safe to say the buffalo did not transport it; for they did not carry their trails into those altitudes.

Thus might we take up in succession each one of Mr. Berthoud's five-and-twenty plant names, and, knowing the vegetation, native and introduced, of the region whereof he writes, might either positively disprove, or throw a mantle of heavy doubt upon every statement which he has made in this wonderful paper respecting the plants. The buffalo, away back in unrecorded and unknown ages, perchance may have aided in bringing some plants to new stations. This, to say the least, is possible. But positive proof of such a thing, even in the case of a single plant species, will doubtless be

long forthcoming; and in Mr. Berthoud's paper there is no more evidence of such mode of plant dissemination than there is that the man in the moon is a buffalo hunter. Mr. Berthoud says he read Wallace's "Island Life." We perceive that that fine book excited his imagination to such an unfortunate degree as to have led him into two erroneous fancies; namely, that he knew some plants by their botanical names, and that he could write an argument.—EDW. L. GREENE.

"*The California Vine Disease.*" By NEWTON B. PIERCE.
Bulletin No. 2, U. S. Department of Agriculture, Division of Vegetable Pathology. Washington, 1892.

This pamphlet of 222 pages is the preliminary report of investigations by the author, covering a period of ten months spent in Southern California, and of five months in the vineyards of the Mediterranean region, whither he went at his own expense for a careful comparative study of allied foreign diseases.

The malady known as "The California Vine Disease" seems to have originated about the year 1885 in Anaheim, Orange County, whence it rapidly spread in Orange, Los Angeles and San Bernardino counties, destroying whole vineyards. The direct loss caused thus far by the disease is estimated at several million dollars. The report opens with an historical sketch of the grape industry in Southern California and then follows an exhaustive collection of facts obtained with the view of determining the bearing of soil, irrigation, drainage, temperature, rainfall, etc., upon the strange affection. Mr. Pierce is convinced that these conditions have only an indirect relation, if any, to the case, although the bearing of heat is worthy of further consideration. The histological and physiological study of the diseased tissues has been begun but that part of the work is not yet sufficiently complete to be reported upon. Bacteria have been found in the affected vines and have been isolated and cultivated, though inocula-

tion experiments have thus far failed to prove that these micro-organisms are to bear the odium of having incited the disease. This line of investigation is, however, not yet closed, and more information in regard to it may be expected in the future.

The general character and effects of the malady are well outlined and comparisons are drawn between it and diseases of the vine which are better understood. Of the vine parasites already known, the fungus *Uncinula spiralis* is the only one present in Southern California in sufficient abundance to place it under suspicion, but if this fungus is the exciting cause, its results are quite different in this region from what they are known to be elsewhere. The relation of *Uncinula* to the affection is to be further investigated. Many experiments have been made in the direction of preventive treatment, but blindly, inasmuch as the nature of the disease is not understood. Mr. Pierce suggests that for the present the vines be treated with the Bordeaux mixture and be kept as free as possible from *Uncinula* by the application of sulphur.

Although one, after reading the report, may experience a shade of disappointment that the cause of the trouble is still unlocated, yet it is evident that if the disease is ever to be understood and successfully combated, it is likely to be by the means of just such methodical and painstaking investigation as those conducted by Mr. Pierce. The report furnishes a good illustration of the methods of research employed in the recently developed science of vegetable pathology.—M. A. HOWE.

Flora of West Virginia. By CHARLES F. MILLSPAUGH, M. D.
Being Bulletin No. 24 of the West Virginia Agricultural Experiment Station, Morgantown, W. Va., 1892.

This is the most important of the recent local Catalogues that have appeared in America; for, while there are no diagnoses of genera, or of species except in the cases of a small number of new ones, valuable information is given

respecting the general habitat and full range within the State, of all the species. The territory embraced within the boundaries of West Virginia is very likely, as the author surmises, as promising a field for botanical research as can be found in any part of the United States east of the Mississippi. Anyhow, the zeal of Dr. Millspaugh and the success which has followed his few years of labor there, would have rendered interesting many a district eastward whose vegetation has not yet been catalogued. This neat and handy volume numbers more than five hundred pages, and the list of plants is carried through the lower Orders, while a Fossil Flora Supplement concludes the whole.

Next to a full descriptive Flora of a state or county, there is no better stimulus to local botanical investigation than publications like this; and we shall hope that Dr. Millspaugh may eventually be enabled to complete a descriptive handbook of West Virginian botany.

It is scarcely necessary to state that the author is governed by principle rather than by time-honored bad precedent, in the matter of nomenclature. The botanists of the United States are, as a body, so rapidly conforming to principle, that few if any are left to exemplify the old irregularities. But, as there are not only new species diagnosed in this volume, but new binary combinations made, the author should have been more particular about his date of publication. The title-page bears the date of "June, 1892." We suppose the actual appearing of the volume was made a half-year later than this, at the least. We hope the author will give us publicly the exact date of issue. It is really important.—E. L. G.

MISCELLANEOUS NOTES AND NEWS.

DR. ANSTRUTHER DAVIDSON, of Los Angeles, has issued a printed list of the names of plants found growing spontaneously within the county of Los Angeles. The species are

not numbered, nor are any notes of habitat appended to the names; moreover, the modesty of our friend seems to have led him to treat his useful twenty-page pamphlet as not deserving of a date; and so there is nothing to indicate in what year this first catalogue of the plants of Los Angeles county was given to the world. We also observe one new plant name, as if that of a new species, unaccompanied by any diagnosis. This should not have been. It is to be hoped that this beginning may be followed, within a few seasons, by another and more elaborate catalogue.

MR. WILHELM N. SUKSDORF, of White Salmon, Washington, is the author of a catalogue of the Flowering Plants and Ferns of his adopted State, which he entitles "Flora Washingtonensis." This, also, is the simplest kind of a catalogue, with no very particular indications of localities; but the author states that the whole number of species is 1690. This welcome publication is dated Oct. 29th, 1892. No species are described, and we believe no new *nomina nuda* appear.

To a number of friendly inquiries as to whether *ERYTHEA* is to take the place of *Pittonia*, we give answer in the negative. But succeeding issues of the series last named will be likely to appear at longer intervals than did the earlier, inasmuch as *ERYTHEA* makes an additional draught upon the time and strength of the author of *Pittonia*.

ONE of the most laudable examples of scientific enterprise that we have heard of lately, is set by the Botanical Seminar of the University of Nebraska. Professor Bessey, and his assistants and graduate students, have undertaken, on their own responsibility, a botanical survey of the State, the plan of which, as well as a list of the officers and workers, is given in a recent pamphlet. These gentlemen have a most inviting field before them, and we shall expect interesting results; meanwhile the University of Nebraska is to be congratulated in its having, in at least one of its departments, a body of

men with zeal to undertake, at their own cost, an important work, the responsibilities of which the State is not ready to assume. If their University has a number of such energetic departments, its future greatness is assured.

FIELD botanists of the Pacific Coast will be interested in knowing that the universities and learned societies of California propose to ask the Legislature at its next session to appropriate a sum of money sufficient to map a large portion of the State, chiefly the valley areas and the adjacent foothills. The United States Geological Survey has signified its willingness to act in conjunction with the State, perform the work, and bear half the expense. The Survey Corps has already mapped a good part of the high mountain areas in northeastern California, and also part of the Coast Range adjacent to the Mt. Shasta region. All towns, hamlets, mines, roads and trails, as well as the natural features, are delineated; and these maps show in addition contour lines, the intervals representing 100 or 200 feet, according to the scale. Though not made for the special use of botanists they will prove extremely helpful to any who may visit the high peaks and mountain elevations of those sections.

NEW plants in goodly number present themselves for names to botanists of the East as well as the West. But how happens it that at the East, where it is sometimes thought men hold a monopoly of learning and good taste, the plants are faring worse than elsewhere in all the world, in respect to the proportion of barbarous and ugly specific names assigned them? Before me lie certain pages printed at the East last November, bearing names and definitions of twelve new species. Nine out of these twelve are invested with uncouth personal names. Two of them bear the geographical appellation *Texanum*. Only one of the whole lot has been blessed with an adjective name. At this rate, one is tempted to wish that botanical discovery might cease, for a time, until some of the botanists should find leisure to acquire a vocabulary of Latin adjectives.

A REARRANGEMENT OF AMERICAN PORTULACEÆ.

By THOMAS HOWELL.

THE Family of Portulacæ is a very natural one, and the relations between genus and genus are very close; and the plants not being well suited to herbarium study, on account of their succulent texture, authors have in many cases failed to bring out the real characters by which the genera may be most readily distinguished. For many years past, the botanists who have had new species to deal with, have referred them to old genera, not venturing to propose new ones, until now the books and papers relating to these plants present many incongruities, according to the views of field botanists who are better acquainted with the real characteristics of the plants.

The genera are fairly represented, and the species quite numerous, in those portions of the West which I have had the fortune to become familiar with; and I submit the following scheme of our western genera and species. This is based on a number of characters of fruit, and matters of habit which were not known to others who have written upon this family.

Four different types of fruit-structure separate our genera into as many quite natural groups.

GROUP I. Shrub; pericarp double, *i. e.*, with 3-valved epicarp and 6-valved endocarp.

1. **TALINOPSIS**, Gray, Pl. Wright. i. 14. Sepals 2, membranaceous, persistent. Petals 5. Stamens ∞ . Style 3-cleft. Seeds uncinat-arcuate.

1. **T. FRUTESCENS**, Gray, l. c. 15. Single species, of Texas and New Mexico, and very distinct from all other genera.

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GROUP II. Herbs; capsule circumscissile.

2. **PORTULACA**, Tourn. Inst. 236. Calyx with short tube adnate to base of ovary; the lobes 2, deciduous. Capsule circumscissile near the middle. Petals 4 to 6. Stamens 8 to 20. Style 3 to 8-cleft.

* *Leaves flat.*

1. **P. OLERACEA**, Linn. Sp. Pl. 445. Prostrate; leaves obovate to spatulate, obtuse: calyx-lobes acute.—Widely distributed.

2. **P. RETUSA**, Engelm. Pl. Lindh. 154. Stems somewhat ascending; leaves spatulate, retuse or emarginate: calyx-lobes strongly carinate.—Texas to Arizona.

3. **P. LANCEOLATA**, Engelm. l. c. Suberect; lower leaves spatulate, obtuse; the upper lanceolate, acute: calyx-lobes scarcely carinate.—Habitat of the last.

* * *Leaves terete or subterete.*

4. **P. STELLIFORMIS**, Moq. & Sess.; DC. Prodr. iii. 353. Perennial by creeping tuberous-thickened and sometimes moniliform rootstocks: leaves terete, 1 inch long, surpassing the flower clusters: axillary hairs short and soft.—Western Texas to Arizona.

5. **P. HALIMOIDES**, Linn. Sp. Pl. 2 ed. 639. Perennial, fleshy-rooted: leaves oblong, somewhat compressed; axillary hairs copious.—Keys of Florida and West Indies.

6. **P. PILOSA**, Linn. Sp. Pl. 445. Annual; leaves linear-subulate, nearly terete, $\frac{1}{4}$ to $\frac{1}{2}$ inch long, with copious axillary hairs.—Arizona to Florida, and widely dispersed in warm countries.

7. **P. PARVULA**, Gray, Proc. Am. Acad. xxii. 274. Annual, diffuse: leaves oblong-linear, obtuse, nearly terete; axillary hairs copious.—Texas, New Mexico and the Mexican border.

3. **LEWISIA**, Pursh, Fl. 368. Sepals 6 or 8, distinct,

marcescent-persistent. Petals 8 to 16. Stamens ∞ . Capsule circumscissile at the base, then bursting irregularly. Cotyledons accumbent.

1. *L. REDIVIVA*, Pursh, l. c. Leaves subterete, rosulate at the crown of a thick fleshy root: 1-flowered scapes with a whorl of bracts marking a joint near the middle; flower white or pinkish, large and showy.—Washington and California, and eastward to the Rocky Mountains.

4. *OREOBROMA*, *Gen. Nov.* Sepals 2 (in one species apparently 4), persistent. Petals 3 to 10 or more. Stamens 5 to 20 or more, usually not of the same number as the petals. Style 3 to 7-cleft. Capsule membranaceous, circumscissile at the base, thence splitting upwards irregularly, several seeded. Cotyledons incumbent.—Low acaulescent perennials with fleshy roots, and a multicipal caudex bearing tufted leaves, and scapose stems which are jointed at the base. Species taken out of *Calandrinia*, *Lewisia* and *Claytonia* of recent authors, and forming a natural genus, named in allusion to the edible fleshy roots.

* *Root branching, the caudex at the surface of the ground; nerves of bracts and sepals excurrent, gland-tipped.*

+ *Scapes 1-flowered.*

1. *O. brachycalyx.* *Lewisia brachycalyx*, Engelm. Proc. Am. Acad. vii. 400. Leaves spatulate or nearly linear: scapes shorter than the leaves, 2-bracted at the very base: sepals apparently 4: petals 7 to 9, twice or thrice longer than the sepals: stamens 10 to 15.—In granite sand, eastern California to Arizona and southern Utah.

+ + *Flowers many, in paniced racemes.*

2. *O. Leana.* *Calandrinia Leana*, Porter, Bot. Gaz. i. 43. Glauous; leaves terete or nearly so, acute: scape

3 to 6 inches high, leafy-bracted: flowers middle-sized, white streaked with red.—Siskiyou Mountains, California and Oregon. Discovered in 1876, by L. W. Lee.

3. **O. Columbiana.** *Calandrinia Columbiana*, Howell; Gray, Proc. Am. Acad. xxii, 277. Not glaucous; leaves spatulate, obtuse or acutish: scapes $\frac{1}{2}$ to 1 foot high: flowers much as in the preceding.—Bluffs of the Columbia River and northward to British Columbia.

4. **O. Howellii.** *Calandrinia Howellii*, Wats. Proc. Am. Acad. xxiii, 262. Leaves narrowly spatulate with crisped scarious margins: scapes 6 to 10 inches high: stamens usually free; flowers large, red, streaked with orange.—Moony Mountains, Josephine Co., Oregon.

5. **O. cotyledon.** *Calandrinia cotyledon*, Wats. l. c. xx, 355. Leaves broadly spatulate, without scarious margins: scapes 6 to 15 inches high: flowers as in the last, except that the stamens are joined into a column around the styles.—Near Preston's Peak, Siskiyou Co., California.

* * *Root branching; caudex not rising to the surface of the ground; flowers few, in a raceme; excurrent calyx-nerves not gland-tipped.*

6. **O. oppositifolia.** *Calandrinia oppositifolia*, Wats. l. c. Scape 6 to 10 inches high, with 1 to 3 pairs of opposite leaf-like bracts below, and some scattered bractlets above: corolla white: seed without an aril.—On moist slopes at Waldo, Oregon.

7. **O. Tweedyi.** *Calandrinia Tweedyi*, Gray, Proc. Am. Acad. xx, 277. Leaves obovate: scapes 4 to 6 inches high, few-flowered, the bracts alternate: petals an inch long: seeds with a large loose squamiform aril.—Wenatchee Mountains, Washington.

* * * *Root conical or fusiform: caudex 0: scapes 1 to 3-flowered.*

8. **O. pygmæa.** *Talinum pygmæum*, Gray. Sillim. Journ. xxxiii, 407. Scapes scarious-bracted, 1 to 3 inches high: flowers red.—Rocky Mts. to the Sierra Nevada and Cascades.

9. **O. Nevadensis.** *Calandrinia Nevadensis*, Gray, l. c. Larger, 1 to 5 inches high, with narrow leaves and foliaceous bracts: flowers white.—Nevada and California to Washington.

* * * * *Root globose; radical leaves few or 0: scapes leafy-bracted.*

10. **O. triphylla.** *Claytonia triphylla*, Wats. Proc. Am. Acad., x. 345. Scapes 1 to three inches high, bearing leaf-like bracts in the middle, and an umbel of small red or white ephemeral flowers.

GROUP III. Herbs; sepals 2, green-herbaceous: capsule 3-valved, 3- to several-seeded.

5. **CALANDRINIA**, HBK. Nov. Gen. vi. 77, in part. Succulent herbs, with alternate leaves, and ephemeral flowers in bracted racemes. Sepals 2, persistent. Petals 3 to 7. Stamens 3 to 10, seldom of the same number as the petals. Ovary free, many-ovuled. Seeds black, minutely tuberculate. Our species annual.

1. **C. CAULESCENS**, HBK. l. c. Glabrous or slightly pubescent, branching from the base; decumbent stems 3 to 10 inches long; peduncle erect or ascending: sepals ovate, acute: petals broadly obovate, 3 to 5 lines long: seed shining.—Near the coast from British Columbia to South America.

2. **C. MENZIESII**, Hook. Fl. i. 223. t. 70. Larger and coarser than the last: pedicels longer: petals 4 to 6 lines long.—California.

3. **C. MICRANTHA**, Schl. Linnæa, xiii. Lit. Ber. 97. Stems 2 to 4 inches long: petals only a line.—On the Columbia River. Perhaps these are only forms of one variable species.

4. **C. BREWERI**, Wats. Proc. Am. Acad. xi. 124. Stems prostrate: sepals deltoid-ovate; pedicels reflexed in age: seeds dull.—California.

5. *C. ambigua*. *Claytonia ambigua*, Wats. Proc. Am. Acad. xviii. 365. *Calandrinia sesuvioides*, Gray, l. c. xxii. 278. Depressed and spreading from a stout root: sepals broadly ovate: petals obovate, white: seeds shining.—Colorado Desert, California.

6. **TALINUM**, Adans. Fam. ii. 145. Low glabrous herbs, rarely suffrutescent at base. Sepals 2, deciduous. Seeds shining, carunculate. Otherwise like *Calandrinia*.

* *Leaves more or less flattened.*

1. **T. PATENS**, Willd. Spec. ii. 863. Leaves flat: flowers in an ample panicle.—Texas.

2. **T. LINEARE**, HBK. Nov. Gen. vi. 77. Leaves flattish; flowers axillary, solitary.—Texas, Arizona, Mexico.

3. **T. BREVIFOLIUM**, Torr. Sitgr. Rep. 156. Lower leaves scale-like, the upper linear, 3 to 5 lines long: flowers near the summit, few, axillary on very short pedicels.—New Mexico.

* * *Leaves terete: flowers in naked-peduncled cymes.*

4. **T. HUMILE**, Greene, Bot. Gaz. vi. 183. Peduncle shorter than the leaves, 5 to 20-flowered: petals yellow.—Pinos Altos Mountains, New Mexico.

5. **T. SPINESCENS**, Torr. Bot. Wilkes, xvii. 250. Caudex short, succulent, beset with small subulate spines: leaves $\frac{1}{2}$ inch long: peduncles slender, surpassing the leaves: petals rose-red: stamens 20 to 30.—Wenatchee Mts., Washington.

6. **T. TERETIFOLIUM**, Pursh, Fl. 365. Caudex tuberiform: leaves linear: peduncle 3 to 6 inches long: petals purple: stamens 15 to 20.—Penn., Wis. and southward.

7. **T. CALYCINUM**, Engelm. Wislitz. Rep. 4. Peduncles branching: leaves elongated: petals pink, twice the length of the sepals: stamens 30 or more.—Texas, N. Mex., Ariz.

8. **T. PARVIFLORUM**, Nutt.; T. & G. Fl. i. 197. Leaves linear: flowers small, pale: stamens 5.—Texas.

9. *T. CONFERTIFLORUM*, Greene, Bull. Torr. Club, viii. 121. Root fleshy, branching: stems several, branching, leafy: peduncles, bearing a crowded cyme at summit: flowers white: stamens 5.—New Mexico.

7. *CLAYTONIA*, Linn.; Gronov. Fl. Virg. 25. Low succulent perennials, with fleshy roots or deep-seated corms, and showy but light-colored flowers in loose racemes. Sepals 2, persistent. Petals 5, equal. Stamens 5. Seeds compressed, shining.

* *Stems one to several from a deep-seated corm; leaves all radical except a pair of bracts subtending the raceme.*

1. *C. VIRGINICA*, Linn. Sp. 204. Leaves linear-lanceolate, 3 to 6 inches long.—Eastern U. S.

2. *C. CAROLINIANA*, Michx. Fl. i. 160. Leaves spatulate-oblong or oval-lanceolate, 1 or 2 inches long.—Eastern U. S.

3. *C. LANCEOLATA*, Pursh, Fl. 175. Leaves narrowly lanceolate (usually wanting on flowering plants) 1 or 2 inches long.—Rocky Mountains and westward.

4. *C. UMBELLATA*, Wats. Bot. King, 43. t. 6. Leaves orbicular to oblong or ovate, on long slender petioles: raceme umbel-like.—Oregon to Nevada.

* * *Stems and leaves from the crown of a fleshy root.*

5. *C. MEGARRHIZA*, Parry; Wats. Bibliogr. Index, 118. Leaves cuneiform, obtuse, attenuate to a margined petiole with scarious dilated base, 1 to 6 inches long: involucreal leaves spatulate-lanceolate or narrower, tapering at base: stems not exceeding the leaves.—Eastern Oregon to Colorado.

6. *C. ARCTICA*, F. M. Adams, Mem. Soc. Mosc. v. 94. Leaves broader, obtuse, the involucreal ovate or broadly oblong, sessile by a broad base: stems surpassing the leaves: flowers in a short racemiform cyme.—Alaskan shores and islands and adjacent Asia.

8. **MONTIA**, Micheli, *Nova Plantarum Genera*, 17. t. 13. Low glabrous herbs, with delicate pale or white flowers in loose axillary or terminal simple or compound racemes. Sepals 2, green, persistent. Petals usually 5, more or less unequal. Stamens 3 to 5. Ovary 3-ovuled, capsule 3-valved, 3-seeded.—*Montia* Linn., and sections *Limnia*, *Alsinastrum* and *Naicreus* of *Claytonia*, T. & G. Fl. i. 199-202, and Gray, Proc. Am. Acad. xxii. 280-283.

* *Leafy-stemmed annuals; petals unequal.*

+ *At least the lower leaves opposite.*

1. **M. FONTANA**, Linn. Sp. 87. Stems weak, procumbent, 1 to 6 inches long, rooting at the nodes, terminating in few-flowered racemes: seeds turgid, minutely tuberculate, not shining.—Common in Pacific North America and in Europe.

+ + *Leaves all alternate.*

+ + *Stamens 2 or 3, opposite the smaller petals; seeds lenticular, margined, very smooth.*

2. **M. HOWELLII**, Wats. Proc. Am. Acad. xviii. 191. Stems $\frac{1}{2}$ to 2 inches long, depressed, rooting freely at the nodes: leaves linear-spatulate to lanceolate, usually opposite a triangular clasping bract which subtends each few-flowered raceme: petals 1 to 5, or 0: seeds small, black and shining.—Willamette Valley, Oreg., flowering in Feb. and March.

3. **M. dichotoma**. *Claytonia dichotoma*, Nutt., T. & G. Fl. i. 202. Erect, 1 to 3 inches high, branching from the base and compact: leaves all linear: flowers in dense terminal racemes: seeds dull-black.—On the Columbia River from the Dalles westward.

4. **M. LINEARIS** (Dougl.), Greene, Fl. Fr. 181. *Claytonia linearis*, Dougl., Hook. Fl. i. 224. t. 71. Stems 2 to 6 inches long, erect or spreading: leaves linear, sessile by a clasping base: flowers in lax terminal racemes: stamens 3 (rarely 2

or 5): seeds the largest in the genus, black and lustrous.—Vancouver Island to Northern California.

++ ++ *Stamens 5; seeds closely striate and transversely lineolate.*

5. *M. DIFFUSA* (Nutt.), Greene, l. c. *Claytonia diffusa*, Nutt., T. & G. Fl. i. 202. Leaves broadly ovate to lanceolate, or slender petioles; flowers very small.—Columbia River to northern California.

* * *Leafy-stemmed perennials, stoloniferous or bulbiferous; racemes terminal and axillary, not involucre-bracted; petals 5, scarcely unequal; stamens 5.*

+ *Stems filiform; leaves alternate; raceme terminal.*

6. *M. PARVIFOLIA* (Moc.), Greene, l. c. *Claytonia parvifolia*, Moc.; DC. Prodr. iii. 361; perhaps also *C. sarmentosa*, Bong. Sitch. 137. Stems slender, erect or spreading, 2 to 12 inches long, ending in a few-flowered raceme: leaves obovate to lanceolate.—Alaska to California.

+ + *Leaves opposite; racemes axillary.*

7. *M. CHAMISSONIS* (Esch.), Greene, l. c. 180. *Claytonia Chamissonis*, Esch.; Spreng. Syst. i. 790. Slender, $\frac{1}{2}$ to 1 foot high: leaves lanceolate in several pairs, the lowest producing bulblets or stolons and the plant so propagating: flowers few in the raceme.—Alaska to California and Arizona, in marshes.

8. *M. HALLII* (Gray), Greene, l. c. *Claytonia Hallii*, Gray, Proc. Am. Acad. xxii. 283. Smaller, and within 2 or 3 pairs of leaves; not known to produce stolons or bulblets.—Wet places, from Oregon to northern California.

* * * *Leaves all radical; stems scapiform; racemes involucre-bracted; petals and stamens 5 each.*

+ *Involucral bracts more or less united into a disk, other and smaller bracts above them.*

9. **M. perfoliata.** *Claytonia perfoliata*, Donn; Willd. Sp. ii. 1186. Light-green; leaves deltoid or ovate to lanceolate, long-petioled involucral pair of bracts completely united: racemes peduncled.—Common from Vancouver Island to Mexico; also in Chili.

10. **M. rubra.** Whole plant livid red: leaves deltoid or rhomboid, abruptly narrowed to a margined petiole: scapes 3 to 6 inches high; involucral bracts completely united, or slightly open on one side; raceme nearly or quite sessile.—Oregon and Washington; common in pine woods.

11. **M. parviflora.** *Claytonia parviflora*, Dougl.; Hook. Fl. l. c. 225 t. 73. Light-green: leaves spatulate to filiform: involucral bracts completely united, or distinct on one side: raceme sessile or peduncled.—Oregon and California.

12. **M. spathulata.** *Claytonia spathulata*, Dougl.; Hook. Fl. l. c. 226 t. 74. Succulent and glaucous: leaves slender and terete, or becoming spatulate: involucral bracts either wholly united and the disk shorter on one side, or joined together on one side only and that throughout or in part: raceme nearly or quite sessile.—Oregon and adjacent Calif.

13. **M. gypsophiloides.** *Claytonia gypsophiloides*, F. & M. Sem. Petr. ii. 33. Leaves elongated filiform; involucral bracts similar, united on one side: racemes simple.—California.

14. **M. tenuifolia.** *Claytonia tenuifolia*, T. & G. Fl. i. 201. Whole plant more or less glaucous, 1 to 4 inches high: leaves linear; involucral bracts either linear and joined on one side, or completely connate into an orbicular disk: raceme usually sessile.

+ + *Involucral leaves distinct; petals subequal.*

++ *Perennials with creeping rootstocks; racemes without bractlets.*

15. **M. asarifolia.** *Claytonia asarifolia*, Bong. Sitch. 137. Radical leaves subcordate-reniform to rhombic-ovate, on long slender petioles: flowers white, in a simple raceme.—High mountains, from Alaska to Calif. and Nev.

++ ++ *Perennials with fibrous roots; racemes bracteolate.*

16. **M. Sibirica.** *Claytonia Sibirica*, Linn. Sp. 204. Leaves orbicular to lanceolate, the petioles not dilated at base: raceme geminate.—From Asia and Alaska to Calif.

17. **M. bulbifera.** *Claytonia bulbifera*, Gray, Proc. Am. Acad. xii. 54. Leaves lanceolate to linear, their petioles short, widened and fleshy-thickened at base and so forming a bulb: raceme simple.—Southern Oregon and adjacent Calif.

GROUP IV. Sepals 2, broad, more or less scarious, persistent; capsule 2-valved.

9. **SPRAGUEA**, Torr. Pl. Frem. 4. t. 1. Succulent herbs, with small flowers spicately or capitately crowded at the ends of naked or leafy-bracted peduncles. Sepals nearly equal, emarginate at each end. Petals 4, unguiculate. Stamens 3, opposite the 3 larger petals, exserted.

1. **S. UMBELLATA**, Torr. l. c. Biennial; stems all arising from a single crown: radical leaves spatulate to oblanceolate, with thick petioles 2 to 6 inches long: flowers in dense umbellate heads.—Siskiyou and Sierra Nevada Mountains.

2. **S. PANICULATA**, Kell. Proc. Calif. Acad. ii. 187, fig. 56. Biennial: stems paniculately branching, forming a globose tuft near the ground, only 2 or 3 inches in diameter.—Imperfectly known, from specimens found in a ravine some six miles west of Virginia City, Nevada.

3. **S. nuda.** *Calyptridium nudum*, Greene, Pitt. i. 64. Annual, root fleshy-fibrous: leaves in a rosulate tuft 1 to 2 inches long: flowers in a compact orbicular cluster of short spikes.—California.

4. **S. multiceps.** Depressed branching perennial: stems 1 to 6 inches long, with densely leafy branchlets, leaves 3 to

6 lines long, or on young plants 2 or 3 inches: peduncles terminating the branchlets, with 1 or 2 scarious bracts below the inflorescence: flowers in dense globular heads.—On Mt. Hood and Mt. Adams.

10. CALYPTRIDIDIUM, Nutt.; T. & G. Fl. i. 198. Small depressed annuals, with fleshy leaves, and small flowers in dense axillary and terminal spikes. Sepals mostly unequal. Petals 2 to 4. Stamens 1 to 3, shorter than the petals and alternate with them.

* *Petals 2 or 3; stamen 1; sepals with scarious margins; seeds obtusely margined.*

1. **C. MONANDRUM**, Nutt. l. c. Erect, 4 to 8 inches high, with many depressed or decumbent branches nearly as long: sepals slightly unequal: petals usually 3: style short, undivided.—California, chiefly southward.

2. **C. ROSEUM**, Wats. Bot. King, 44. t. 6. figs. 6-8. Decumbent, forming a mat 1 to 4 inches broad: sepals very unequal: petals 2: style 2-parted.—Southern Oregon to Nevada and California.

* * *Petals 4, stamens 1 to 3; seeds acutely margined.*

3. **C. QUADRIPETALUM**, Wats. Proc. Am. Acad. xx. 356. A span high; sepals round-reniform, plane at maturity, with greenish centre, and white or rose-tinted scarious margin.—Lake County, California.

4. **C. PARRYI**, Gray, Proc. Am. Acad. xxii. 285. Depressed; sepals orbicular or oval, herbaceous, with narrow white margin: style half as long as the ovary.—San Bernardino Co., California.

It will be seen by the foregoing, that the chief result of these studies has been the altering of the accepted limits of *Claytonia*, *Montia* and *Calandrinia*. Linnæus after having founded the genus *Limnia* on what I have called *Montia*

Sibirica, subsequently thinking it too closely allied to *Montia* to stand as a generic type, referred it, not to that, but to *Claytonia* instead; with which latter it has little in common. It was a strange movement to make, but all men subscribed to the proposition.

In the case of *Calandrinia*, Kunth confused two generic types; and the late Dr. Gray persisted in referring all the plants of whichever type, to this genus. But the capsule in one of the types, is that of *Lewisia*; with which fact, however, Dr. Gray was not acquainted until notified of it, at a late date, by Mr. Henderson and myself. It is upon this capsule of *Lewisia* combined with other characters that belong to *Calandrinia*, that OREOBROMA is based.

The above arrangement of genera and species was written as long ago as 1888, but has remained until now unpublished; meanwhile, Professor Greene, in the *Flora Franciscana*, has transferred a part of the *Claytonia* species to *Montia*.

OBSERVATIONS ON THE COMPOSITÆ.—II.

By EDWARD L. GREENE.

Tribe II. EUPATORIACEÆ.

THIS embraces a series of genera intimately connected with the Asteroideæ and the Vernoniaceæ. M. Baillon includes them in the latter tribe. Their style-branches, however, are not subulate, seldom even linear, but usually obtuse and rather distinctly clavate. Moreover, the bases of the anthers are not sagittate but sub-entire. The flowers, though often yellowish, are never truly yellow.

In the Benthamian view of the limits of the genera, these number not far from forty; of which more than two-thirds, and even a greater proportion of the species, are of North America including Mexico.

TRICHOCORONIS, a small group of flaccid riparian herbs, though perhaps best placed here, imitates *Erigeron* of the

next tribe in general aspect, and lacks even the clavate style-branches of this one, these organs being nearly linear and even somewhat compressed, rather than terete and claviform. Although the type of the genus has pentagonal achenia and a coroniform concreted pappus, a newly discovered Californian ally of it displays exactly quadrangular achenes surmounted by distinct and conspicuous pappus paleæ, and equally distinct bristles alternating with them. This I have published as a genus *Biolettia*; and, with authors who, like Bentham and Asa Gray, make much of this kind of character, allowing it to overbalance all considerations of agreement in habit, *Biolettia* will be received in generic rank. But, as the type is a *Trichocoronis* in *facies*, I now prefer to treat it as an aberrant member of that genus, and rename it:

Trichocoronis riparia. *Biolettia riparia*, Greene, Pitt. ii. 216.

The great representative genus in this subordinal group of plants is EUPATORIUM, the type of which was familiarly known to the ancient Greek and Roman botanists as *Eupatorion* and *Eupatorium*, with whom it enjoyed a reputation in medicine. From pre-Linnæan authors it received a number of binary names, for example, *E. aquaticum*, Gesner (1541), *E. adulterinum*, Fuchs (1542) *E. vulgare*, Matthiolus (1554), and *E. cannabinum*, C. Bauhin (1623). The last of these, having been adopted by Linnæus, is the one now in use.

Around this historic type there range themselves in close congeneric relation, some half-dozen species of Europe and Asia, and something like twenty plants of the Atlantic States of North America. But of the several hundreds of Mexican and South American species commonly referred to *Eupatorium*, the greater proportion differ from the typical group in habit, and in various and conflicting peculiarities of the inflorescence, involucre, etc. Then over and above all these, are an almost equal number of allied plants, which have by various authorities been disposed in a dozen or fifteen genera, nominal or real, all of which would fall into *Eupatorium* as

received by botanists of the last century, and which are so treated by so prominent a systematist as M. Baillon. With these plants before us we stand, therefore, face to face with one of the most difficult problems in systematic botany. There is no agreement at all among the most critical of investigators as to how the limits of a genus in Compositæ shall be determined. The supreme value of that general make-up which we call habit may be satisfactorily trusted in one instance, but not in another, it would seem. The form of the involucre, and the number and imbrication of its bracts, are found decisive with some authors but are rejected by others. The form of the achene and the nature of the pappus are relied upon by one man and wholly distrusted by another. If a question be raised as to what ought to be received as the proper circumscription of *Eupatorium*, it becomes difficult to decide to what author of genera appeal should first be made. To attempt to start with Linnæus' *Genera Plantarum* is futile. It is not likely that a botanist lives, or ever did, who, by the sole help of the Linnæan diagnosis of *Eupatorium*, could decide what manner of plants should compose this genus. His assertions that the achenes are "oblong," and that the pappus is "plumose," would exclude all the species known to him, and all that any authors thus far have referred to it. This kind of fact will commend itself to the reflection of those who have recently proposed that the publication of a genus shall depend upon a verbal diagnosis only, and with Linnæus as the initial author. The only way which the botanist has or ever had of learning what this author means for *Eupatorium*, is the way of laying aside the "Genera" and taking up the "Species," in which latter he finds light; though not from any specific description or diagnosis, but only by seizing upon the bibliography given, and going back to older authors who had given figures or descriptions or both. In his diagnosis, the one phrase which gives at least a hint of the genus, is that relating to the style, which is described as "very long," with "branches straight and erect;"

but this is a tribal, or subordinal characteristic, and not a special mark of the genus *Eupatorium*.

Modern authors, beginning with Cassini or with Lessing, record a 4 or 5-angled achene having smooth sides, and being surmounted by an uniserial pappus of scabrous bristles, as the essential characters of this type genus; to which, however are added, as of less importance, an imbricated involucre of a considerable number of unequal bracts, and a corolla the limb of which is not campanulate, but funnelform, *i. e.* attenuate to the tube. I have long been thinking that, in this vast family of the Compositæ, where the flowers are always congested into dense heads, any diversity in the form of the corolla should be more than usually significant to the systematist. The natural tendency of this crowding is to reduce all shapes of the corolla to one; and the difference between a funnelform limb and a campanulate limb, when all are alike crowded, may signify much genetically. WILLUGBÆYA (Neck. Elem. 82. 1790—*Mikania* Willd. Sp. iii. 1481. 1803) was taken out of the *Eupatorium* of Linnæus, on account of its 4-bracted involucre, 4-flowered heads, and campanulate-dilated corolla. Baillon restores the species to *Eupatorium*, induced no doubt by the consideration that some had been admitted into *Willugbæya* having the funnelform corollas of *Eupatorium*. These, it is true, had been placed in the rank of a genus KANIMIA (Gardn.; Hook. Lond. Journ. vi. 446. 1849); and it is now claimed that *Willugbæya* and *Kanimia* differ both from *Eupatorium* and from each other in the form of the style-branches. These are to be claviform (therefore terete and obtuse) in *Eupatorium*, acutish in *Willugbæya*, and obtuse but compressed in *Kanimia*. That the few and definite involucreal bracts and flowers has not been thought a character of the highest import is evident from the fact that species with 3-flowered and even 1-flowered involucre are retained in *Eupatorium*, by those who exclude from it the genera last mentioned. Hence the greatest stress appears to be laid upon characters of the corolla and of the style-branches. That nearly all the species of the two lesser

genera are of climbing habit is taken note of by all the authors as if it were of some significance; and we are predisposed to think it ought to have some weight. But to place any great dependence upon it is inconsistent altogether with the acceptance of *Senecio* as now limited; a genus in which species of climbing mode of growth are somewhat numerous. But even the style-branches present greater diversity by far, within *Senecio* as now received, than is found within the whole suborder here under consideration. So that M. Baillon who, giving to *Senecio* its broadest boundaries, also merges all the genera named above, besides many more, in *Eupatorium*, is perhaps the only consistent man among all those who within the last twenty-five years have made special study of these plants. However, before this can be affirmed quite positively, one must enquire whether the conventional *Senecio* presents equal diversities in form of corolla, and whether its achenes display as many incongruities. But the discussion of the achenes and pappus of Eupatoriaceæ must form a future chapter of these Observations.

MORPHOLOGICAL NOTES.

By S. B. PARISH.

1. *Lateral Flowering of AGAVE AMERICANA.*

THE normal manner of flowering of the Century plant is too well known to require more than the briefest description. When a plant has accumulated sufficient nutritive material in its massive leaves, in this climate usually when from fifteen to twenty years old, it throws up from the center a tall scape, and in the space of a few months the flowers are produced, and the seed ripens. The plant then dies. During all these years of growth the subterranean trunk continually sends out offshoots from axillary buds, which become independent plants, so that, if these are not removed, the parent becomes

the center of a cluster of its progeny of various ages, ready successively to take its place.

An Agave growing in the grounds of S. E. A. Palmer, at San Bernardino, to which my attention was lately called, showed a curious departure from the normal habit of the genus. This plant, a very large one which will flower within a few years, had thrown out an offshoot, which instead of producing a new plant, had lengthened up into a slender scape about three feet high, and two or three times divided at the summit. Earlier in the season it had flowered sparsely, and then bore four capsules, still unripe, but with well formed ovules.

The inflorescence of Agave is terminal, the scape being a prolongation of the axis. In the case here noted it was lateral. Yet the distinction is really one of time, since the axillary bud of the parent becomes the terminal one of the young plant, and in the course of years, when sufficient strength has been accumulated for the purpose, will be prolonged into a flowering scape. In this instance the vigor of the parent was sufficient to produce the result at once.

2. *Nature of the petiolar glands in ARMENIACA VULGARIS.*

THE petiole of the apricot is beset with small protuberances, a line or two high, irregularly distant, and situated along the edges of the slightly channeled upper surface. They do not appear to produce any secretion, although glandular at the apex. Frequently, especially in some varieties, their organs become more or less lamillate, not seldom developing into regular lanceolate leaflets. The largest I have noted were a quarter of an inch long. Two leaflets, usually opposite, on the same petiole are not uncommon, but I have not been able to find a greater number. It is always the glands near, and usually these next to the blade in which this transformation takes place.

From their position on the petiole and their occasional foliar development, these stalked glands may be considered as representing the petiolules of reduced leaflets. If this

view is correct the leaves were originally pinnate, the present blade being the enlarged terminal lobe, a form common in rosaceous genera.

PLANT DISPERSION BY THE BUFFALO.

To make exhibition of the emptiness and the fictitiousness of what may otherwise pass for scientific literature with fact for its substance is no desirable task; but we have long been persuaded that a systematic expurgation of current botanical literature, by plain and unsparing criticism of a certain class of writings, ought to be inaugurated; hence the review article, to which the subjoined letter bears reference.

The letter, I assume, was not intended for publication; for the modest author of it would not have deemed it of sufficient importance; and, as the distance between him and us precludes the waiting for his written consent, we take the liberty of presenting his instructive and serviceable sentences, withholding his locality and signature.

E. L. G.

———— 10 Jan., 1893.

PROFESSOR EDWARD LEE GREENE,
Berkeley, California.

My Dear Sir:—I must write and tell you with how keen an appreciation I read in the January number of *ERYTHEA* your timely review of the article by Edward L. Berthoud, which appeared in the *Botanical Gazette* for October last, entitled "A Peculiar Case of Plant Dissemination." Such an article as this by Mr. Berthoud is a discredit to any reputable botanical journal, and deserves indeed to be severely handled.

It can not be denied, however, that theoretically the buffalo, in their annual migrations, ought to have been efficient agents in plant dispersion north and south. I once held the opinion myself; and in the course of my numerous expeditions across the country that lies between the Red River of the North and Yellowstone, I have examined a great many buffalo wallows, in hope of finding there species of plants foreign to the general flora of the surrounding plains. But with a single excep-

tion my search was always fruitless. The exception which I have in mind is that of *Ranunculus glaberrimus*, which I found in 1883 abounding in the vicinity of buffalo wallows, eighteen miles west from Jamestown, North Dakota. How far north and south it may have extended, I am unable to say; but its range east and west seemed to be only some eight or nine miles. My herbarium specimens collected at that time and in that place, show a perfect identity with the plant of Idaho and Washington.

Not only botanically, but also geographically, does Mr. Berthoud err. There is not the least evidence that the buffalo ever ranged into northern Idaho. The character of the country would forbid such a thing. There is not sufficient grass in the region to sustain these animals; and the forests which cover almost the whole country are much too dense to admit of their carrying their trails through them.

Very Respectfully Yours,

NOTES ON WEST AMERICAN CONIFERÆ.—I.

By J. G. LEMMON.

1. PSEUDOTSUGA TAXIFOLIA (Lambert) Britton, Trans. N. Y. Acad. viii. 14.

Variety *suberosa*, var. nov.

Small trees with whitish, thick, corky bark, thin foliage and small ovate cones 1-2 inches long, with convex, at length firm scales, comparatively short, slightly exserted, narrow bracts and small seeds. On high, exposed slopes, also in secluded ravines, 7,000-8,000 ft. alt. of the principal mountains of northern Arizona and New Mexico. I first detected this cork-bark spruce in July, 1884, on the southern flank of Mt. Agassiz of the San Francisco Mountains.

Its shining silvery white bark so soft that it could be readily cut with a pocket knife, attracted immediate attention, being so different from the dark, hard bark of the typical Douglas Spruce.

The trees of the Zuñi and Sandia Mountains bear cones

of the larger dimensions given, but all have the whitish, corky bark described. It was related to us at Flagstaff that Mr. Merriam of the Death Valley Expedition, last season detected a spruce with corky bark on Mt. Kendrick. This is doubtless, the same tree.

Variety *elongata*, var. nov.

Another marked variety of Douglas Spruce with comparatively thin, whitish (outside), shallow-furrowed bark, and conspicuous long, narrow, yellowish shining cones, $3\frac{1}{2}$ – $4\frac{1}{2}$ inches long and one-fifth as thick, with comparatively short bracts and thin, soft scales, inhabits the great forest around the base of Mt. Hood, Oregon, where we detected it Sept., 1892. This variety is in striking contrast with the usual short-fruited Douglas Spruce met with in the vicinity at lower stations.

This long-coned spruce is not to be confounded with the "Big-cone Spruce"—*Pseudotsuga macrocarpa* (Torrey), Lemmon—of the San Bernardino Mts., Cal. That species is expressed by trees which are much less symmetrical than the well-known Douglas Spruce, they are found equally developed from the bottom to the top of the mountains, the limbs are longer than the typical, inclined to be horizontal, the dark bark deeply furrowed, the ovate-elliptical cones very large, 5–8 inches long and one-fourth as thick, their convex scales at length firm, the lunate apophyses with a thin crenulate cartilaginous margin; bracts large but comparatively short, etc.; these very distinguishing characters never found shading off into any forms of the other well-known species—*P. taxifolia*.

2. SPRUCE *versus* FIR.

It is surprising that certain writers continue to use the name "Douglas Fir" when referring to Douglas Spruce. Most modern authors are at accord in restricting the use of Fir in a general way to trees of the very natural and com-

compact genus *Abies*, and Spruce in a like general way to trees of the widely different genus *Picea* and the closely allied genera but recently separated from it—*Hesperopeuce*, *Tsuga* and *Pseudotsuga*. In late articles I have designated the kinds of Spruce in the vernacular as True Spruce, Western Spruce, Hemlock Spruce and False Spruce, respectively.

The genus *Pseudotsuga* (False Spruce), comprises two distinct species, the well-known original *P. taxifolia*, properly called Douglas Spruce, and the other the lately separated *P. macrocarpa*, the Big-coned Spruce. The general acceptance of distinguishing names would avoid ambiguity and lead to unmistakable references, a desirable consummation in garden botany, one which the genius of the age demands and which could be brought about in a few years if the describers and admirers of plants would agree upon fitness, precision and uniformity in the use of vernacular names.

In a lately published "List of Conifers and Taxads in cultivation in the open air of Great Britain and Ireland" by Dr. Maxwell T. Masters, occurs the following paragraph under PSEUDOTSUGA, Carrière.

"A genus constructed for the reception of the Douglas Fir. The habit and foliage are those of the Silver Firs, the male flowers like those of *Picea*; cones pendent, ripening in the first year; scales persistent; bracts markedly three-lobed; wing of the seed narrow, pointed; cotyledons 5 to 7, three-sided, entire as are the primary leaves. It differs from Spruce in foliage. The structure of the wood is quite distinct."

Concerning this elaborate statement of the reasons why Dr. Masters regards our western tree as belonging to the firs rather than to the spruces as generally arranged, I have this to say in analyzing his argumentative description.

(1) The habit of the Douglas Spruce in youth is much unlike any fir, and in age it somewhat resembles only one species of Fir—*Abies grandis*—with which it is associated in the forests of the north-west, but the trees are quite unlike fir trees with which they are elsewhere associated; (2) the foliage in color resembles a few of the species of Fir,—those

I have grouped as White-barked Firs—while it closely resembles that of the Hemlock Spruce in other respects. To particularize: (a) the leaves of Douglas Spruce are like those of the firs in that they have two longitudinal resin ducts,—so also have the leaves of Hemlock Spruce; (b) they are distichous, flat and twisted at base on the lower branches, as upon those of the White-barked Firs, and also upon those of the Hemlock Spruces; (c) they are distinctly petiolate—unlike the whole family of Firs, whose leaves are all sessile—while those of Hemlock Spruce and of Western Spruce are petioled, and the leaves of *Picea* have analogous leaf-bases; (3) the male flowers of *Pseudotsuga* as stated, are like those of *Picea*, but they have conspicuous spurred commissures to the stamens, like those of Hemlock Spruce, but, unfortunately for my side of the argument, quite unlike the broad, nearly circular, erect crest terminating the commissure in *Picea*; (4) “ripening the first year,” (said of the cones) is not distinctive because the cones of both fir and spruce mature in a single season; (5) “cotyledons 3-sided” is also irrelevant, for the lobes of all polyphyllary cotyledons must be triquetrous whether of a fir or a pine; (6) “wing of seed narrow, pointed” describes quite frequently the form of spruce, never that of fir, seed-wings; (7) “the structure of the wood is quite distinct” not from most of the tough spruces, but quite so from the soft, brittle wood of most of the firs; (8) finally, the most important characters relied upon for classification by modern systemists, namely those of the fruit, a few of which are given in Dr. Masters’ paragraph, show plainly, that our tree belongs with the spruces.

If Dr. Masters had rounded out his description by giving all the salient, distinguishing characters of the spruces (including *Pseudotsuga*) to wit:—Trees less symmetrical than the firs (*Abies*), the branches less frequently in whorls; leaves petioled or on raised bases; cones ovate or elliptical, terminal or nearly so, their scales persistent; seeds rounded, not gland-bearing, half-covered by the base of the pointed

wing, etc., the reader comparing these characters with the salient features of the firs (*Abies*) to wit:—Symmetrical trees, their branches usually horizontal in regular whorls: leaves sessile; cones erect, lateral, nearly cylindrical, their numerous scales deciduous; seeds angular, gland-bearing, nearly covered by the base of the large, broad wing, etc.; would have had presented before him the most convincing reasons for classing our western tree with the Spruces and not with the Firs.

MR. PARISH'S account, given on page 45 preceding, of abnormal flowering in an offshoot of *Agave Americana*, has recalled to mind a more remarkable instance which fell under my own observation in the Pinos Altos Mountains, New Mexico, some twelve years since. The species was *A. Parryi*, and the plant a wild one, on its native mountain slope. In this case the mature central and parental member of the cluster of plants, on coming into flower, had communicated its floriferous energy to all the offspring, great and small—and there were eight or ten of them—each one of which bore at the same time its scape of flowers. Of course the career of the whole family circle was thus brought to a close simultaneously with that of the patriarchal centre of it; for it is in the nature of the Agaves to die immediately they have once flowered and perfected their seeds.

EDW. L. GREENE.

OBSERVATIONS ON THE COMPOSITÆ.—III.

By EDWARD L. GREENE.

EUPATORIACEÆ (continued).

THE old and typical species of *EUPATORIUM* being tolerably well at agreement in habit, and exhibiting uniformly a 5-angled achene, the angles not being obscured by intervening secondary ribs or striæ, the recognition, early in the present century, of one Mexican, and one Atlantic North American species of this alliance having achenes 10-striate, and wearing an aspect somewhat unlike that of *Eupatorium*, suggested to several botanists independently, the idea of establishing a new genus on this foundation; and so were added to the nomenclature of the group *COLEOSANTHUS* (Cass. Bull. Philom. 67. 1816), and its synonyms, *Rosalesia* (Llav. & Lex. 1824), *Brickellia* (Ell. 1824), *Wikstroemia* (Spreng. 1826), and *Bulbostylis* (DC. 1836). Here we have five eminent botanists engaged independently in the consideration of a given type, and each one reaching the same conclusion, namely, that the plants represent a genus distinct from *Eupatorium*; while Sir William Hooker, into whose hands had fallen another member of the group from the north-western part of North America, ventured to give it a specific name under *Eupatorium* (*E.?* *grandiflorum*, Hook. Fl. ii. 26) only with a mark of doubt as to its being truly of that genus.

The old axiom in systematic botany, that the genus determines its character, and not the character the genus, implies that the recognition of a genus is the first thing, and that its characters, few or many, feeble or strong, are an after consideration. So that under this axiom, a genus may hardly have a stronger warrant than the fact that six or seven competent botanists have independently given it recognition. It were therefore presumptuous in a mediocre botanist to deny the validity of *Coleosanthus*, even if its only character be the 10-striate achene. But there are really some other differ-

ences. The achene of *Eupatorium* is not only relatively shorter than that of *Coleosanthus*; it is almost always manifestly tapering from above or near the middle, down to the base. In *Coleosanthus* it is linear and terete, or at least more nearly so a good deal than in *Eupatorium*, besides being longer. And, although the *Coleosanthus* species, now quite numerous, are not of uniform habit, none of them agree with typical *Eupatorium* in that respect.

The most important dissertations on this genus, after the fifth volume of DeCandolle's *Prodromus*, were that of Bentham in the *Botany of the "Sulphur"* (1844), and that of Gray, in the first part of *Plantæ Wrightianæ*. Both these eminent men recognized the priority of Elliott's *Brickellia* over DeCandolle's *Bulbostylis*, rejecting the latter and restoring the earlier name, as they were in duty bound by the law of priority. Yet both of them, in maturer years, having discovered *Coleosanthus* to be prior to *Brickellia*, refused now to allow the same law to amend their own error; and so they stood by that, and retained the name *Brickellia* in the face of the law. It is so much easier to apply the rules to other people's mistakes than to one's own. The needed corrections in nomenclature were made by Dr. Kuntze, as late as 1891; but a few of the species that had been somewhat recently published under *Brickellia* appear to have escaped his eye. These are:

C. Cedrosensis. *Brickellia Cedrosensis*, Greene, Bull. Torr. Club, x. 86 (1883).

C. Knappianus. *Brickellia Knappiana*, Drew; Pitt. i. 260 (1888).

C. rhomboideus. *Brickellia rhomboidea*, Greene, Pitt. ii. 103 (1890).

C. cuspidatus. *Brickellia cuspidata*, Gray, Proc. Am. Acad. xxii. 421 (1887).

If there be any obstacle to the retention of *Coleosanthus* in generic rank, I conceive that obstacle to be no other than

its exceedingly close relationship to *Kuhnia* (Linn. Sp. 2 ed. ii. 1662 (1763), the achenes of which are as terete as in *Coleosanthus*, but they are more than 10-striate, the low raised lines of their surface numbering perhaps some twenty; and the pappus is strongly plumose. Furthermore, the style-tips of *Kuhnia* are, as a rule, much shorter and thicker than in any species of either *Eupatorium* or *Coleosanthus*. But in the genus last named exist a number of species that present just the habit of *Kuhnia*, and several in which the pappus is pronouncedly barbellate. Into *Kuhnia*, then, and not into *Eupatorium* must *Coleosanthus* fall, we think, if it should eventually prove untenable. Even before species of *Coleosanthus* with pappus almost plumose had come to light, Lessing expressed the opinion that, because no one followed Cassini in dismembering *Liatris* on account of difference between a merely scabrous and a plumose pappus, therefore not even *Kuhnia* ought properly to be separated from *Eupatorium*; and his reasoning is excellent. But he does not seem to have appreciated the strength of the other characters of *Kuhnia*, namely, the short thick style-tips, and the multistriate achenes.

That *Kuhnia* suffered neglect at hands of the author of the Synoptical Flora of North America, I strongly suspect from the look of things in my own herbarium alone; for I notice there, by comparing shoots hailing from widely sun-dered stations, great diversities not only in foliage and inflorescence, but in the length, degree of exsertion, and other peculiarities of style-tips, and also of the texture and color of the pappus; and yet my specimens are not very numerous. It will be seen by a glance at Gray's synonymy of *K. eupatorioides* that quite a number of species have been proposed by good botanists; and in how far these deserve recognition as such, should be made the subject of painstaking research, by some competent person on that side of the continent which the genus inhabits.

The mostly westerly specimens before me are, a sheet from Montana, and several from Texas and New Mexico; and I

have not a doubt that these represent species distinct from each other and from the eastern original. If it were in the genus *Eupatorium* a half dozen species would be considered firmly established upon differences such as these exhibit.

IMMIGRANT PLANTS IN LOS ANGELES COUNTY, CALIFORNIA.—I.

By ANSTRUTHER DAVIDSON, M. D.

To the botanical student in Southern California few things seem more remarkable than the number of immigrant plants that, not only maintain their established footing, but in many instances increase their range with a rapidity and certainty that precludes the possibility of their extinction under any change of circumstances. While some of these have been primarily introduced in the interest of the agriculturist, the greater number are weeds accidentally imported.

Careful reference to the Botany of the State Survey, by Brewer and Watson, illustrates the great change our flora has undergone in the last thirty years in respect to introduced species. Many then rare are now common, some then adventive have since become established.

A few years ago Mr. Parish of San Bernardino published some interesting notes, entitled, "Naturalized Plants of Southern California," but from lack of opportunity this county had not been much explored by him, and his list and notes as relating thereto are necessarily incomplete. It is my intention in these notes to make good the omissions, and, while reviewing the whole ground of the immigrant plants of Los Angeles County, to endeavor to convey some idea of the comparative scarcity of the different species. To further this purpose I have discussed those of each family in the order of their relative frequency.

Brassica nigra, Koch, extends all over the county, and

where undisturbed may be said to flourish most luxuriantly on moist clay banks; in such places forming thickets six to ten feet high, impenetrable as brushwood, and affording nesting sites for blackbirds and sparrows, which, feeding upon the seeds, help to further disseminate the plague. In many grain fields the loss it occasions is considerable, and can only be prevented through the tedious process of weeding by hand. *B. campestris*, L., common enough in the city of Los Angeles, and adjoining lands, can not as yet be considered troublesome. *B. alba*, L. Already reported by Dr. Hasse as found at Santa Monica.

Sisymbrium officinale, Scop. This plant reported by Dr. Hasse from Mandeville Cañon, I had found two years ago at Millards Cañon. In both places it is increasing rapidly. *S. acutangulum*, DC., though discovered here by Brewer about 1860, remained obscure until three years ago, when I found it not infrequent in various parts of the city of Los Angeles. It flowers early in the season when the growth of grass, etc., is rank, and its inconspicuous flowers are easily overlooked, which probably accounts for its not having been more frequently observed.

Bursa pastoris, Wigg. Very common, and here, as in its native haunts, it is easily crowded out by other plants; and so, with us, is commonly found, along with the Crotons and Lepidiums, in the dry and sandy wastes.

Nasturtium officinale, R. Br., flourishes in the quieter waters of all our streams, covering them with a mantle of green all summer.

Raphanus sativus, L. Widely dispersed and thoroughly established, and by its flowering and fruiting all the year round, it bids fair to become one of the most troublesome of weeds.

Silene Gallica, L. Frequent in sandy soils.

Stellaria media, Cyr. This is fairly common but the conditions necessary to its maintenance, naturally limits its range in our rather dry climate; so that it has not spread beyond shaded places in arroyos adjoining the city.

Silene conoidea, L. (*S. multinervia*, Wats.) Reported from Santa Monica.

Cerastium viscosum, L. In the city lawns here and at Santa Monica, it is not infrequently met with, and this is what might be expected of a plant so common in Europe among grasses.

Portulaca oleracea, L. Of very frequent occurrence along the byways and streets of Los Angeles.

Malva parviflora, L. Abundant everywhere.

Modiola Caroliniana, Don. First discovered last year by Miss A. J. Merritt, within the limits of the city of Los Angeles, and since then found at El Monte.

Linum usitatissimum, L. This is another new record for southern California; and the plant seems fairly established, as I have found it appearing regularly every spring at the Santa Fe depot; no doubt originally introduced with freight.

Erodium moschatum, L'Her. The note on the *Erodiums* in the Botany of the State Survey would lead one to infer that in early days this was rarer than *E. cicutarium*. In Europe and the British Isles *E. cicutarium* is the more widely diffused, while here the conditions are in part if not wholly reversed. *E. moschatum* in the neighbourhood of Los Angeles bids fair to supplant not only *E. cicutarium* but everything else, through its early, rank and rapid growth.

E. cicutarium, L'Her. Though widely disseminated, this is mostly confined to the foothill districts and to drier ground, where the other appears unable to maintain a hold.

Medicago denticulata, Willd. A valuable fodder plant, abundant on the plains and among the lower foothills. *M. sativa*, Moris., though frequently escaping from cultivation, is not by any means common as a wild plant; and it seems doubtful if it would long survive if the farmers should cease to cultivate it.

Melilotus Indica, All. Very common. *M. alba*, Lam. Of this, two plants were observed by me two years since, growing in a sand wash of the river at Elysian Park. The winter rains obliterated the station altogether; but I have

since discovered, near the Cienega, two clumps of this fragrant plant, growing to the height of some four feet. In this station it is likely to remain unmolested.

Trifolium repens, Rivin. In the city lawns this is quite common, and where not eradicated promptly, soon covers the whole ground, the grasses receding before it; but outside of these places this clover at present scarcely exists.

Vicia sativa, L. As might be expected, this relic of early Spanish settlers is annually met with in the environs of Los Angeles, but may be considered somewhat rare.

Mesembryanthemum æquilaterale, Haw. Plentiful on sand dunes along the sea shore. *M. crystallinum*, L., grows with the preceding, but also affects low and subsaline soils back from the sea, even penetrating nearly to the city boundary on the coast side. *M. nodiflorum*, Haw. Common along the Eastern coast of Catalina Island.

Apium graveolens, L. Of all the Umbelliferæ this is the most firmly naturalized and must have been introduced at an early period, as it is not only widely diffused, but covers in dense masses acres of ground to the westward of the city.

Pastinaca sativa, L. A few years ago this was somewhat scarce in the Cienega. Now it is fairly common, and will probably increase.

Fœniculum vulgare, Ger. Plentiful in the city where it has acquired a perennial habit of growth, its stout and numerous stems forming quite dense masses.

Daucus Carota, L. An occasional escape.

Coriandrum sativum, L. A few plants have been seen on the streets of Los Angeles.

Peucedanum graveolens, B. & H. A casual?

Galium Aparine, L. Not infrequent along the seaboard.

G. spurium, L. Rarer than the last and ranging more inland.

Dipsacus fullonum, L. Established near the woolen mills, where the heads are used in cloth manufacture.

Erigeron Canadensis, L., grows abundantly and luxuriantly on waste grounds everywhere near Los Angeles.

Centaurea Melitensis, L. This promises in due time to become as injurious a weed as the hoarhound, by its forming dense and wide masses, to the total exclusion of every other plant.

Bidens pilosa, L. A city weed, common along the roadsides, in ditches and moist ground.

Xanthium Canadense, Mill., is common. *X. spinosum*, L., scarcely to be found outside the city limits.

Cotula coronopifolia, L. Frequent in shallow pools and moist places.

Sonchus oleraceus, L. When the State Survey volumes were published this plant was apparently unknown in the State. Now it is more common than *S. asper*, Vill., which is associated with it everywhere.

Anthemis Cotula, L. Widely diffused and generally more abundant in the country than in the city. At Avalon, on Catalina Island, it covers quite a large area.

Melampodium perfoliatum, HBK. In the orchards to the southeast of Los Angeles, and in Vernon district, it is fairly common, but very variable in size, sometimes only six inches in height, at other times six feet.

Verbesina encelioides, B. & H. At El Monte some twelve miles from Los Angeles, it was found established years ago. At present it is quite common in some of the corn fields. Last season I found a few plants near the river; so that this Mexican species is gradually widening its range as a naturalized plant.

Silybum Marianum, Gært. This is another plant apparently more common at El Monte than elsewhere. Near Pasadena a few specimens are to be found, but in both places it is quite localized.

Senecio vulgaris, L. Occasionally observed on waste grounds.

Taraxacum Dens-leonis, Desf. Solitary plants may be frequently observed in the lawns, but show no disposition either to multiply or to extend their range.

Cotula australis, Hook. Limited to a single station at Sierra Madre, where Dr. Hasse found it.

Crepis biennis, L. A casual in Sixth Street Park, Los Angeles.

Bellis perennis, L. Once observed on Main Street, Los Angeles.

Here also may be recorded two plants natives of America, but accidental introductions in this county.

Gymnolomia multiflora, B. & H. In 1890 I found some specimens growing in the river bed at Los Angeles; and Dr. Hasse the same season found one plant at Santa Monica. In neither place has it reappeared.

Dicoria canescens, T. & G. For the last two seasons a few specimens have been found on the sand banks near the railway bridge, no doubt accidentally introduced from the Mohave Desert.

ON JUSSIÆA REPENS OF LINNÆUS.

By BARON FERDINAND VON MUELLER.

Will you be so kind, dear Professor Greene, as to publish, in some one of the botanical periodicals of your country, the fact that the *Jussixa repens* of American phytographers is not the Linnæan plant that was so named; for that has the petals white, except their base (just as in *Ranunculus aquatilis*) as was stated long ago by Rheede and by Ray, in their definitions of what afterward became the type of Linnæus' species.

The genuine *J. repens* is known with certainty only from continental India, where the smaller species, with petals always entirely yellow, does not exist; but which, however, must approach very near to the Indian confines. This is the *J. diffusa* of Forskaal; and, as Mr. Oliver has shown, it is also the African plant, and the same occurs throughout Australia. I believe it is also the American plant. Mr. Mohr, of Alabama, who, at my suggestion made through Mr. Thomas Meehan, investigated the case, reports that in the Southern United States the plant called *J. repens* has always quite yellow petals.

As the subject is one of some interest from the point of geographical distribution, will you kindly make known at an early date your own experience in connection with the American *Jussixa*, and address a note on the subject, to Professor Lèveillè.

Respectfully yours,

FERD. VON MUELLER.

Melbourne, Australia, 5 Dec., 1892.

The above letter, from my friend in Australia, explains itself; but I have to add by way of comment, that I had from him nearly two years ago, an intimation that our American *Jussicea* was not *J. repens*; and, in the Flora Franciscana (page 227) I acceded to his proposition that we have in North America only the *J. diffusa*. But, since the separating of *Jussicea* from *Ludwigia* has no warrant at all, from a phytological point of view, I have treated them, in as far as I had to do with them in the Flora Franciscana, as one genus, under the older name, *Ludwigia*, retaining the specific name assigned by Forskaal. The California plant, just like that of the Atlantic slope, has always a pure yellow corolla.

Linnaeus' brief conventional diagnosis of *J. repens* is, of course, entirely useless; and, as my correspondent suggests, we must go back to the pre-Linnaean founders of the species, in order to find the real characters of the Indian type; but perhaps the fullest description of true *repens*, accompanied by an excellent plate, was given by Dr. Wight in the third volume of Hooker's Botanical Miscellany, page 300, plate 40.

EDW. L. GREENE.

STUDIES IN CALIFORNIAN UMBELLIFERÆ.—II.

By WILLIS L. JEPSON.

Eryngium aristulatum. Prostrate, very slender, the stems 10 to 16 inches in length: radical leaves long petioled, the short blade spinose-toothed and with a few lanceolate segments; cauline leaves opposite, sessile, spinulose-serrate: heads very numerous, 3 lines in diameter; bracts exceeding the head, about 5 lines long, spinescent at base; bractlets spinose, the body narrowly lanceolate, inversely sagittate-winged from the base upwards, the lobes of the wings thus forming sinuses in each of which are borne 1 to 3 awns, surpassing the breadth of the wing: calyx-lobes hyaline-margined, cuspidate, exceeded by the long styles.

In the dry bed of a winter lake, situated in the mountains south of Uncle Sam Mountain, Lake County, July 28, 1892. The radical leaves are imperfectly known, but are at least 4 inches long. The bractlets usually surpass little or not at all the calyx, but some simulate the bracts in size, exceeding the head. Its nearest ally is *E. articulatum*, Hook. (Lond. Journ. Bot. vi. 232, 1847), originally collected by Geyer "at the stony edges of the Spokane River, and Skitsoe and Coeur d'Aleine Lakes," Idaho. It differs from that in its prostrate habit, numerous small heads, longer styles, and winged bractlets.

SANICULA BIPINNATA, Hook. & Arn. Bot. Beech. 347. Credited to the Sierra foothills, from Kern County to Butte. It is also common in the foothills of the Coast Range, bordering the lower Sacramento Valley; in the shade of oaks, flowering in March.

CARUM KELLOGGII, Gray, Proc. Am. Acad. vii, 344. This, known to be frequent about San Francisco Bay, is one of the most common and widely distributed of summer plants in the hills of the Coast Range in the counties of Napa and Solano.

LEPTOTÆNIA CALIFORNICA, Nutt. var. *dilatata*. Leaves nearly as in the type; peduncles at summit abruptly widened into a disciform dilatation, 9 lines in diameter; fruit 7 lines long, 5 lines wide, narrowly margined, oil-tubes anastomosing. Bolander, n. 6526.

A MONTH ON THE SHORES OF MONTEREY BAY.

By MARSHALL A. HOWE.

The name "Monterey" has a magic sound to the botanical student as well as to the historian and the fashionable tourist. Being for a long time the largest settlement on the coast and the capital of "Alta California," it was a natural stopping-place for the early botanical explorers. Here, in 1791, were Thaddæus Haenke and Luis Née, the first botanists to touch

upon the Californian coast, and later, Monterey was visited for longer or shorter periods by Archibald Menzies, Chamisso, Eschscholtz, Douglas, Coulter, and others, whose names are so closely interwoven with the history of botany in California. Most of these collectors confined their attention chiefly to phanerogams, but Menzies, Douglas and Coulter sent back to Europe many of the lower plants; and it is to the shores near Monterey that several species of the marine algæ can trace the beginning of their relations with the world of science. Among the latter are *Fucus Harveyanus*, *Rhabdonia Coulteri*, *Gigartina microphylla*, *Chylocladia ovalis*, var. *Coulteri*, and probably others like the *Gelidium* and *Microcladia*, bearing the specific name *Coulteri*, the original specimens of which are attributed in a vague way to California. It has been from the Bay of Monterey, too, though chiefly from the northern shore, that in later years, Dr. C. L. Anderson, the enthusiastic and well known student of the California marine algæ, has brought to light many new and interesting species. It was therefore with pleasant anticipations that I decided to devote the month of July last to the collection and study of the "sea-weeds" on the classic shore of the Bay of Monterey.

To one who has never seen any other coast than that of New England, a morning glimpse into one of the tide-pools off the rocks near Pacific Grove is a revelation! The wonderful clearness of the azure-tinted water under the morning sunlight is admirably adapted for showing off to the best advantage the many and varied forms of animal and vegetable life. The brilliant green of *Cladophora scopæformis* and *Ulva latissima* is contrasted with the pink and white of the corallines which abundantly line the pools, while the dull hue of a tuft of *Gelidium* or *Prionitis* serves but to heighten the bright red of fragments of *Callophyllis* and *Nitophyllum* which, perchance, have been swept in during the night from greater depths. In the bottom of the pool, too, it may be, the pretty "sea-anemones" spread their tentacles, or a brown and yellow star-fish imagines himself hidden in some half-sheltered cranny.

The surrounding rocks are left by the ebbing tide covered with a dense moist mat of the olive-green weeds, which are interesting, though possessing little beauty in form and color. Three species of *Fucus* are represented here. *Fucus fastigiatus* and *F. Harveyanus* are perhaps the most abundant, though *F. evanescens* is not rare. *Fucus fastigiatus*, when growing at about the point reached by the highest tides has a peculiar dwarfed aspect which is quite striking. They were doubtless specimens from such a locality to which Harvey alludes in the *Nereis* as having been collected at Monterey by Douglas. *Ascophyllum nodosum*, so common on the Atlantic coast, is conspicuous by its absence, but its place is taken, in a way, by *Codium tomentosum*, which does not favor New England with its presence though found on almost every other shore in the world.

Halidrys osmundacea, or Sea-oak, is an interesting plant growing at low-tide mark and below, which I regret not giving more attention. The fronds of the few specimens secured are remarkably variable, and moreover they are *strictly dioecious*, though Harvey gives "spore-cavities containing both spores and antheridia in the same loculus" as a generic character both of *Halidrys* and *Cystoseira*. The fragment of a plant described by Harvey, first in the *Botany of Beechey's Voyage* as *Cystoseira Douglasii* and afterward referred in the *Nereis* to the *C. expansa* of J. Agardh, is thought by American phycologists to have been simply the upper part of the deep water form of *Halidrys osmundacea*. It is possible that the forms now going under the name of *H. osmundacea* are in need of further study on their native rocks.

Halosaccion Hydrophora, often popularly called Sea-sacks, is not uncommon in the lower tide-pools near Pacific Grove. The fronds of this species are described in the *Nereis* as "quite simple," but specimens were here found with conspicuous proliferous branches. One of the noteworthy features of the Pacific marine flora when compared with that of the Atlantic is the striking exhibition of the

genus *Gigartina* both in species and individuals. Dr. Anderson recognizes nine species in his "List of California Marine Algæ," seven of which were found last July in greater or less abundance about the Bay of Monterey. The common *Gigartina Radula* is often thickly clothed with the elegant *Microcladia Coulteri*, so much prized for ornamental uses. *Gigartina mamillosa*, the only species of this genus on the coast of New England, is not known to occur in California. *Iridœa laminarioides* is a plant that must be seen growing to be appreciated. The matter-of-fact description given it by that enthusiastic and poetic friend of the "sea-mosses," Rev. A. B. Hervey, is explained only by the supposition that he had never seen it in all its iridescent glory upon its native shores. Dried specimens give but a faint suggestion of the possibilities of the plant in the way of displaying rainbow tints under the right conditions of light and moisture.

A sea-weed which immediately attracts attention in most bays of the Pacific coast is the Great Kelp—*Macrocystis pyrifera*. This plant undoubtedly attains a length greater than that of any other of the earth's organisms. A length of 700 feet is attributed to a single individual by Sir J. D. Hooker in the *Flora Antarctica* and still more imposing figures have found a place in the estimates of others. Beds of this giant weed are found in the Bay of Monterey, usually at some little distance from the shore. The plants grow in rather deep water and on reaching the surface lie prostrate on the waves, buoyed up by the air-vessels, which occur in the petioles of the leaves. The great size of *Macrocystis* and the distinct differentiation into stem and leaves, make it difficult to realize at first that this plant has its place among the algæ. *Nereocystis Lütkeana*, the Sea-otter's Cabbage, another of the great weeds of the Pacific, was, judging from descriptions, not fully grown at the time of my visit. Still, specimens twenty-five or thirty feet long were found washed ashore on "Moss Beach," which, however, faces the open ocean rather than the bay.

Among the more interesting plants collected, *Fucus evanes-*

cens, *Adenocystis Californica*, *Callithamnion Americanum*, and *Bonnemaisonia hamifera*, are perhaps deserving of special mention, inasmuch as they do not appear in Dr. Anderson's "List of California Marine Algæ." *Bonnemaisonia hamifera* is a beautiful and noteworthy alga. Prof. Farlow states (in a letter to Dr. Anderson) that it has also been found at Santa Barbara, but that the plant from which the description was drawn came, somewhat recently, from the coast of Japan.

The month's work about the Bay of Monterey was rewarded by the acquisition of specimens representing about 105 species, some of which are due to the generosity of others who were collecting at the same time. For assistance in the determination of some of the specimens I am indebted to Dr. C. L. Anderson of Santa Cruz and Prof. W. G. Farlow of Harvard University. Below is a list of the plants collected, with the exception of a few sterile fragments, the affinities of which are still uncertain:

- | | |
|---|--|
| <i>Codium adhærens</i> , Ag. | <i>Alaria marginata</i> , Post. Rupr. |
| <i>C. tomentosum</i> , Stack. | <i>Postelsia palmæformis</i> , Rupr. |
| <i>Ulva enteromorpha</i> , LeJolis. | <i>Macrocystis pyrifera</i> , Ag. |
| <i>U. enteromorpha</i> , LeJolis, | <i>Nereocystis Lütkeana</i> , Post & Rupr. |
| var. <i>intestinalis</i> , LeJolis. | <i>Fucus Harveyanus</i> , Decaisne. |
| <i>U. Lactuca</i> (L) LeJolis, | <i>F. fastigiatus</i> , Ag. |
| var. <i>latissima</i> , LeJolis. | <i>F. evanescens</i> , Ag. |
| <i>Chætomorpha ærea</i> (Dillw.) Kütz. | <i>Halidrys osmundacea</i> (Menzies) |
| <i>C. sutoria</i> (Berk.) Harv. | Harv. |
| <i>Cladophora cartilaginea</i> , Rupr.(?) | <i>Egregia Menziesii</i> (Turn.) Aresch. |
| <i>C. fracta</i> (Fl. Dan.) Kütz. | <i>Porphyra vulgaris</i> , Ag. |
| <i>C. scopæformis</i> , Rupr. | <i>P. nereocystis</i> , Anderson. |
| <i>C. uncialis</i> , Fl. Dan. | <i>P. naiadum</i> , Anderson. |
| <i>Desmarestia ligulata</i> , Lmx. | <i>Petrocelis cruenta</i> , Ag. |
| <i>Ectocarpus granulatus</i> , Ag. | <i>Nemalion Andersonii</i> , Farlow. |
| <i>Leathesia tuberiformis</i> , S. F. Gray. | <i>Ceramium diaphanum</i> , Roth. |
| <i>Chordaria abietina</i> , Rupr. | <i>C. rubrum</i> , Ag. |
| <i>Adenocystis Californica</i> , Rupr. | <i>Centroceras clavulatum</i> , Ag. |
| <i>Laminaria Farlowii</i> , Setchell MS. | <i>C. Eatonianum</i> , Farlow. |
| <i>L. Sinclairii</i> , Farlow & Eaton. | <i>Microcladia Coulteri</i> , Harv. |
| <i>L. Andersonii</i> , Farlow MS. | <i>M. borealis</i> , Rupr. |
| <i>Costaria Turnerii</i> , Grev. | <i>Ptilota hypnoides</i> , Harv. |

- P. plumosa*, Ag.
 var. *filicina*, Farlow.
P. densa, Ag.
Griffithsia ———.
Callithamnion Americanum, Harv.
C. Arbuscula (Dillw.) Lyngb.
 var. *Pacificum*, Harv.
C. dasyoides, J. Ag.
C. polyspermum, Ag. (?)
Pikea Californica, Harv.
Sarcophyllis Californica, J. Ag. (?)
Chrysomenia pseudodichotoma,
 Farlow.
Kallymenia Californica, Farlow.
Cryptosiphonia Woodii, J. Ag.
Farlowia compressa, J. Ag.
Prionitis lanceolata, Harv.
P. Andersonii, Eaton.
Halosaccion Hydrophora, J. Ag.
Gigartina Radula, J. Ag.
G. microphylla, Harv.
G. horrida, Farlow.
G. spinosa, (Kütz) Harv.
G. papillata, Ag.
G. volans, Ag.
G. canaliculata, Harv.
Endocladia muricata (Post. &
 Rupr.), J. Ag.
Chondrus canaliculatus, J. Ag.
Iridæa laminarioides, Bory.
I. dichotoma, Harv. (?)
Callophyllis variegata (Bory),
 Kütz.
C. furcata, Farlow.
Gymnogongrus linearis (Turn.),
 J. Ag.
Ahnfeldtia plicata, Fr.
Rhodymenia ———.
- Stenogramma interrupta* (Ag.)
 Mont.
Rhabdonia Coulteri, Harv.
Cordylecladia conferta, Ag.
Plocamium coccineum, Lyngb.
P. violaceum, Farlow.
Gracilaria confervoides, Grev.
Delesseria alata, Lmx.
Nitophyllum Andersonii (Ag.),
 Farlow.
N. Fryeanum, Harv.
N. latissimum (Harv.), J. Ag.
N. Ruprechtianum, Ag.
N. violaceum, J. Ag.
Erythrophyllum delesserioides, Ag.
Gelidium corneum, Lmx.
G. cartilagineum (L.) Grev.
G. Coulteri, Harv.
Rhodomela Larix (Turn.) Ag.
R. floccosa (Esper), Ag.
Polysiphonia senticulosa, Harv.
P. parasitica, Grev.
P. parasitica, Grev.
 var. *dendroidea*, J. Ag.
P. Baileyi, (Harv.), J. Ag.
P. bipinnata, Post. & Rupr. (?)
P. Woodii, Harv.
Bonnemaisonia hamifera, Hariot.
Laurencia pinnatifida, Lmx.
L. pinnatifida, Lmx.
 var. *spectabilis*.
L. virgata, J. Ag.
Chylocladia ovalis (Huds.), Hook.
 var. *Cculteri*, Harv.
Corallina officinalis, L.
C. squamata, Ell.
Amphiroa Orbigniana, Harv.
A. Aspergillum, J. E. Gray.

NEW CALIFORNIAN PLANTS.

By F. T. BIOLETTI.

Scorzonella maxima. Stout, 2 to 4 feet high, leafy-stemmed, glabrous: lower leaves about a foot long and 2 inches broad, entire, or with a few small and scattered teeth: heads very broad, about 400-flowered: bracts of involucre about 40, the outer long-acuminate from a broadly ovate base, the others successively narrower at base, the innermost linear-lanceolate: achenes about 3 lines long; lanceolate paleæ $1\frac{1}{2}$ lines, the whole pappus 5 or 6 lines long.

Collected at the end of summer, 1892, in Los Guilucos Valley, Sonoma County. The species resembles *S. arguta*, Drew, which is smaller, has finer flowers, as well as different involucre bracts, and a pappus of different proportions.

BLEPHARIPAPPUS HIERACIOIDES (H. & A.), Greene, forma **anomala.** Ray-achenes not enfolded by the involucre bracts, these only concave, not falling away with the achenes, but becoming deflexed and somewhat persistent after discharging them.

This, a robust form or variety of a common species, grows plentifully on a certain elevated plateau among the hills behind Berkeley. The semipersistent involucre bracts become as much deflexed as in *Senecio vulgaris* or other of the more common composites; a thing otherwise unknown in the Madioid tribe. But no other characters are detected; so that it can hardly be deemed a species distinct from *B. hieracioides*.

REVIEWS AND CRITICISMS.

Revision der kleineren Ranunculaceen-Gattungen *Myosurus*, *Trautvetteria*, *Hamadryas*, *Glaucidium*, *Hydrastis*, *Eranthis*, *Coptis*, *Anemonopsis*, *Actæa*, *Cimicifuga* and *Xanthorrhiza*. Von Dr. ERNST HUTH. Englers' Bot. Jahrb. xvi, 278-324.

This learned and elaborate discussion of the smaller genera of Ranunculacæ is a paper of exceptional interest to North American botanists; for several of the genera are almost or quite exclusively American. Even *Myosurus* known for centuries as an Old World monotype, now, in that development which Dr. Huth so judiciously accords to it, appears as for the most part an American genus. As a genus its history is most unique. Not known to the ancients, but recognized by all authors from the middle of the sixteenth century forward, no second species was discovered until near the middle of our own century; while of the seven now recognized, five have been detected within the last fifteen years, and in western North America.

The two new species proposed by this author are *M. breviscapus* and *M. Pringlei*. The latter, a plant from Chihuahua, distributed by Mr. Pringle in 1887, we had supposed would prove a new species if examined critically. The former is credited with a remarkable dispersion over several portions of the globe, namely, Europe, Africa and North America; but three varieties are distinguished and characterized. The variety *Madoniensis* is of the mountains of Sicily; var. *Africanus* is Algerian; var. *Californicus* is of middle California, and has been collected only by the present writer, according to Dr. Huth; but, if the more prominent beak of the achene, and not the shorter scape, be the more essential character of the species, almost all the Californian "*M. minimus*" will be of this species notwithstanding that in the bulk of the specimens the scapes are longer, and the spikes shorter than in true *M. minimus*. The common plant of which I speak, n. 1193 of the State

Survey collection, and also distributed by myself, from Siskiyou Co., in 1876, I have long looked upon as probably distinct from *M. minimus*, but could not seem to find any weightier character than that of the long scapes and short spikes. I doubt if Dr. Huth has ever seen this plant; and I am almost certain that, in spite of its numerous and greatly elongated scapes, it is specifically identical with his *M. breviscapus*. The achenes are the same, and furthermore, the State Survey, n. 1193, is from the Livermore Valley, just the region whence I brought the smaller plant with short scapes, on which Dr. Huth founds his *M. breviscapus* var. *Californicus*. But perhaps all these plants were, by Dr. Gray, included in his *M. apetalus* var. *lepturus*.

That the author of this Revision is misled as to the importance of the length of scapes in this genus, I infer from other circumstances. For example: he has referred my *M. minimus* var. *apus*, to Watson's *M. sessilis*. Both have sessile or subsessile spikes, and are in this respect alike, while in the more important matters of the form and the length of the spikes themselves there is much difference. In Watson's species they are short and conical. In my plant they are long and cylindrical. Under the typical species of the genus Dr. Huth distinguishes four varieties, the most pronounced of which is our *M. minimus* var. *filiformis*, which Dr. Gray was disposed to consider specifically distinct. Had we seen only the best of the specimens, at least apart from the less typical ones, we should have taken such a view ourselves, at the outset. But, along with these, growing on the same square rod of moist ground at the summit of Guadalupe, we found plants so much like genuine *M. minimus*, besides plenty of intermediate forms, that we can never cease to regard the most extremely attenuate and delicate specimens as representing a mere variety of the old type.

The Australian variety, named *australis*, to the casual view looks quite like genuine *M. minimus*; but a glance at the fruit, with the help of a good lens, reveals such a broad and quite sharply rhombic outline to the back of the achene,

as quite removes all doubt as to its merits as a strong geographical variety. The naming of this is attributed to Baron von Mueller; but Dr. Huth does not tell us whether or not it is now first published. From the Ural Mountains there is recognized a variety *perpusillus* characterized as much more slender than the true *minimus*, with scapes much more elongated as compared with the leaves. As far as the description goes, therefore, this might be near our West American var. *filiformis*.

It is a pity that, in the Middle or Southern Atlantic states of our continent Rafinesques *M. Shortii* is not rediscovered. As a species it was early rejected, but whether with reason, or arbitrarily and because at a certain period it was the fashion to ignore Rafinesque, probably no one knows. But we remark that Dr. Huth not only gives it recognition as a var. *Shortii* of *M. minimus*, but adduces for it a couple of stations in northern parts of the Old World, in addition to the American localities of long ago.

In dealing with the second species of *Myosurus* that was made known, our monographer uses a kind of freedom which is not in our day commonly allowed. Between two names, *M. apetalus*, which has priority, and *M. aristatus*, which is more appropriate, he chooses the latter. We do not know whether, in case there had not been a second and more suitable name for the species, the author would have coined a new one. But it seems to us that the man who is not ready to take the stand of making a new and good name, when the old one is bad, can not, in reason, allow himself the license of adopting the better but later one of some one else. It is perhaps true that there is less injustice in rejecting a prior name that is bad than one that is good; because it may be said, and with reason, that no man has a right to impose on a species an unfit name. But the consequences to the stability of nomenclature are alike in the two instances. If names are not to stand, whether apt or inept, according to strict priority, changes will be perpetual. And if changes were to be admitted on the score of improvement, a fine

opportunity lay open to Dr. Huth in the case of the typical species of this genus, *M. minimus*; for since this is the largest species of the whole seven, and is named "the smallest," it is not only the most inappropriate name in the whole genus as we now have it, but more inappropriate than any name for any possible future *Myosurus* is likely to be.

Eranthis and *Coptis* are retained in the rank of genera by Dr. Huth, though it is confessedly impossible to name a single character of any importance, by which the former is distinguishable from *Helleborus*; and M. Baillon reduces both these small genera to that original out of which they were taken. We are of the opinion that *Eranthis* should be joined to *Helleborus*, and that *Coptis* is perfectly distinct by habit and strong vegetative characters, such as the coriaceous foliage, hard rootstocks, and roots of peculiar color and qualities. We also consider that on these accounts the plants are just as incongruous with *Isopyrum*, to which some have thought the species might be referred. We consider that it would be less unnatural to merge *Isopyrum* in *Thalictrum* even, than to unite *Coptis* to the former. Between *Coptis* and *Helleborus*, or *Coptis* and *Isopyrum* we perceive only certain close analogies of fruit structure, but no very near affinity; while to our view, between *Isopyrum* and *Thalictrum*, there is close affinity, and little difference beyond that of the number of the carpels and the number of seeds in each. We did not know, until now, that either of these small genera, *Eranthis* and *Coptis*, had acquired so considerable a number of species. According to our author, who is a great conservative in the matter of species, *Eranthis* has seven and *Coptis* nine. The former is a genus of the Old World exclusively; the latter is partly of the same distribution, though with four American species.

In the case of *Actœa*, a small genus still, and mainly American in its distribution, Dr. Huth has made an unsuccessful study; or at least such will be the opinion of any American botanist who may have given much attention to these plants. Dr. Huth recognizes only a single species of

Actæa, though at least six have obtained recognition with botanists in times past and present. We have been wont to think that there are as many as four or five; one with berries constantly black (*A. spicata*), one with milk-white fruits borne on stout, much thickened pedicels (*A. alba*), and about three different red-berried species, two of which run into albino states as to the color of their fruits. I suppose there is no botanist of Atlantic North America who doubts that *A. alba* is thoroughly distinct from that other and red-fruited kind with which it has had the misfortune to be confounded by several eminent men at various periods. The white-berried varieties of the other species have fruits of a snowy and glistening whiteness; so that the curiously thickened pedicels of *A. alba* are not its only manifest character. The white of its berries is a milky white and the surface is dull, not shining. Indeed, the berries are said to have a form of their own, *i. e.*, globular rather than ovoid. Upon the whole, with Dr. Huth's learned paper before us, we feel like renewing the call made upon East American botanists not long ago, to collect living plants of all the Baneberries of both continents, and grow them side by side, with a view to settling the limits of the species. These can be established in no other way. I remark that Dr. Huth had not read the most recent of all contributions to the history of the genus; that given in the second volume of *Pittonia*.

We cannot but admire the altogether scholarly character of Dr. Huth's paper; the full list given of authors whom he has consulted; the crediting of *Myosurus* to its true author, a pre-Linnæan; the implicit censure passed upon Linnæus whom he charges with having rejected the good Gesnerian name *Christophoriana*, and having put in its stead *Actæa*, which all botanical scholars know, or may know, belonged to the Elder bush originally, and which ought never to have been transferred to these herbs. This is an aspect of Dr. Huth's work which, like simple truthfulness everywhere, will commend itself to all who are opposed to shallowness, superficiality, and time-serving.

EDW. L. GREENE.

MISCELLANEOUS NOTES AND NEWS.

AN International Congress of Botanists held at Genoa in 1892, instituted Sept. 9, an International Standing Committee on Nomenclature, composed of the following thirty botanists: ASCHERSON, and ENGLER, Berlin; BAILLON, BUREAU and MALINVAUD, Paris; BAKER and CLARKE, Kew; BATALINE, St. Petersburg; BRITTON, New York; A. DECANDOLLE, Geneva; CARUEL, Florence; CELAKOVSKY, and WILLKOMM, Prague; CREPIN and DURAND, Brussels; COULTER, Bloomington; FRIES, Upsala; GREENE, Berkeley; HENRIQUES, Coimbra; HOOKER, Sunningdale, Berks; KANITZ, Klausenburg; KERNER de MARILAUN, Vienna; LANGE, Copenhagen; VON MUELLER, Melbourne; LARA, Jerez de la Frontera; RADLKOEFER, Munich; SACCARDO, Padua; SCHMALHAUSEN, Kieff; SURINGAR, Leyden; WHITTROCK, Stockholm. The official notification of membership just received by Professor Greene, recites the causes and events which led to the institution of the committee. The Congress by a practically unanimous vote declared its approval, barring certain significant amendments, of the first three of the now noted Articles of Berlin, but declined to give any official expression of opinion as to the fourth, and virtually left all questions open by referring to this Standing Committee the propositions already made, and all others which might arise. The members of the committee are advised to confer one with another and report to some future World's Congress, "the decisions of which shall have the force of law."

THE Board of Forestry of California has drawn upon itself an abundance of adverse criticism, and the Legislature of the State has been asked to abolish the commission. That there is a great and important work for the Board to accomplish no one will question, but that its members have displayed any real knowledge of forestry no one is prepared to affirm; nor indeed does that prerequisite to the success of the commission appear to have been at all necessary to the expenditure of an appropriation, as transpires from sensa-

tional investigations. It is not, however, the first occasion that the name of a department of science has been used to secure appropriations from the State and Nation for purposes altogether foreign to those for which it was intended.

THE Sierra Club of San Francisco promises to become a large and powerful organization. Its objects are sufficiently comprehensive to allow it to aid in a practical and important work—that of protecting the forests of the High Sierra. In these Sierra forests are the groves of “Big Trees” that long ago gave a world-wide fame to the vegetation of California. It is not uncommon for travelers to observe that the trunks of the sequoias have been charred from recent fires caused chiefly by careless hunters and camping parties or destructive stockmen. The writer on a visit to the Merced Grove found the largest trees on fire. Many members of the club who annually visit the High Sierras would consent to be armed with the authority of the organization to aid them in enforcing the laws existing against vandal recklessness.

The Honorable S. CLINTON HASTINGS, a prominent Californian, whose zeal and liberality furnished the means for publishing the second volume of the Botany of the State Geological Survey, died in San Francisco on the twentieth of last month, at the age of seventy-nine years. A genus *Hastingsia* was dedicated to him by the late Sereno Watson, in the volume aforementioned; but, like several other of the Watsonian liliaceous genera, it does not meet with general recognition; the species being restored to *Schœnolirion*.

THE VEGETATION OF THE SUMMIT OF MOUNT HAMILTON.

By EDWARD L. GREENE.

A number of years ago, even before the Lick Observatory had been completed, Professor Holden, at that time President of the University, expressed to me his desire that, at the earliest convenient time, a botanical survey of Mount Hamilton should be made, and a catalogue of its vegetation published.

From two different points of view, statistics of the spontaneous vegetation of this locality would both be interesting at the time of their publication, and become more so with succeeding years, and the changes incident to the continued occupation of the summit by men and domestic animals. In western California, at least in the middle sections of the State, the original vegetation, free from admixture of foreign elements, can not be found elsewhere but in the midst of the few remaining unbroken tracts of seaboard forest, and on the summits of our higher coast mountains. The mountain tops are the last places to be reclaimed by man from their natural condition, and consequently are the last places to be invaded by those Old World field and wayside and garden weeds which everywhere closely attend the steps of the farmer and horticulturist. One finds the mountain summits tenanted almost solely by their own native plants, long after the valleys and the cultivated lower slopes have had theirs either mixed up with, or more or less nearly exterminated by, the more hardy and aggressive alien growths. It was therefore in Director Holden's mind that our researches upon the mountain vegetation should have been made at the first occupancy of the summit by the astronomers, thus presumably in advance of the arrival of any plant immigrants. It could not then be done; for none unacquainted with California botany could take even the preliminary steps; and a pressure

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of other work at Berkeley which could not be deferred precluded the possibility of its being undertaken by the present writer until the year 1891. However, the date of the completion of the Observatory, and of the consequent occupancy of the station by residents, would certainly have been found too late for the recording of the earliest arrivals in the line of immigrant plants. Some of these must have come perhaps ten years earlier, along with the workmen and their teams, when the foundations of the Observatory were being prepared and the roads made. This earliest work must have involved the importation of provisions, grain and hay to the mountain top, while at the same time the digging and grading prepared places of germination for such seeds of alien plants as thus found their way to the locality.

In the second place, Mount Hamilton having been chosen as the site of the Lick Observatory on account of its being a fair weather mountain, as compared with other middle Californian summits of equal or nearly equal elevation, it must be interesting to note how well the native vegetation, as compared with that of the other summits referred to, would have indicated to the botanist without other data, the relative immunity of this mountain top from fogs and long continued rains.

The subjoined catalogue, embracing about two hundred and ten species of phanerogramic growths, besides several ferns, is not likely to prove a complete list for the limited and not very definitely circumscribed area which it is meant to cover. It is drawn chiefly from field notes made by the writer during the last week of July, 1891; that is to say, in the midst of the dry season of the year, at a time when the greater proportion of annual species—and these form the great bulk of the native vegetation in all parts of California—were long past flowering and quite dead. Owing to this circumstance, no doubt a considerable number of species must have escaped notice entirely; and some of those accredited were seen only in the herbarium of Miss Mildred Holden, as having been collected by her in June. Some

others were enumerated out of a small collection brought to me by Mr. C. T. Blake of Berkeley, a botanical amateur of keen eye who does more or less good service in botany wherever he goes on a vacation tour. As to the ground intended to be covered by the catalogue, I may say that it begins at no very precisely marked point, but in a general way embraces the land lying above the line of the Aquarius Road on the north side, and descends to about the same elevation on the southward slope, extending eastward to the Joaquin Murrieta Springs.

The relative aridity of Mount Hamilton as compared with such mountains as Diablo and St. Helena, is indicated by the absence of everything which can be called a forest. Such oaks and pines as are of arborescent dimensions are too much scattered to constitute even a grove anywhere, and represent those species only which belong to the dry districts. The Coast Range oaks which, under more favorable conditions become large trees, are here found on the north side only, and near the summit, forming low thickets not much exceeding a man's height. The genus *Ceanothus*, which in other and less arid mountain districts both of the Coast Range and the Sierra Nevada, often makes up a great proportion of the dense brushwood that covers the slopes and even the lower summits, seems to be wholly absent from Mount Hamilton; and even the Buckthorn is found to be the *Rhamnus tomentella* of the dry interior of the State, and not the *R. Californica* of the moist seaboard hills and mountains. Equally strong botanical evidence of a dry atmosphere is found in the abundant development of the genus *Eriogonum*, the species of which are most numerous in the very dry region of the Great Basin east of the Sierras, few in the Californian Coast Range, and of a somewhat surprising number on the higher slopes of Mount Hamilton, where most of the species are representatives of more southerly districts, and have here, at least in some cases, their northern limit of distribution.

Although, as above noted, our list is not like to prove a complete one, it is fairly representative of the flora of this

particular summit; and its value as a contribution to the published knowledge of plant distribution on the Pacific Coast will be realized more fully after similar lists shall have been made upon the vegetation of other mountains of western California, such as Tamalpais, Diablo, St. Helena, and the Loma Prieta (Mount Bache).

The species reasonably presumed to be adventive or naturalized on the summit are marked in the list by an asterisk. They are not numerous; and all of them save *Matricaria discoidea*, which is indigenous to our seaboard, are natives of the Old World, now extensively naturalized in California and elsewhere. Some of these, as the appended notes will show, were found only in one or two specimens, and only future years will tell whether or not all of them become truly permanent denizens of the place. It will also be observed that for a considerable number of native Californian plants, the known range has been greatly extended by this record of their occurrence on Mount Hamilton; and indeed that entire sub-range of mountains of which this is the highest peak, offers one of the most inviting of fields for botanical exploration.

LIST OF SPECIES.

1. *VICIA TRUNCATA*, Nutt.; Torr. & Gray, Fl. N. Am. i. 270.
2. *LATHYRUS VESTITUS*, Nutt.; Torr. & Gray, Fl. N. Am. i. 276.
3. *PSORALEA MACROSTACHYA*, DC. Prodr. ii. 220. Seen only at the Joaquin Springs.
4. *PSORALEA PHYSODES*, Dougl.; Hook. Fl. Bor.-Am. i. 136.
5. *LOTUS HUMISTRATUS*, Greene, Pittonia, ii. 139. Apparently common, even to the summit.
6. *LOTUS CRASSIFOLIUS* (Benth.), Greene, Pittonia, ii. 147. Frequent on the northward slope near the summit.

7. *TRIFOLIUM MACRÆI*, Hook. & Arn.; Hook. Bot. Misc. iii. 179.

8. *TRIFOLIUM TRIDENTATUM*, Lindl. Bot. Reg., under t. 1075.

9. *TRIFOLIUM ROSCIDUM*, Greene, Fl. Fr. 31. In moist shades about Aquarius Springs.

10. **MEDICAGO DENTICULATA*, Willd. Sp. Pl. iii. 1414. Observed only in a flower bed belonging to one of the employees, but in several specimens.

11. *LUPINUS MICRANTHUS*, Dougl.; Bot. Reg. t. 1251.

12. *LUPINUS FORMOSUS*, Greene, Fl. Fr. 42.

13. *LUPINUS ALBIFRONS*, Benth.; Bot. Reg. t. 1642.

14. *THERMOPSIS CALIFORNICA*, Wats, var. *velutina*. From one to two feet high, silvery-canescant throughout with a dense stiff and spreading, somewhat plush-like pubescence: leaflets slightly rhombic in outline, and mostly very acute.

In the *Flora Franciscana* I have expressed a misgiving as to the validity of *T. Californica* as a species. If the present plant had been its type, there would have been no doubt about its title to specific rank. But Mr. Watson named the Marin County plant as his type. That is far more like *T. macrophylla* than is this denizen of Mount Hamilton; and even the specimens from Monterey, which are in the State Survey collection and were included in *T. Californica* by the author, though a good deal more tomentose than the type, are still quite unlike, and much less densely pubescent than this new variety. It is common enough, on open grassy ridges westward from and a little below the Observatory, and also above Aquarius Springs.

15. *CERASUS EMARGINATA*, Dougl.; Hook. Fl. Bor.-Am. i. 169. The wild Red Cherry occurs sparingly along the higher ridges, as a bush only three or four feet high.

16. *CERASUS DEMISSA*, Nutt.; Torr. & Gray, Fl. N. Am. i. 411. The Western Choke Cherry; frequent on northward slopes.

17. HOLODISCUS DISCOLOR (Pursh), Maxim. Adnot. Spir. 150. *Spiræa discolor*, Pursh. Common among rocks and in thickets along the highest ridges.

18. CERCOCARPUS BETULÆFOLIUS, Nutt.; Hook. Icon. t. 322. The Mountain Mahogany; not very common, and in a shrubby form only.

19. POTENTILLA GLANDULOSA, Lindl. Bot. Reg. t. 1583.

20. ROSA CALIFORNICA, Ch. & Schl., Linnæa, ii. 35. At the Joaquin Springs.

21. RUBUS VITIFOLIUS, Ch. & Schl. l. c. 10. The wild Blackberry; not seen except at the Aquarius Springs.

22. ACER MACROPHYLLUM, Pursh, Fl. i. 267. Toward the Joaquin Springs.

23. ÆSCULUS CALIFORNICA (Spach), Nutt.; Torr. & Gray, Fl. N. Am. i. 258.

24. RHUS DIVERSILOBA, Torr. & Gray, Fl. N. Am. i. 218. Poison Oak; very little seen.

25. RHAMNUS TOMENTELLA, Benth. Pl. Hartw. 303; Greene, Fl. Fr. 88. Common on dry exposures looking southward; less tomentose than on the foothills of the Sierra. Also in wet ground bordering the Joaquin Springs, where it shows so little pubescence, and so much more ample foliage, that it was at first thought to be *R. Californica*; but an inspection with lens reveals the peculiar pubescence of *R. tomentella*; and, as Mount Hamilton belongs to dry interior region, and not to the Coast Range, it is this, rather than *R. Californica* which one would naturally expect to find here.

That no trace of the large representative Rhamneous genus *Ceanothus* should have been observed anywhere on this mountain is a very noteworthy fact; especially since its species form the bulk of the brush-wood in so many places both of the Coast Range and the Sierra.

26. CROTON SETIGERUS, Hook. Fl. Bor.-Am. ii. 141; Greene, Fl. Fr. 89. Near the summit, where it may have

been brought accidentally; though it is not rare in such situations elsewhere.

27. **MALVA PARVIFLORA*, Linn. Amœn. Acad. 416. The common weedy very small flowered mallow. Observed only about the cottages, in depauperate specimens.

28. *STELLARIA NITENS*, Nutt.; Torr. & Gray, Fl. N. Am. i. 185.

29. *ARENARIA CALIFORNICA*, Brewer; Boland. Catal. 6; Greene, Fl. Fr. 124. Abundant on sunny slopes near the summit.

30. *ARENARIA MACROPHYLLA*, Hook. Fl. Bor.-Am. i. 102. t. 37. Very plentiful, on rocky slopes above the Aquarius Road, in the shade of oak bushes; the ground doubtless very moist in Spring, at the flowering season of the plant. This was hitherto supposed to belong more exclusively to the Coast Range northward, and it has not often been collected. Its occurrence on Mount Hamilton, and in such quantity, is therefore a significant extension of its known range.

31. **RUMEX CRISPUS*, Linn. Sp. Pl. i. 335. Although not found on the slopes of the mountain anywhere, and usually affecting cultivated lands only, this coarse weed has obtained a firm footing on the rocky soil about the Observatory.

32. **RUMEX ACETOSELLA*, Linn. l. c. (RED SORREL). Only one plant seen.

33. **POLYGONUM AVICULARE*, Linn. Sp. Pl. i. 362 (KNOT-GRASS). Not yet prevalent here, but several plants noticed.

34. *ERIOGONUM STELLATUM*, Benth. Trans. Linn. Soc. xvii. 409. Very common on sunny slopes looking southward and westward near the summit.

35. *ERIOGONUM TRACHYGONUM*, Torr.; DC. Prodr. xiv. 15. Abundant in like situations with the preceding, but beginning at lower line of elevation. The species has latterly been blended, in the books, with the Texano-New-Mexican *E. Wrightii*, which is of different habit and foliage, with a

more virgate inflorescence, and which reaches the eastern slope of the Sierra Nevada. The present plant is of a very different geographical region; inhabiting the interior of California, being common in the gravelly dry beds of streams and cañons on the western side of the valley of the Sacramento, and thence southward, through the Mount Diablo Range.

36. *ERIOGONUM SAXATILE*, Wats. Proc. Am. Acad. xii. 267; Greene, Fl. Fr. 149. On the precipitous northward slope of Newton's Peak, growing among loose rocks with a scant argillaceous soil beneath. This handsome species was not known until recently from any point north of the Santa Lucia Mountains. Mr. Hickman sent it to us, a year or two since, from the Salinas region; and this station on Mount Hamilton is the northernmost recorded; probably the northern limit of the species.

37. *ERIOGONUM NUDUM*, Dougl.; Benth. Trans. Linn. Soc. xvii. 413. One of the most common and widely dispersed of the Californian species of the genus; found on this mountain at all altitudes.

38. *ERIOGONUM GRACILE*, Benth. Bot. Sulph. 46; Greene, Fl. Fr. 151. An annual species, common about the Observatory; a form rather lower and stouter than usual; the flowers mostly dull yellowish with or without a tinge of rose.

39. *OXYTHECA HIRTIFLORA* (Gray), Greene, Fl. Fr. 153. On the southward slope, under bushes.

40. *CHORIZANTHE MEMBRANACEA*, Benth. Trans. Linn. Soc. xvii. 419. t. 7. On dry open hillside above Aquarius Springs.

41. **AMARANTUS RETROFLEXUS*, Linn. Sp. Pl. ii. 991.

42. **AMARANTUS ALBUS*, Linn. Sp. Pl. 2 ed. ii. 1404. Both these weeds, too familiarly known in many parts of the world, are merely gaining a foothold at the summit, as recent accidental importations.

43. **CHENOPODIUM ALBUM*, Linn. Sp. Pl. i. 219.

44. *CHENOPODIUM MURALE, Linn. l. c. The remark made above, concerning the two Amaranths, applies to these two cosmopolite Pigweeds.

45. LEWISIA REDIVIVA, Pursh, Fl. Am. Sept. ii. 368: *L. alba*, Kell. Proc. Calif. Acad. ii. 115. fig. 36. A somewhat rare plant in California, though common throughout a great extent of country lying to the northward and northeastward of our borders.

46. CLAYTONIA NUBIGENA, Greene, Pitt. ii. 294.

47. SEDUM RADIATUM, Wats. Proc. Am. Acad. xviii. 193. Mr. Watson's account of the habit and duration of this species, unhappily repeated by me in the *Flora Franciscana* before I had yet seen the plant growing, is far from correct. The species is strictly annual; but it has the peculiar habit of propagating, as do several of our western and annual Saxifrages, by leafy plantlets which are formed in the axils of the lowest leaves before the parent plant dies. These, falling to the earth, put out their rootlets as soon as the autumn rains come, so that the observer, in winter, would naturally infer them to be young plants of some biennial species. It is common among rocks along the Aquarius Road, in company with *Arenaria macrophylla*.

48. COTYLEDON CÆSPITOSA, Haworth, Misc. Nat. 180.

49. RIBES GLUTINOSUM, Benth. Trans. Hort. Soc. i. 476. Some fine specimens of this very ornamental wild currant grow at the Joaquin Springs. This is what has been commonly called *Ribes sanguineum* in California; but the middle Californian shrub is too unlike the far northern type in size, pubescence, floral structure, etc., to be made a mere variety of it. It is a very good subspecies at the least. The racemes of large pink flowers, appearing in late winter and early spring, though beautiful indeed, are quite inferior to those of *R. sanguineum*, which are almost blood-red. We have had both growing in the grounds of the University, and flowering and fruiting annually for years, the northern

shrub of course under cultivation only, and have noted other differences between them over and above those here mentioned.

50. *RIBES SUBVESTITUM*, Hook. & Arn. Bot. Beech. 346. The gummy-leaved strong-scented wild gooseberry of the middle Californian banks and woods; found only toward the Joaquin Springs.

51. *ZAUSCHNERIA CALIFORNICA*, Presl, Rel. Hænk. ii. 28. t. 52.

52. *EPILOBIUM MINUTUM*, Lindl.; Hook. Fl. Bor.-Am. i. 207.

53. *EPILOBIUM PANICULATUM*, Nutt.; Torr. & Gray, Fl. N. Am. i. 490.

54. *EPILOBIUM CALIFORNICUM*, Hausskn. Epil. Monogr. 260. At the Joaquin Springs.

55. *CENOTHERA HIRTELLA*, Greene, Fl. Fr. 215. Dry southward slopes near the summit; the plants dead and the seeds scattered at date of observation.

56. *GODETIA QUADRIVULNERA* (Dougl.), Spach, Phaner. iv. 389.

57. *GODETIA RUBICUNDA*, Lindl. Bot. Reg. t. 1856.

58. *CLARKIA CONCINNA* (F. & M.), Greene, Pittonia, i. 40.

59. *CLARKIA ELEGANS*, Dougl.; Lindl. Bot. Reg. t. 1575.

60. *CLARKIA BREWERI* (Gray), Greene, Pitt. i. 141. Communicated in 1892, by Professor Barnard; and the second recorded station for this rare and beautiful plant.

61. *MENTZELIA MICRANTHA* (H. & A.), Torr. & Gray, Fl. N. Am. i. 535. A species seldom met with, but occurring in considerable quantity well toward the Springs, on the Aquarius Road; the flowers minute.

62. *MENTZELIA LINDLEYI*, Torr. & Gray, Fl. N. Am. i. 533: *M. Bartonica*, Steud. Nom. i. 189. Common along the road-

sides at and near the summit; the large deep yellow flowers expanding just before nightfall. It is probable that Steudel's name for the species may be the older, and the one to be adopted.

63. *MENTZELIA DISPERSA*, Wats. Proc. Am. Acad. xi. 137. A small-flowered species, scarcely more showy than n. 59.

64. *MICRAMPELIS FABACEA* (Naud.), Greene, Pittonia, ii. 129.

65. *VIOLA PURPUREA*, Kellogg, Proc. Calif. Acad. i. 56. Scarcely more than a geographical sub-species of *V. Nuttallii*, which is of the Rocky Mountain region. The *V. aurea*, Kell., commonly supposed to be the same as *V. purpurea* is really quite different, and probably not identical with the older *V. præmorsa*, to which it was joined in Dr. Gray's latest enumeration of our violets.

66. *CARDAMINE CALIFORNICA* (Nutt.), Greene, Fl. Fr. 266.

67. *ARABIS BREWERI*, Wats. Proc. Am. Acad. xi. 123. On rocks, along the northward slope in various places.

68. *STREPTANTHUS MILDREDÆ*, Greene, Fl. Fr. 260. Plentiful along the Aquarius Road not far from the Spring. Closely allied to *S. glandulosus*, though that has flowers three times as large, of a bright purple color, these and the broad pods secund. The present new species, dedicated to Miss MILDRED HOLDEN, has the small almost black flowers of the rare *S. niger* of Marin County.

69. *ERYSIMUM ASPERUM* (Nutt.), DC. Syst. ii. 505.

70. *BARBAREA VULGARIS*, R. Br. Hort. Kew. 2 ed. iv. 109. One robust specimen, in fruit, observed on the rocky embankment below the Observatory, on the south side; probably a recent importation from the valley below.

71. *BRASSICA NIGRA* (Linn.), Koch, in Riehl. Deutsche Flora, iv. 713 (1833). The Black Mustard; seen in only a few small specimens.

72. BURSA PASTORIS, Dorsten, Bot. fol. 54 (1540); Lobel, Obs. 110, f. 1 (1570). *Thlaspi bursa pastoris*, Linn. Sp. Pl. ii. 647 (1753). *Capsella bursa pastoris*, Moench, Meth. 271 (1794). This cosmopolite, the Shepherd's Purse, follows closely the footsteps of civilized man everywhere, and is of course already to be numbered among the weeds of this summit; though it is safe to say, it would not have been found there fifteen years ago.

73. ESCHSCHOLTZIA CROCEA, Benth. Trans. Hort. Soc. n. ser. i. 406; Lindl. Bot. Reg. xx. t. 1677. On the westward slope of the ridge above Aquarius Springs.

74. PLATYSTEMON CALIFORNICUS, Benth. l. c. 405. The most common of Californian poppy-like plants; the flowers small, cream-colored, and commonly called Cream Cups.

75. UMBELLULARIA CALIFORNICA (Arnott), Nutt. Sylv. i. 87. At the northward and westward this follows the streamlets or gulches upward nearly to the summit of the mountain.

76. CLEMATIS LASIANTHA, Nutt.; Torr. & Gray, Fl. N. Am. i. 9.

77. RANUNCULUS OCCIDENTALIS, Nutt., var. RATTANI, Gray, Proc. Am. Acad. xxi. 373.

78. DELPHINIUM NUDICAULE, Torr. & Gray, Fl. N. Am. i. 33. The Scarlet Larkspur, perhaps the most beautiful of the Californian species, is common, and of luxuriant growth, in shaded grounds along the Aquarius Road.

79. DELPHINIUM PATENS, Benth. Pl. Hartw. 296. A rather slender blue or pink-flowered species of the woods.

80. DAUCUS PUSILLUS, Michx. Fl. i. 164.

81. PEUCEDANUM TOMENTOSUM, Benth. Pl. Hartw. 312.

82. PEUCEDANUM CARUIFOLIUM, Torr. & Gray, Fl. N. Am. i. 628.

83. SANICULA ———, the species uncertain.

84. MYRRHIS OCCIDENTALIS (Nutt.) Benth. & Hook. f. Gen. i. 897.
85. CICUTA CALIFORNICA, Gray, Proc. Acad. vii. 344; Greene, Pittonia, ii. 10: *C. virosa*, var. *Californica*, C. & R. Rev. Umb. 130. In running water about the Joaquin Springs.
86. GALIUM APARINE, Linn. Sp. Pl. i. 157.
87. GALIUM NUTTALLII, Gray, Pl. Wright. i. 80.
88. GALIUM ANDREWSII, Gray, Proc. Am. Acad. vi. 537.
89. VITIS CALIFORNICA, Benth. Bot. Sulph. 10. Dwarfed and sterile, trailing over the ground, on an open slope above the Aquarius Spring.
90. GARRYA FREMONTI, Torr. Pac. R. Rep. iv. 136.
91. SAMBUCUS GLAUCA, Nutt.; Torr. & Gray, Fl. N. Am. ii. 13.
92. SYMPHORICARPUS MOLLIS, Nutt. l. c. 4.
93. CAPRIFOLIUM INTERRUPTUM (Benth.), Greene, Fl. Fr. 347.
94. PHORADENDRON FLAVESCENS (Pursh.), Nutt. Pl. Gamb. 185.
95. VALERIANELLA ———. Species indeterminable for want of flowers and fruit.
96. CHRYSOPSIS ECHIOIDES, Benth. Bot. Sulph. 25.
97. GRINDELIA ROBUSTA, Nutt. Trans. Am. Phil. Soc. vii. 314.
98. BIGELOVIA MOHAVENSIS, Greene; Gray, Syn. Fl. 138. Hitherto known only from the Mohave Desert, and the mountains adjacent thereto.
99. CORETHROGYNE FILAGINIFOLIA (H. & A.), Nutt. Trans. Am. Phil. Soc. n. ser. vii. 290. *Aster filaginifolius*, Bot. Beech. 146 (1836).

100. ERIGERON PETROPHILUS, Greene, Pittonia, i. 218. In crevices of rocks on the northward slope; more plentiful here than in the original stations about Mount St. Helena, and of a more pubescent type. It is an æstival rather than vernal species; and such are all its nearest allies.

101. MICROPUS CALIFORNICUS, Fisch. & Mey. Ind. Sem. Petr. ii. 42.

102. WYETHIA HELENIOIDES (DC.), Nutt.; Gray, Pl. Fendl. 82.

103. HELIANTHUS CALIFORNICUS, DC. Prodr. v. 589. Only a poor growth of this, at the Joaquin Springs.

104. HELIANTHELLA CALIFORNICA, Gray, Pac. R. Rep. iv. 103. Less frequent here than northward, but not rare.

105. LEPTOSYNE ———; one of the annual species of this mere subgenus of *Bidens* or *Coreopsis*.

106. MADIA DISSITIFLORA, Torr. & Gray, Fl. N. Am. ii. 405. Very common, in the usual shady places on northward slopes.

107. MADIA HISPIDA, Greene, Pittonia, ii. 217.

108. *Madia exigua*. *Sclerocarpus exiguus*, Smith, in Rees Cycl. xxxiii (1816). *Harpæcarpus exiguus*, Gray, Bot. Mex. Bound. 101 (1859). *Madia filipes*, Gray, Bot. Calif., etc.

109. HEMIZONIA HEERMANNI, Greene, Bull. Torr. Club, ix. 15. Originally from the mountains of Kern Co.; but re-discovered a few years since by Mr. Chesnut on Mount Diablo.

110. HEMIZONIA TRUNCATA (DC.), Gray, Syn. Fl. 311.

111. LAGOPHYLLA RAMOSISSIMA, Nutt. Trans. Am. Phil. Soc. vii. 391.

112. BLEPHARIPAPPUS PLATYGLOSSUS (F. & M.), Greene, Pitt. ii. 246.

113. *BAERIA GRACILIS* (DC.), Gray, Proc. Am. Acad. ix. 196.

114. *ERIOPHYLLUM CONFERTIFLORUM* (DC.), Gray, Proc. Am. Acad. xix. 25.

115. *RIGIOPAPPUS LEPTOCLADUS*, Gray, Proc. Am. Acad. vi. 48.

116. *CHÆNACTIS LANOSA*, DC. Prodr. v. 659.

117. *ANTHEMIS COTULA*, Linn. Sp. Pl. ii. 894. The Mayweed, or Dog Fennel; not prevalent, but several plants observed.

118. *ACHILLÆA MILLEFOLIUM*, Linn. l. c. 899. Doubtless native here as it is in many parts of California.

119. *MATRICARIA DISCOIDEA*, DC. Prodr. vi. 50. *Santolina suaveolens*, Pursh. Fl. ii. 520, not *Matricaria suaveolens*, Linn. Doubtless native on the Californian plains, but here probably by accidental introduction. A homely weed, but of delightful fragrance when the fresh herbage is bruised lightly.

120. *ARTEMISIA VULGARIS*, var. *CALIFORNICA*, Besser, Linnæa, xv. 91.

121. *ARNICA DISCOIDEA*, Benth. Pl. Hartw. 319. Plentiful along the borders of thickets at the north side.

122. *SENECIO ARONICOIDES*, DC. Prodr. vi. 426. Associated with the last, and as common.

123. *SENECIO DOUGLASII*, DC. l. c. On the south side.

124. *CARDUUS VENUSTUS*, Greene, Proc. Philad. Acad. (1892) 359.

125. **CENTAUREA MELITENSIS*, Linn. Sp. Pl. ii. 917. Common.

126. **CENTAUREA SOLSTITIALIS*, Linn. l. c. Only two or three plants seen.

127. *CALAIS LINEARIFOLIA*, DC. Prodr. vii. 85.

128. *PTILORIA CANESCENS*, Greene, *Pittonia*, ii. 131.
129. *NEMOSERIS CALIFORNICA* (Nutt.) Greene, l. c. 193.
130. *HIERACIUM ALBIFLORUM*, Hook. *Fl. Bor.-Am.* i. 298.
131. *AGOSERIS HETEROPHYLLA* (Nutt.), Greene, *Pittonia*, ii. 178.
132. *AGOSERIS GRANDIFLORA* (Nutt.), Greene, l. c.
133. *AGOSERIS RETRORSA* (Benth.), Greene, l. c.
134. *SONCHUS OLERACEUS*, Linn. *Sp. Pl.* ii. 794.
135. *CAMPANULA EXIGUA*, Rattan, *Bot. Gaz.* xi. 339. A diminutive species, perhaps not very rare; but the only other stations known for it are the higher parts of Mount Diablo and Mount Tamalpais.
136. *ARCTOSTAPHYLOS TOMENTOSA*, Dougl.; *Bot. Reg.* t. 1791.
137. *ARCTOSTAPHYLOS MANZANITA*, Parry, *Bull. Calif. Acad.* ii. 491. Neither of these common sorts of Manzanita is very abundant on this mountain.
138. *PSEVA MENZIESII* (R. Br.), O. Ktze. *Rev. Gen.* ii. 390. Not in "pine woods" as it should be, according to the habitat attributed to it in the books, but under shrub oaks, on the north side. The station is an unexpected one, and only one specimen, though that a fair one, was noticed.
139. *DODECATHEON HENDERSONII*, Gray, *Bot. Gaz.* xi. 233. Although only the dead scapes and empty capsules were seen, it will be safe to say that we have here the type of the species, and not the var. *cruciatum*, which is of the Coast Range exclusively, as far as known.
140. *APOCYNUM ANDROSÆMIFOLIUM*, Linn. *Sp. Pl.* i. 213.
141. *Asclepias Californica*. *Acerates tomentosa*, Torr. *Bot. Mex. Bound.* 160. t. 44. *Gomphocarpus tomentosus*, Gray, *Bot. Calif.* i. 477. The two or three common Californian silkweeds whose corollas lack that minute and unim-

portant organ called the "horn" of the hood, are in no other respect different from the best types of the genus *Asclepias*, and I am persuaded that in a natural system of plant classification they must be restored to that genus. There is an older *A. tomentosus* of Elliott, which precludes the use of Dr. Torrey's specific name for this one, given under *Acerates*. One tuft of the species was found at the very summit of Mount Hamilton, and no more was seen.

142. *PHLOX GRACILIS* (Dougl.), Greene, *Pittonia*, i. 141.

143. *COLLOMIA GRANDIFLORA*, Dougl.; *Bot. Reg.* t. 1174. A few robust specimens were observed on the dividing ridge, near the cottages.

144. *GILIA MULTICAULIS*, Benth.; *Bot. Reg.*, under t. 1622.

145. *Gilia gilioides*. *Collomia gilioides*, Benth, l. c.

146. *LINANTHUS DICHOTOMUS*, Benth, l. c.

147. *LINANTHUS LINIFLORUS* (Benth.), Greene, *Pittonia*, ii. 254.

148. *LINANTHUS FILIPES* (Benth.), Greene, l. c. 255.

149. *NEMOPHILA INSIGNIS*, Dougl., *Journ. Hort. Soc.* iii. 319.

150. *PHACELIA CIRCINATA* (Willd.), Jacq. f. *Ecl.* 135, t. 91. One of several quite different plants conventionally referred to this aggregate species.

151. *EMMENANTHE PENDULIFLORA*, Benth. *Trans. Linn. Soc.* xvii. 281. Plentiful at the summit, and robust.

152. *PHACELIA BREWERI*, Gray, *Proc. Am. Acad.* x. 317. Mt. Diablo is hitherto the only recorded habitat of this species; but it is no rarity in this range of mountains, and occurs near Santa Cruz and Monterey.

153. *PHACELIA HISPIDA*, Gray, *Syn. Fl.* 161. Common.

154. *PHACELIA RAMOSISSIMA*, Dougl.; *Linn. Trans.* xvii. 280. Only in shady places toward the Joaquin Springs.

155. *Eriodictyon Californicum*. (H. & A.). *Wigandia Californica*, Bot. Beech. 364. t. 88. (1840). *Eriodictyon glutinosum*, Benth. Bot. Sulph. 36 (1844).

156. *CYNOGLOSSUM GRANDE*, Dougl.; Hook. Fl. Bor.-Am. ii. 85.

157. *CRYPTANTHE TORREYANA* (Gray), Greene, Pittonia, i. 118.

158. *CRYPTANTHE FLACCIDA* (Lehm.), Greene, l. c. 115.

159. *PLAGIOBOTHRYIS NOTHOFULVUS*, Gray, Proc. Am. Acad. xvii. 285.

160. *AMSINCKIA INTERMEDIA*, Fisch. & Mey. Ind. Sem. Petr. i. 26.

161. *CONVOLVULUS VILLOSUS* (Kell.), Gray, Proc. Am. Acad. xi. 90.

162. *SOLANUM UMBELLIFERUM*, Esch. Mem. Acad. St. Petersb. x. 281.

163. *ANTIRRHINUM GLANDULOSUM*, Lindl. Bot. Reg. t. 1893. Dry banks near Aquarius Springs. This locality becomes a notable extension of the known range of the species. The root is manifestly perennial; the stem even suffrutescent at base.

164. *ANTIRRHINUM VAGANS*, Gray, Proc. Am. Acad. vii. 373.

165. *COLLINSIA TENELLA*, Benth.; DC. Prodr. x. 593; Greene, Pitt. i. 55. A surprising extension of range for a species not before known to occur south of Mount Shasta. Plentiful at a certain point on the Aquarius Road. But, since its detection on Mount Hamilton, Mr. Bioletti has found it near Los Gatos.

166. *COLLINSIA BICOLOR*, Benth.; Bot. Reg. t. 1734.

167. *PENTSTEMON CORYMBOSUS*, Benth.; DC. Prodr. x. 593. A very pretty red-flowered species, forming depressed shrubby evergreen mats on the rocks at the north side; just coming into flower at the end of July.

168. *PENTSTEMON BREVIFLORUS*, Lindl. Bot. Reg. t. 1946. Dry northward slope of the Newton Peak.
169. *PENTSTEMON AZUREUS*, Benth. Pl. Hartw. 327. Common about the Observatory and residence.
170. *MIMULUS GUTTATUS*, DC. Cat. Monsp. 127; Greene, Bull. Calif. Acad. i. 110.
171. *EUNANUS BOLANDERI* (Gray), Greene, Bull. Calif. Acad. i. 105.
172. *CASTILLEIA PARVIFLORA*, Bong. Veg. Sitk. 157.
173. *ADENOSTEGIA PILOSA* (Gray), Greene, Pittonia, ii. 180.
174. *APHYLLON FASCICULATUM* (Nutt.), T. & G. in Gray, Man. 2d. ed. 281.
175. *APHYLLON TUBEROSUM*, Gray, Bot. Cal. i. 585.
176. *MONARDELLA VILLOSA*, Benth. Lab. Gen. & Sp. 332.
177. *ACANTHOMINTHA LANCEOLATA*, Curran, Bull. Calif. Acad. i. 13. Plentiful along the lower part of the Aquarius Road; herbage almost oily, and very heavily aromatic.
178. *SALVIA COLUMBARIÆ*, Benth. l. c. 302.
179. *STACHYS PYCNANTHA*, Benth. Pl. Hartw. 331. Near the Joaquin Springs only.
180. *STACHYS BULLATA*, Benth. Lab. Gen. & Sp. 547.
181. *URTICA HOLOSERICEA*, Nutt. Pl. Gamb. 183.
182. *ALNUS RUBRA*, Bong. Veg. Sitk. 162. One fine tree perhaps forty feet high, at the Aquarius Spring.
183. *QUERCUS DOUGLASII*, Hook. & Arn. Bot. Beech. 391. (DOUGLAS OAK and BLUE OAK). Trees of middle size are noticeable in considerable numbers on the western flanks of the mountain, some of them not far below the Observatory at the northward.
184. *QUERCUS DUMOSA*, Nutt. Sylv. i. 7. One of the several so-called Scrub Oaks; this one not at all plentiful here.

185. *QUERCUS CHRYSOLEPIS*, Liebm.; Benth. Pl. Hartw. 336 (IRON OAK). Only in a small scrubby but very handsome state not before seen by me. It is a compact rigid bush with abundance of very small mostly entire almost box-bush-like foliage, and is very plentiful on the north side just below, and even up to the summit of the ridge.

186. *QUERCUS WISLIZENI*; A. DC. Prodr. xvi, part 2, 67. Also only in a small almost bushy form.

187. *QUERCUS AGRIFOLIA*, Nee, Anal. Cienc. Nat. iii. 271. A few trees observed near the road at western base of Copernicus Peak.

188. *QUERCUS KELLOGGII*, Newb. Pac. R. Rep. vi. 28, fig. 6. Small trees only.

189. *ALLIUM FALCIFOLIUM*, Hook. & Arn. Bot. Beech. 400.

190. *ALLIUM BOLANDERI*, Watson, Proc. Am. Acad. xiv. 229. Species not before heard of as from any point south of Humboldt County. We have little more than the oblique corm-like bulbs and lateral scapes to judge from; but these in this species are very characteristic.

191. *BRODIAEA CAPITATA*, Benth. Pl. Hartw. 339.

192. *TRITELEIA LAXA*, Benth. Trans. Hort. Soc. i. 413, t. 15.

193. *HOOKERA CORONARIA*, Salisb. Parad. Lond. ii. t. 98.

194. *CALOCHORTUS ALBUS*, Dougl.; Bot. Reg. t. 1661.

195. *CALOCHORTUS LUTEUS*, Dougl.; Bot. Reg. t. 1567.

196. *CALOCHORTUS VENUSTUS*, Benth. Trans. Hort. Soc. i. 412. t. 15, fig. 3. These *Calochortus* species were long past flowering at my date; but I found them all in the herbarium of Miss Holden.

197. *CHLOROGALUM POMERIDIANUM* (DC.), Kunth. Enum. iv. 682. Very plentiful on the southward slope; the plants very small to be of this species, and the flowers were not seen.

198. *ZYGADENUS FREMONTI*, Torr. Pac. R. Rep. vii. 20.

199. *JUNCUS EFFUSUS*, Linn. i. 326.

200. & 201. Two species of *CAREX* were observed, one in dry ground, the other about the Springs. Both were out of fruit, and no specimens were taken.

202. *POLYPOGON MONSPELIENSIS*, Desf.; Reichenb. Ic. Fl. Germ. i. 15, t. 91.

203. *AVENA FATUA*, Linn. Sp. Pl. i. 80.

204. *MELICA IMPERFECTA*, Trin. Mem. Acad. St. Petersburg. 1840, 59.

205. *FESTUCA MYURUS*, Linn. l. c. 54.

206. *HORDEUM MURINUM*, Linn. l. c. 85.

207. *ELYMUS CONDENSATUS*, Presl. Rel. Hænk. i. 265.

208. *ELYMUS SITANION*, Schult.; R. & S. Mant. ii. 426.

209. *PINUS PONDEROSA*, Dougl.; Loud. Arboret. iv. 2243. This, the tree commonly known as the *YELLOW PINE*, does not appear to occur very near the Observatory; but fine groves of it are seen near the summits of high ridges not far away.

210. *PINUS SABINIANA*, Dougl.; Lambert, Pinetum, 1 ed. 146. Commonly called *BULL PINE*, also *NUT PINE*. Frequent on the higher parts of the mountain.

211. *PELLÆA ORNITHOPUS*, Hook. Sp. Fil. ii. 143, t. 116, A.

212. *ASPIDIUM MUNITUM*, Kaulf. Enum. Fil. 236.

IMMIGRANT PLANTS IN LOS ANGELES
COUNTY, CALIFORNIA.—II.

By ANSTRUTHER DAVIDSON, M. D.

Anagallis arvensis, L. Very common in the early summer on the heavier and cultivated grounds near the coast. Though somewhat variable in color of flowers, no specimens resembling *A. cœrulea*, Schreb., either in that regard or in the disposition of the glandular hairs have been found.

Ipomœa Mexicana, Gray. An ornamental plant well established in many places. East of the river and in the fields southwest of Los Angeles it is quite frequent, and threatens to become, in process of time, a very troublesome weed.

Convolvulus arvensis, L. A few years ago when I first observed this plant in an orchard near the University, it covered but a few yards of ground. Last season it ranged over ten times that area in spite of cultivation. The remarkable depth to which the roots descend makes it almost impossible to eradicate it, while cultivation, ordinarily an efficient remedy, here only tends to multiply it. The suspension of cultivating processes in the autumn when this convolvulus is in its glory, likewise favors its increase, so that it is certain to become a very serious pest.

Physalis œquata, Jacq. f. Very common in the more fertile and cultivated soils.

Nicotiana glauca, Graham. Primarily cultivated as an ornamental tree it is now well established throughout the city, along the river banks and other moist places.

Solanum rostratum, Dunal. Margin of a pond at South Santa Monica, according to Dr. Hasse.

Verbascum virgatum, Withering. Not abundant, though frequently met with in the woods along the San Gabriel near El Monte, and near Pasadena and Lamanda Park.

Marrubium vulgare, L. Widely diffused in the valleys of the foothills, and frequently growing in masses so dense as to exterminate all other vegetation.

Mentha piperita, L. A garden escape, established in a few wet places near the river.

Plantago major, L. Generally diffused but nowhere abundant.

P. lanceolata, L. Apparently confined to the streets of Los Angeles and Pasadena, in a few of which it is quite abundant.

Phytolacca decandra, L. One plant found at Santa Monica by Dr. Hasse.

Polygonum aviculare, L. A very common weed along the roadsides and beaten pathways throughout the city and rarely met with outside its limits.

P. nodosum, Pers. Abundant along streams and ditches.

P. incarnatum, Ell. Some specimens apparently referable to this have been found growing along with *P. nodosum*, but further research is necessary to fully establish its identity.

Rumex crispus, L. The only representative of this prolific tribe and at present not very common.

R. Acetosella, L. I first observed a few plants on Orange Ave., Pasadena, last spring, and the same autumn in the lawns at Long Beach. In the lighter and less fertile soils of Europe, by its rapid growth from a running rootstock, this has proved a very injurious weed, and if it find a foothold it may prove no less troublesome here.

Amarantus retroflexus, L. A prevalent weed in cultivated grounds.

A. albus, L. Frequent on slightly alkaline soils.

Alternanthera achyrantha, R. Br. Apparently well established in a few places in the streets and lawns near the Sixth Street Park. By its creeping habit, rooting as it does at every node, the maintenance of its foothold and the increase of its range are assured.

Chenopodium album, L. Very common in sandy soils.

C. viride, L. Rare, on the river bank at Fruitlands and Elysian Park.

C. murale, L. Very common round walls and fences in all our towns and villages.

C. ambrosioides, L. Less common than the last.

Urtica urens, L. Not infrequent in moist shady situations.

Ricinus communis, L. In the waste ground and moist banks along the edge of ditches it has become well established and is a flourishing tree.

Cyperus esculentus, L. I gathered a few specimens on the sand banks of the river opposite the Park in the autumn of 1891, which were so identified by Mr. J. N. Rose. Since then I have failed to discover it.

Panicum sanguinale, L. Common in moist places, spreading readily by rooting at the lower nodes. *P. Crus-galli*, L., almost confined to damp and irrigated grounds, is very variable in height, form and pubescence. In the city streets I occasionally see a few isolated plants of *P. colonum*. The Botany of the State Survey gives San Diego Co., Arizona and New Mexico as localities where this is indigenous. With us the plants are so few, and apparently so strictly limited to the more favorable ground in the streets and lawns, that I think it may reasonably be classed among introduced species in this section.

Setaria glauca, Beauv. A somewhat rare casual in the city streets. *S. caudata*, R. & S. Along the orchard fences on East Washington Street patches of this grass are flourishing. The vigorous growth would indicate that the species has been established here for at least a few years; but hitherto it has not been recorded from Southern California.

Phleum pratense, L. Though not cultivated in the County it was once observed on the railroad at Elysian Park.

Phalaris Canariensis, L. A casual on rubbish heaps and waste grounds.

Polypogon Monspeliensis, Desf. Very common in the valleys and moister soils.

Cynodon Dactylon, Pers. Chiefly in lawns, where once established it spreads rapidly, soon exterminating all other grasses. By some individuals it is preferred to any other lawn grass, requiring less watering and trimming, and forming if a less green at least a denser covering. In every

situation it shows a disposition to spread along the waysides and highways.

Avena fatua, L. Very abundant in some districts and always more or less prevalent among volunteer oats.

Lamarckia aurea, Moench. First found on this continent in 1876, it is now one of the common grasses around Los Angeles.

Arundo Donax, L. Though frequent on the Los Angeles river, there is nothing in the distribution that would indicate its being indigenous here. So far as I have observed, it never either flowers or fruits so that the possibility of its seeds having been conveyed by water pipes, as Mr. Parish suggests, must be a very unusual occurrence.

Dactylis glomerata, L. Rare, in lawns and waste places.

Poa annua, L. Common and most noticeable in the spring time as it fruits before the other grasses have well begun to grow. All the plants of *P. pratensis* here observed are evidently escapes from cultivation. It is reported however as indigenous in the higher mountains.

Eragrostis pilosa, L. Sparingly represented in many parts of the city. In the moist sands of the river bed at Los Angeles a few specimens of *E. major* are always to be met with.

Festuca Myurus, L. No native grass so common on hills, plains and in cultivated grounds; yet its foreign derivation can not well be doubted. *F. elatior*, L., var. *pratensis*, Vasey, has been introduced with lawn seeds at Santa Monica, according to Dr. Hasse.

Gastridium australe, Beauv. Common on dry grassy plains.

Bromus maximus, L. Already frequent in the waste grounds throughout the city and rapidly spreading. As a fodder plant it is seemingly valueless.

Bromus rubens, L. Fairly common about Los Angeles, as also at Santa Monica and Pasadena, and like the former, increasing rapidly.

Bromus mollis, L. To the station previously reported by

Dr. Hasse may be added Pasadena and Los Angeles, a few plants having been observed in these places last season.

Lolium perrenne, L. Ordinarily a casual in cultivated ground in this State; it is in one locality at least a well established plant, covering quite a space of ground in the wet soils of the cienega south of the city. It appears ranker and more silicious than that found growing on cultivated soils.

Lolium temulentum, L. Not infrequent in waste places and grain fields; and along with it *L. arvense*, occasionally.

Hordeum murinum, L. Unfortunately too common.

Andropogon Sorghum, Brot. Primarily introduced as a fodder plant in cultivated soils; it has since remained with us, and in spite of cultivation is slowly increasing its range.

Spergula arvensis, L. To the above list this species now falls to be added, having been discovered by Miss Merritt along the railroad track at Pasadena. As it is fairly abundant it has doubtless existed there for some time.

The above list of 107 species, representing 27 genera, will seem like a large showing of adventive and naturalized plants for one county; especially in so new a country as California. The largest number belonging to any one natural family are the grasses; all the species of which here mentioned have been carefully identified by Dr. Vasey. In the number of species the Compositæ come next in order, with 19 species. Of Cruciferæ there are 8; all the other orders being represented by fewer species.

How many of these 107 plants have been acquired to our flora since the publication of the Botany of the State Survey it will be impossible to determine; for it is by no means probable that the collectors employed on that work recorded all the foreign plants then existing here. It is also manifest that several which Mr. Watson supposed to be aliens are natives. Such are at least two of the *Mesembryanthemum* species, as the author of the *Flora Franciscana* has shown, and as I should certainly infer from the manner of their distribution in this county. *Polygonum acre* and *P. nodosum*, as well as *Plantago hirtella* are as surely indigenous. Omitting these

from the category, there remain not less than 22 of the species of my list, which were not known to occur in California anywhere, at the time when the State Survey volumes were issued. They are the following:

Brassica alba,	Crepis biennis,
Modiola Caroliniana,	Bellis perennis,
<i>Melilotus alba,</i>	<i>Convolvulus arvensis,</i>
<i>Pastinaca sativa,</i>	<i>Ipomœa Mexicana,</i>
Coriandrum sativum,	<i>Nicotiana glauca,</i>
<i>Fœniculum vulgare,</i>	Solanum rostratum,
Apium graveolens,	Eragrostis major,
<i>Sonchus oleraceus,</i>	Bromus mollis,
<i>Verbesina encelioides,</i>	<i>Setaria caudata,</i>
<i>Xanthium spinosum,</i>	<i>Arundo Donax,</i>
<i>Melampodium perfoliatum,</i>	<i>Andropogon Sorghum.</i>

Those the names of which are in italics may at this date be considered as naturalized in this region; for they exist in such numbers, and are so generally disseminated, that their future extinction is next to impossible. The others seem as if they had come in more recently; but among these the *Bellis* and *Crepis* are most likely to assume a permanent place in our flora of aliens.

Sisymbrium officinale,	Cotula australis,
Spergula arvensis,	Silybum Marianum,
Apium graveolens,	Plantago lanceolata,
Senecio vulgaris,	Lolium temulentum,
Cotula coronopifolia,	Lolium perenne.

These have all now extended their range to at least the southern boundaries of the state, and all with the exception of *Senecio vulgaris* are well established; some of them even common.

These lists illustrates very fully the great increase not only in the range but in the number of our plant immigrants. Their increase so far is but commensurate with the commercial and agricultural development during that period, the majority of the weeds having been introduced and encouraged by agricultural pursuits. Succeeding years shall no doubt find us in possession of many others; and while it may seem

idle to speculate on such a fascinating subject, it nevertheless appears to me that any further injurious additions we are likely to encounter here will most probably be natives of South America or the Eastern States. The majority of the noxious European weeds are already naturalized here, and illustrate in their own peculiar way how impossible it is for any one to anticipate their behaviour under changed conditions of soil and climate. *Brassica nigra* can scarcely be considered as noxious in Europe but *B. Sinapistrum* is in many districts the bane of the farmer's life. In the states of Pennsylvania and New York it is somewhat troublesome in the grain fields. Mallow, hoarhound, knapweed, the bur clover and others, surprise us by their fertility and ready adaptation to western soils. The reason of this change in ratio of the different species is obviously the drought. Many of the annuals in Europe are abundant because there the moister soil and climate favor their perpetual growth. Here the shorter spring and the dry summer hasten the ripening and dissolution of the weaker annuals so that those like *Spergula arvensis* can never become here the pests they are in many parts of the Old World. On the other hand, the deeper rooting kinds such as the mallows, are not so adversely influenced by drought; indeed, in some instances they are rather favorably affected by it.

The rapid transformation which this section of the country is undergoing in its conversion from waste and brush land to orchards and farms, will lead to many changes in the quality and conditions of the soil, and undoubtedly will affect in a great measure the quality and distribution of our naturalized species; and such a record as is here made may in the future afford a basis for some interesting comparisons.

NOVITATES OCCIDENTALES.—II.

By EDWARD L. GREENE.

Lathyrus violaceus. Apparently glabrous, but under a lens sparsely short-hairy throughout: stems slender, shrubby below, 4 to 8 feet high, acutely angled: leaflets about 12, elliptical, obtuse and with slender deflexed mucro, the margins delicately crisped: peduncles surpassing the leaves, many-flowered and rather dense: flower about 8 lines long; lateral pair of calyx-teeth oblong-lanceolate, much longer than the tube, the lowest one equalling these in length but only half as wide, the short upper pair slightly connivent at tip and forming a semi-elliptical sinus; petals at first red purple, changing to violet blue, the banner very broadly obcordate, the sides only slightly recurving, the middle displaying about 10 nearly parallel veins, some of them simple, others forked near the summit, all running through to the upper margin of the organ, none running into meshes, wings a trifle shorter than the keel, almost parallel with it, not meeting above it.

One of the most beautiful of Californian *Lathyri*; and known only as growing in the Garden of Native Plants at Berkeley, from seeds that came from the mountains of southern California (Los Angeles Co.). Its nearest ally is a shrubby species of the middle sections of the State which, along with certain low and strictly herbaceous forms, has been referred to *L. vestitus*. But *L. violaceus* differs from all those not only in color of flowers, but in good characters of calyx and corolla.

Lathyrus lætiflorus. Somewhat shrubby habit of the preceding and as tall; the more scanty short hairs straight and appressed: leaflets of firmer texture, elliptic-lanceolate: peduncles exceeding the leaves, loosely many-flowered: flower about 11 lines long; lateral pair of calyx-teeth broadly subulate, not longer than (scarcely as long as) the tube, the lowest one subulate, rather longer than the tube, the very short upper pair connivent, the tips almost meeting, forming

a broadly obovate or nearly orbicular sometimes almost closed sinus; petals nearly white (faintly flesh-colored), the banner obcordate, with sides abruptly reflexed, each side with a concavity, the middle with few divergent short and simple red veinlets none of which reach the border or anastomose: wings meeting and concealing the keel from above.

Like the preceding, this plant is a tenant of the University garden, the seeds having been sent from Los Angeles Co. in 1891. It is a most distinct species, by the characters of the calyx and corolla. The flowers, scentless in all the allied species of our coast, in this one are delicately fragrant.

Tellima tripartita. Very slender, less than a foot high, hispidulous under a lens, in no part glandular: radical leaves rather numerous, small, about $\frac{1}{2}$ inch broad, parted almost to the base into 3 obovate-spatulate or obcordate lobes; the cauline solitary, similar to the radical: flowers only 3 to 6, in a loose raceme, the pedicels about equalling the calyx; this campanulate, nearly free from the ovary, the lobes triangular, acute: petals rather large, pinkish, 3-lobed, the 2 upper ones less distinctly so, or entire.

In the mountains of San Diego Co., Calif., near San Jacinto; collected in 1892 by Mrs. Gregory. In habit, suggestive of *T. Cymbalaria*, but in all respects very distinct.

Tissa Talinum. Perennial and apparently suffrutescent; the erect branches almost without internodes and densely clothed with linear or linear-filiform leaves 1 to $2\frac{1}{2}$ inches long, these from glabrous to sparsely glandular-hispidulous under a lens; the triangular-lanceolate long-attenuate stipules $\frac{1}{2}$ to $\frac{3}{4}$ inch long: inflorescence a rather dense short-peduncled cyme: capsules nearly cylindrical, 3 or 4 lines long, little exceeding the narrowly linear-oblong hispidulous sepals: seeds minute, broad-pyriform, smooth, wingless.

Guadalupe Island, off Lower California; first collected by Dr. Edward Palmer (1889), and distributed as *T. pallida*, which it is very unlike. Collected again very recently by Dr. E. Franceschi, whose specimens are larger. The species is most unlike all others in its almost obsolete internodes

and consequent dense leafiness, giving it more the air of a *Talinum* than of the ordinary *Tissa*.

Tissa valida. Perennial, with a perpendicular fleshy and somewhat fusiform and simple or branching root: stems stout, tufted, the outer members of the tuft decumbent at base, the others erect, $\frac{1}{2}$ to 1 foot high, the internodes 1 to $1\frac{1}{2}$ inches long; leaves rather fleshy and semi-terete, about equalling the internodes; stipules deltoid-ovate, acute, about $\frac{1}{4}$ inch long: herbage altogether pale, and clammy-pubescent with short, spreading gland-tipped hairs; branches cymose and floriferous from below the middle: sepals oblong-lanceolate, rather exceeding the valves of the ovate capsule: seeds black and almost shining, mostly destitute of wing.

Island of Santa Cruz, off Santa Barbara, California; collected by the author in 1886, and distributed rather freely as *T. macrotheca*, from which it is distinct. It has the pale herbage of *T. pallida*, on which account Dr. Britton tells me he referred it to that species. I have always thought it a new one; but have been loath to propose species in this intricate genus. But our insular forms are apparently less confluent than those of the mainland.

MISCELLANEOUS NOTES AND NEWS.

GEORGE VASEY, M. D., Botanist to the United States Department of Agriculture for the last twenty years, died in the City of Washington, on the 4th of last month, at the age of seventy-one years.

PROFESSOR MACMILLAN'S elaborate catalogue of the vegetation of the Minnesota Valley, a work of great interest, and long expected, reached us just too late for a full review in this issue of ERYTHEA. Will not the author give us the real date of issue of this important work? The "December 29, 1892," of the title is manifestly far from correct.

THE literature of the beautiful genus *Yucca* has lately been increased by another very valuable paper prepared by Professor Trelease and issued as a part (in advance) of the Fourth Annual Report of the Missouri Botanical Garden. There are 47 pages of letter press, and 23 plates. Four of the plates are devoted to our Mohave Desert species, *Y. brevifolia*, and are admirable representations of this interesting tree as it appears in its native soil, with its background of desert scenery. Last year the author journeyed far and wide through our yucca districts, and this paper is rich in records of personal observation and investigation in the field.

MR. FREDERIC V. COVILLE, we are glad to learn, has succeeded to the place made vacant by the death of Dr. Vasey. The headship of the Botanical Division of the Agricultural Department at Washington is fast growing to be an office of much responsibility, and of great usefulness to American botany; and the new appointment is a most happy one, in as much as Mr. Coville is a young man of excellent attainments, clear of head, full of zeal and energy, and quite abreast of the times in all matters relating to the advancement of botanical science. He will have received many congratulations from friends near home; but none more cordial than ours which come from the Pacific States.

ENGLISH botanists are still at outs over the composition of the English blackberry patch. Twenty years ago a contributor to the *London Journal of Botany* protested at length against the proposal of more new species; but a recent writer in the same journal considers that there are still English brambles unnamed and describes two new species in the January number. The February issue contains the conclusion of a series of articles devoted to a revision of British *rubi*. The author, W. M. Rogers, recognizes ninety species, many of which are avowedly "aggregates" of numerous closely related forms. Bentham and Hooker (*Handbook British Fl.* 5 ed. 1887) recognize just five species; Babington (*Manual*, 8th ed.) describes forty-five.

NEW PLANTS OF THE PACIFIC COAST.—I.

By THOMAS HOWELL.

Thermopsis gracilis. Erect, slender, 1 to 3 feet high, with spreading branches; sparingly strigose-pubescent throughout, at least when young: stipules broadly ovate to lanceolate, usually acute: leaflets an inch or two long, cuneate-oblongate: racemes short, few-flowered and lax; bracts ovate, acute, mostly shorter than the pedicels: calyx-teeth triangular; the upper lip truncate or barely 2-toothed: pod appressed-silky, 2 inches long, 2 lines wide, spreading or somewhat recurved, 5 to 10-seeded.

Mountains of southwestern Oregon, from the sources of the Willamette River, to northern California.

Thermopsis robusta. Stout, 4 to 6 feet high; densely tomentose throughout: stipules large, broadly ovate to orbicular, acuminate, exceeding the petioles: leaflets 2 or 3 inches long, rhombic-ovate, acute at each end; raceme elongated and dense; bracts ovate-lanceolate, acute, longer than the pedicels: calyx-teeth acuminate, the upper lip notched: fruit unknown.

In the Californian Coast Range, near the Oregon boundary; obtained in June, 1884, and not yet reported from elsewhere.

Lupinus mucronulatus. Perennial, stems decumbent, 2 to 6 inches long, the leaves 2 or 3 only; pubescence short and appressed; stipules subulate: leaflets 6 to 10, obovate to oblanceolate, obtuse or acutish, mucronulate, an inch or two long, sparingly hairy on both sides, or glabrous above; peduncles equalling the leaves: racemes 2 or 3 inches long, rather dense; bracts setaceous; flowers subverticillate, purple or ochroleucous: upper lip of calyx acute, entire, the lower longer, narrow, subentire: petals 4 or 5 lines long, equal; keel falcate, ciliate above the middle.

Species peculiar to the serpentine formation on the eastern side of the Coast Range near Waldo, Oregon. Its nearest relation appears to be the Alaskan *L. arcticus*.

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Lupinus saxosus. Perennial, stems decumbent or ascending, 4 to 10 inches long, soft-pubescent with spreading hairs; stipules subulate: leaflets 8 to 12, densely appressed-silky, sparsely pubescent above, $\frac{1}{2}$ to 1 inch long, acute or obtusish: raceme dense, 2 or 3 inches long, short-peduncled; bracts lanceolate, acuminate, caducous: flowers subverticillate, on short slender pedicels: upper lip of calyx bifid, the lower little longer, trifid: petals equal, $\frac{1}{2}$ inch long, the banner glabrous and keel ciliate: pod villous: seeds 4 or 5.

On high stony ridges, from near the Dalles eastward, in Oregon and Washington.

Lupinus canescens. Root thick, perennial; stems stout, strict, 2 or 3 feet high, at length branching: leaflets 8 to 12, lanceolate, acuminate, 1 to 3 inches long, densely appressed-villous on both sides; inflorescence hirsute: raceme dense, 8 to 10 inches long, short-peduncled; bracts subulate, somewhat persistent, about equalling the calyx; flowers subverticillate, on stout pedicels 1 line long or more; upper lip of calyx toothed, lower nearly entire; petals 4 lines long, the rather broad banner pubescent exteriorly; keel shorter than the wings, ciliate.

Collected in June, 1885, at the western base of Buck's Mountain, a spur of the Blue Mountains of Oregon; distributed as n. 787 of my collection of that year.

Trifolium Oregonum. Perennial; stems decumbent or ascending; herbage glabrous, or the petioles and peduncles appressed-silky; stipules linear, or the upper ones lanceolate, acute, entire, or serrate above the middle: leaflets linear-oblong to lanceolate, $\frac{1}{2}$ to 1 inch long: flowers in loose somewhat umbellate heads, the short pedicels reflexed in age: calyx-tube minutely villous, the subulate-setaceous teeth twice longer: ovary stipitate, glabrous, 3 to 4-ovuled.

Rather common near Waldo, in southeastern Oregon, flowering in early spring. From the description in the Botany of the California Geological Survey I take this to be the *T. longipes* of that work; but it is easily distinguished from that species by its weak decumbent stems, large loose

heads of pinkish flowers, and ultimately reflexed pedicels. The two often grow together, and *T. longipes* is later in its flowering.

Astragalus salinus. Perennial; stems rather slender, decumbent or ascending, 4 to 8 inches long, branching: leaflets 9 to 17, obovate to oblong, obtuse or retuse, 4 to 6 lines long: peduncles shorter than the leaves: calyx narrow, the short subulate teeth half as long as the tube: pod inflated, glabrous, thin-chartaceous, ovoid, with a short curved beak.

Saline soils of southeastern Oregon; in aspect much like *A. diphyus*, but its thin-walled pods readily distinguish it.

Astragalus (Phaca) Hoodianus. Perennial; stems very erect, 4 to 6 inches high; herbage canescent with a short appressed pubescence: leaves 6 to 8 inches long, leaflets in 10 to 14 pairs, linear, $\frac{1}{2}$ inch long or less: peduncles stout, exceeding the leaves and often nearly a foot long: flowers in a long and rather loose raceme, white or yellowish, on pedicels a line long: bracts foliaceous, lanceolate, 2 lines long: calyx cylindrical not half the length of the corolla, rather densely pubescent, the triangular acuminate teeth about as long as the slightly gibbous tube: mature pod thick-walled and hard, 6 or 8 lines long, oblong, acute, dorsally compressed, pubescent.

Species apparently somewhat local in Wasco County, Oregon, where it grows on hills from Hood River to a point a few miles east of the Dalles, and also on the opposite side of the river. Its nearest ally seems to be *A. conjunctus*, which has purple corollas and glabrous pods.

Astragalus Suksdorffi. Cinereously pubescent throughout: the stems many from a stout perennial root, slender, ascending, 8 to 12 inches long: stipules foliaceous, ovate-lanceolate, acute, about a line long: leaflets in 4 or 5 pairs, cuneate-oblong, obtuse or retuse, 3 or 4 lines long: peduncles very slender, shorter than the leaves; flowers in a compact cluster, white or yellowish, on slender pedicels; bracts lanceolate, about half as long as the pedicels; calyx campanu-

late, its subulate teeth about equalling the tube; banner far exceeding the wings and twice the length of the keel, entire: pod of firm texture, sessile, obliquely ovate, acuminate, $\frac{1}{2}$ inch long or less, finely appressed-pubescent.

In loose volcanic soil near the base of Mount Adams; collected by W. N. Suksdorf, and described by him as *A. Pulsiferæ*.

TWO CALIFORNIAN CRYPTOGRAMS.

By MARSHALL A. HOWE.

Fimbriaria nudata. Thallus with a broad purple margin, obcordate, or often with an angular sinus and narrow divergent lobes; scales extending beyond the margin and inflexed at the apical notch; peduncle naked, light brown, $1\frac{1}{4}$ to $2\frac{1}{2}$ cm. high; carpocephalum rather large, ovate or obtusely conic, scarcely lobed, capsules 2 to 6 (commonly 3 or 4); inner involucre white, sub-globose, 8 to 12-cleft, constricted at the base of the clefts, segments cohering at the apices; spores dark, becoming black, angular, warty-rugose, 57 to 74 mic. in diameter; elaters bi-tri-spiral.

A single fruiting specimen of the above plant was found by the writer in Mill Valley, Marin County, California, April 12, 1892. It has since been collected by George Hansen near Jackson, Amador County, and by W. L. Jepson at St. Helena in Napa County.

Fimbriaria nudata is evidently nearly related to *F. Palmeri*, Aust., which occurs on Guadalupe Island off the coast of Lower California, but seems to be sufficiently differenced by having, most commonly, 10 or 11 divisions in the inner involucre instead of eight and 3 or 4 capsules to the carpocephalum in place of the five of *F. Palmeri*.

The carpocephalum of *F. Palmeri* is described as slightly constricted in the middle, while that of our plant, in the growing state, at least, shows nothing of this character.



A form of *POLYPODIUM CALIFORNICUM*, Kaulf.

The accompanying plate shows the outline of a frond of *Polypodium Californicum* collected in Marin County, California, January 31, 1892, by Messrs. Michener and Bioletti.

The segments in the lower part of the frond are lobed and cleft instead of being simply serrate as in the typical form. It is undoubtedly analogous to Moore's variety *semilacerum* of *Polypodium vulgare*, but observations thus far lead to the conclusion that the present form has too much the nature of an occasional sport to deserve a varietal name. Fronds with the lower segments more or less cleft have been noticed in the vicinity of Berkeley, and specimens showing a departure from the type as great as that represented in the figure have recently been collected by Mr. Jepson near Olema in Marin County.

But one of the interesting features of our figured plant and the one which perhaps chiefly justifies calling attention to it is its relationship to Kellogg's *P. falcatum*. The size of the frond, which has a length of thirteen inches and a maximum width of six inches, the narrowly acuminate and falcate middle segments, and the reduced size of the two lowest pairs of segments, are all strongly suggestive of *Polypodium falcatum*; but the veinlets anastomose in two or three cases, and this fact together with the characters of the sori and the shape of the upper segments induce the writer to believe that the nearest alliance of the plant is with *Polypodium Californicum* Kaulf., variety *intermedium* D. C. Eaton. The frond has a thin texture, such as may belong, according to the descriptions, to either of the forms in question. Plants showing a puzzling relationship between *Polypodium falcatum* and *P. Californicum*, var. *intermedium* are not uncommon in the cañons about the Bay of San Francisco.

Plate I. represents the frond reduced one-half and one of the segments the natural size. The middle segments are rather more narrowly acuminate than the figure indicates.

CORRECTIONS IN NOMENCLATURE.—I.

By EDWARD L. GREENE.

PIPTOMERIS, Turczaninow.

FOR the reinstatement of the earliest JACKSONIA, namely that of Rafinesque, the reader is referred to Pittonia, ii. 174 and 274. For the more extensive Australian genus of Leguminosæ to which *Jacksonia* was inadmissibly applied, there happens to be an available name, as above indicated. All experts in Australian botany are agreed that PIPTOMERIS is inseparable from that natural generic assemblage to which Robert Brown assigned an untenable name.

The known species are to be named as follows:

1. *P. APHYLLA*, Turcz.; Bull. Mosc. i. 258 (1853). *Jacksonia piptomeris*, Benth. Fl. Austral. ii. 62 (1864).
2. *P. dilalata* (Benth.; Ann. Wien. Mus. ii. 74 (1838) *sub* Jacksonia).
3. *P. densiflora* (Benth.; Lindl. Sk. Swan Riv. 13 (1839) *sub* Jacksonia).
4. *P. carduacea* (Meissn.; Bot. Zeit. 25 (1855) *sub* J.).
5. *P. floribunda* (Endl.; Ann. Wien. Mus. ii. 197 (1838) *sub* Jacksonia).
6. *P. odontoclada* (F. v. M.; Benth. Fl. Austral. ii. 55 (1864) *sub* J.).
7. *P. ramosissima* (Benth.; Mitch. Trop. Austral. 258 (1848) *sub* J.).
8. *P. foliosa* (Turcz.; Bull. Mosc. i. 260 (1853) *sub* J.).
9. *P. spinosa* (Labill. Nov-Holl. i. 107. t. 136 (1804) *sub* Gompholobio).
10. *P. stricta* (Meissn.; Bot. Zeit. 27 (1855) *sub* J.).
11. *P. hakeoides* (Meissn.; Lehm. Pl. Preiss. i. 45 (1844) *sub* J.).
12. *P. furcellata* (Bonpl. Malm. 30. t. 11 (1813) *sub* Gompholobio).
13. *P. horrida* (D. C. Prodr. ii. 107 (1824) *sub* J.).
14. *P. sericea* (Benth.; Hæg. Enum. 31 (1837) *sub* J.).

15. *P. Sternbergiana* (Hueg. Bot. Archiv. t. 3 (1837) *sub J.*).
16. *P. vernicosa* (F. v. M.; Benth. Fl. Austral. ii. 58 (1864) *sub J.*).
17. *P. rhadinoclona* (F. v. M. Fragm. x. 37 (1876) *sub Jacksonia*).
18. *P. Forrestii* (F. v. M.; Proc. Linn. Soc. of N. S. W. 2 ser. ii. 194 (1887) *sub J.*).
19. *P. thesioides* (A. Cunn.; Ann. Wien. Mus. ii. 74 (1838) *sub J.*).
20. *P. compressa* (Turcz.; Bull. Mosc. i. 260 (1853) *sub Jacksonia*).
21. *P. Clarkei* (F. v. M.; Proc. Linn. Soc. of N. S. W. 2 ser. ii. 193 (1887) *sub J.*).
22. *P. scoparia* (R. Bn.; Ait. Hort Kew, 2 ed. iii. 13 (1811) *sub J.*).
23. *P. cupulifera* (Meissn.; Bot. Zeit. 27 (1855) *sub J.*).
24. *P. restioides* (Meissn.; Lehm. Pl. Preiss. i. 46 (1844) *sub J.*).
25. *P. velutina* Benth.; Fl. Austral. ii. 60 (1864) *sub J.*).
26. *P. Lehmanni* (Meissn.; Lehm. Pl. Preiss. i. 46 (1844) *sub J.*).
27. *P. racemosa* (Meissn. l. c., *sub Jacksonia*).
28. *P. umbellata* (Turcz.). *Jacksonia umbellata* and *J. juncea*, Bull. Mosc. i. 261 (1853).
29. *P. nematoclada* (F. v. M. Fragm. x. 50 (1876) *sub J.*).
30. *P. rhadinoclada* (F. v. M. l. c. 38, *sub J.*).
31. *P. capitata* (Meissn.; Lehm. Pl. Preiss. i. 45 (1844) *sub J.*).
32. *P. alata* (Benth.; Hueg. Enum. 30 (1837) *sub J.*).
33. *P. angulata* (Benth. Fl. Austral. ii. 62 (1864) *sub J.*).
34. *P. Stackhousei* (F. v. M.; Proc. Linn. Soc. of N. S. W. vi. 791 (1881) *sub J.*).
35. *P. purpuascens* (F. v. M. Fragm. iv. 161 (1864) *sub J.*).
36. *P. pteroclada* (F. v. M. Fragm. x. 37 (1876) *sub J.*).

ON GENERIC NOMENCLATURE.*

By H. BAILLON.

It is well known what a sensation the *Revisio Generum Plantarum* by O. Kuntze has produced in the botanical world. One of the chapters, which has exercised phyto-graphers most, is that bearing the title: "Linné's *Systema Naturæ*, editio princeps, 1735, as the Beginning of Nomenclature for Genera." The famous *Lois de la nomenclature botanique*, which, though promulgated by a congress, were drawn up, explained and even afterwards modified by A. de Candolle, are by a stroke of the pen destroyed, since according to these, generic nomenclature is reckoned to begin with the first edition of the *Genera* of Linné, published in 1737. And these laws were short-lived, since the botanists of Berlin now propose that "the priority of genera and species shall be counted from the year 1752, resp. 1753." Yet again the *Genera* of Bentham and Hooker takes as its point of departure for generic names, the fourth edition of the *Genera* of Linné (1764). And since it is agreed not to go back of Linné, we shall possibly in the near future hear of some fifth proposition as to the earliest date, drawn from some other work of that author.

It would seem then that a need of a new congress as well as new laws were beginning to be felt. A code which has commenced to be applied in the United States, has so far not been favorably received in England. Shall every nation observe that only which it prefers? Let us note that, so far, France is the only country which has not a code of her own; although the famous congress (of 1867) was held in Paris. One is here reminded of the famous remark of an English statesman, who said that "constitutions are not worth the paper upon which they are written;" and we deem it wise to stand aloof from codes for the present, since our friends, the most distinguished among German botanists, ask us to sign

* From the Bulletin Mensuel de la Societe Linneenne de Paris, 3 August, 1892. Translated from the French by IVAR TIDESTROM.

a document in which we find the words: "I consent to article 1, 2, 3, 4." It is possible, in fact, that some may find themselves obliged to withhold their consent from all of them, or from one, two or three of them only. For justice's sake, it would be necessary, before reforming anything, to know why one should not go back of Linné for generic names. It is just as equitable to have families commence with A. L. de Jussieu. Can there be arbitrary rules? And as regards those laid down by assemblies, why should not each one have its own set which no other should be expected to adopt? Then, from this too ardent desiring of codes and regulations, Botany would be thrown into anarchy. In practice there are doubtful cases, but usually good sense and justice can settle them. It is to be remarked that in such perplexities, little help is found in the pretended codes.

As regards nomenclature, there is but one law worthy of the name; that of historical priority. And why do not those, who, where generic names are concerned, wish to impose upon us the obligation not to go back of Linné of 1737, themselves go back, when it pleases them, to the *Materia Medica* of Dioscorides and to the *Institutiones* of Tournefort? It is not long since A. de Candolle wrote this sentence: "It seems to me that the authority of the illustrious Swede is less with regard to generic names than specific, since genera were really established before his time, but not species" (*Prodr.*, xvii., 33). If he has changed his mind since then, it would be well, for the sake of progress, if he were disposed to change it once more.

REVIEWS AND CRITICISMS.

The Metaspermæ of the Minnesota Valley. A List of the Higher Seed-Producing Plants Indigenous to the Drainage-Basin of the Minnesota River. By CONWAY MACMILLAN. Minneapolis, 1893.

A large octavo volume of more than 800 pages, this is perhaps the most important of all American contributions to

the geography of plants. The region whose higher vegetation is herein catalogued and scientifically discussed is a very natural one, and rather new to careful exploration; and the rather young state of Minnesota, by authorizing this sort of an undertaking, and bringing the whole to so noble an issue, has placed herself in the front rank of states in enterprise of natural history exploration and publication.

The amount of botanical work which this book represents is vast indeed; and the quality of it, in general, excellent. In 30 introductory pages are given the natural features of the country under investigation; a list of publications bearing on the botany of the region; a discussion of the subject of nomenclature; and an argument for that sequence of orders and genera which is adopted in the Catalogue. The Catalogue itself, occupies 540 pages, and is followed by more than 200 pages devoted to various matters, geographical and statistical, bearing on this flora.

For a year or two past, Professor MacMillan has been making his influence felt as a zealous and able exponent of principle *versus* usage in respect to botanical nomenclature, and in the work before us he has given the fullest expression to his views. Pages 11 and 12 of his Introduction contain statements of the difficulties of the present situation and their causes, and in terms that are both fresh and clear, though not always quite accurate; for it is not accurate to speak of priority as an "international law," nor to say that, as such, it has "arisen," as if recently. The fundamentality of the principle of priority has been recognized always and everywhere in botany; only individuals, and especially since Linnæus, who set the example, have here and there made exceptions, more or less numerous, in favor of later and improved, or at least more widely published names. Priority was the ruling principle, not only before international or even national congresses were, but almost before botany in any nation had risen to the dignity of a science.

Very much of the recent controversy about nomenclature relates to the starting point from which priority ought to be

reckoned. Professor MacMillan has thrown no new light upon this subject. On the contrary, by diverting himself and his readers with an ingenious sophism, he has the more obscured it. That assumed parallelism between the reckoning of longitude on the earth's surface, and the reckoning of historical priority in biological nomenclature, does not exist. Whether that of Paris, or that of Greenwich, or any other, be chosen for the zero meridian of longitude, involves no questions of absolute truth and right; makes nothing for or against injustice to scientific men; does not affect historic truthfulness, or literary accuracy. Thus at least three of the most weighty considerations that regulate human actions—justice, truthfulness, right—while failing to have the least bearing upon the starting point for longitudes, are in contact with the subject of botanical nomenclature at every point. The two cases are about as far as possible from being parallel; and our friend's unfortunate statement, "An arbitrary starting point must be determined for botanical names, just as an arbitrary point of latitude or longitude is determined" (p. 14), seems to have betrayed him into making a concession such as we should have expected only from the opposite side in this controversy, and the extreme of it, too; never from one who thought himself to be defending the cause of "strict priority;" for on page 15, speaking to the point of what book and date shall be adopted as initial for plant nomenclature, he says: "It becomes a matter of preference, to be determined as far as possible in the light of convenience and custom."

If all that we knew of the mind of our author respecting nomenclature were the above sentence, linked to his proposition that the point of departure for genera must be chosen arbitrarily, we should look for his name on the list of those who have subscribed to the Berlin Protest.

But notwithstanding this very conciliatory if not compromising sentence which I have quoted, in practice the author makes no compromise with the pleaders for the usual and convenient; for in no new book that has appeared since Otto

Kuntze's *Revisio Generum* recur so many of that author's new names for old plants. None will be more inconvenient and provoking to those who would be bound down to the customary in nomenclature. This is true in spite of the fact that Prof. MacMillan's "beginning" of nomenclature is a date two years later than that of Dr. Kuntze; and this seems to show the year 1737 is not the usual and customary starting point; and in fact it is not. Neither is it the one—whatever people may now pretend—which had the sanction of the Paris Congress of 1867. That, as has been sufficiently demonstrated by Dr. Kuntze and myself, was by every fair implication the year 1735.

One must here call attention to this, that the Paris Code, in its strong pronouncements for priority, makes no distinction of specific, generic or ordinal names. It employs the term "group" to cover all three. These laws therefore bind one as much to the going by priority in the selection of ordinal as of generic names. But the author of our book ignores this fact altogether and takes up names of families without the least reference to that principle which he admits to be "fundamental" in nomenclature. Then, as if realizing the necessity of defending this falling away, he makes a strained effort to have it appear as though the lines between natural orders were less stable or less certain than between genera. Undoubtedly the history of systematic botany will show that natural orders as groups are quite as little subject to change of limit as genera; I think less so, if there be any difference. Within the last century there have never been any doubts about the limits of the Cruciferæ or Umbelliferæ, for example; while respecting the limits of genera within these, and other such stable orders, there have existed and there still exist very wide diversities of view among the ablest botanists.

The List itself, must take the place of a standard work in botanical libraries everywhere; and there have been very few American books, hitherto, of which so much can be said. It will also hold this rank in spite of certain minor defects which, if small, are not the less to be regretted. One cannot

but desire that every work destined to accomplish so much as this is, should be accurate in all things, and in every way scholarly; and we fear that in this important volume Prof. MacMillan has paved the way to many laxities. In his citations of books I find "Mac. Fl. Can.," which indicates naturally some one's "Flora of Canada." We know it must mean Macoun's *Catalogue of Canadian Plants*. Similarly the Botany of the California State Geological Survey, of which the shorter title proposed by the authors and printed on the first title page is *Botany of California*, Prof. MacMillan cites as "Fl. Calif." Still worse than these is "Coult. Fl. Colo." Professor Porter, aided by Coulter, once published a *Flora of Colorado*. Afterwards Coulter alone compiled a *Botany of the Rocky Mountain Region*. There is no book extant whose title can be cut down to the form given by our author; but strange to say the abbreviation I have repeated is proven to refer to Coulter's Manual of Rocky Mountain Botany, which covers the ground from New Mexico to British America, and on the title of which Colorado is not mentioned. There are many other errors of this sort. Moreover, it had been better that there had been no Latin phrases in the book than that such should have been constructed in cold indifference to case-endings. No one could have criticized where one had written "under *Aster*" or "under *Trollius*;" but "sub *Aster*" instead of sub *Astere*, and "sub *Trollius*" in place of sub *Trollio* are examples of an extremely modern type of Latinity; and with this sort many pages of this fair volume are defaced.

Mr. Hollick, who, in the April number of the *Bulletin of the Torrey Club*, reviews Prof. MacMillan, attributes to a "rigid conscientiousness" his bringing forward of "*Scoria*" as generic name instead of *Hicoria*; the former being, as every one knows, that which an inadvertent printer gave, and not one which the author of the genus *Hicoria* ever propounded or so much as dreamed of. Conscientiousness would have led to the employment of the name which Rafinesque wrote and endeavored to get printed, and which he afterwards

did print, and that before *Carya* appeared. But we suggest that if our author is to retain "*Scoria*," he should, in fairness to Rafinesque, find out the name of the printer and ascribe the name to him who made it, and not to the botanist; for he always abjured it. But, whatever Prof. MacMillan's motive may have been for this action, it is one which did not actuate him in other such cases; for he does here and there correct errors of genus-makers and genus-printers. He makes Cassini say "*Haplopappus*" where he actually said *Aplopappus*; and what is more difficult of explanation, he even alters Rafinesque's well constructed and clearly significant *Lepargyræa* (meaning *silvery-scurfy*) into "*Leptargyræa*," which is meaningless.

We have for two or three years past derived much satisfaction from Prof. MacMillan's zealous contending for priority in specific as well as generic names; and we were not expecting certain lapses of this kind which we have noted in his pages. For example; he makes Linnæus to say "*Alisma Plantago*" where that author always wrote *Alisma Plantago aquatica*. Scopoli (1772) is sponsor for the name *A. Plantago* (see Pitt. i. 293); so that Scopolis' name for the plant is credited to Linnæus, and the Linnæan name of it is not given even in the synonymy. The *Ranunculus ambigens*, Wats., is given in this Catalogue in place of the seventy years earlier *R. obtusiusculus*, Raf., for the same species; these are mere examples. But again, *nomina nuda* are very freely put forward as the rightful names of species, to the displacement of the earliest names that came out along with diagnoses. Indeed, the author makes no distinction whatever between naked names, and names accompanied by descriptions or equivalents. On the whole, the errors in nomenclature, of various kinds, are so numerous, that we should not dare to take anything for granted, as here printed, in the line of the bibliographical; and we might have expected much of bibliographical laxity and inaccuracy in any author who could speak of Watson's Index as being a book "remarkably exact." It

notoriously abounds in errors of all sorts, and a painstaking bibliographer would soon find that out for himself.

The most serviceable, and therefore the kindest office of a reviewer, I take to be that of calling attention to a book's defects; and I have dwelt so long on these, in this instance, that the good things that might be said of even the bibliographical and nomenclatorial pages, must be left unspoken by me; save as they were expressed in the opening paragraphs, and as I here add in conclusion, that in point of usefulness to those who know how to use, without abusing a book that should be a standard, Professor MacMillan's volume will inevitably take, and probably for some time hold, the first place among American publications of its kind.

EDW. L. GREENE.

On Legitimate Authorship of Certain Binomials, with other Notes on Nomenclature. By GEO. B. SUDWORTH, Bull. Torr. Club, xx, 40-46.

Under the above title it is contended that manuscript names subsequently published by other than their originators should not be credited to their authors but to those who first published them with diagnoses. Mr. Sudworth takes up the names of various North American trees, the first considered being that of *Pinus ponderosa*, one of our Western pines. It was so named by Douglas, and the binomial first appeared in that travelers' journal, published in Hooker's Companion to the Botanical Magazine. The species was afterwards characterized by Loudon in the Arboretum, who appended "Douglas" to *Pinus ponderosa*, as Douglas left only a written label accompanying his specimens deposited in the herbarium of the Loudon Horticultural Society. "Strictly therefore," says our writer, "the name should be written, '*P. ponderosa*, Loudon.'"

It seems not to have occurred to Mr. Sudworth that what one does through another he does himself, and that the author of a species and the publisher of the same may be two different persons. Loudon in crediting the species to Douglas

gives us his personal testimony that Douglas was the first to recognize the species as such, to give it a name and to place his material where it could be available for publication. Loudon merely did that which Douglas indicated should be done; and he could not truthfully have done otherwise. To have credited the species to himself would have been both untruthful and unjust, and he would have laid himself open to the charge of piracy.

In like manner *Pinus contorta*, Douglas, Mss. and *Pinus insignis*, Douglas, Mss. (Loudon's Arboretum) are disposed of by Mr. Sudworth. "As is clear, so far as Douglas is concerned, these names are *nomina nuda*, and should, if treated critically, be attributed to Loudon who published them." To me nothing is less clear. These names were never *nomina nuda* to Douglas whatever they may have been to other men. Even after they had been published in the Arboretum, he knew more of the character of the trees to which these names applied than did Loudon or any man then living.

It should be remembered that the authors of unpublished names in collections reserve certain rights which publishers of species are in honor bound to respect. Perhaps no one has spoken more clearly on this question than Asa Gray, who distinctly says that we should feel bound to write as authority the author of a manuscript name although another may have supplied the character. He adds that "no botanist is bound to do the work of publication for another; but that if he chooses to do so, the maxim *qui facit per alias*, etc., must fairly apply and succeeding writers should not be required to take the god-father for the father." W. L. JEPSON.

NOVITATES OCCIDENTALES.—III.

By EDWARD L. GREENE.

ISOPYRUM OCCIDENTALE, H. & A., var. **coloratum**. Rather smaller than the type, and the roots more fleshy (slender fusiform): flowers smaller, rose-red: follicles oblong-linear, $\frac{1}{2}$ inch long, somewhat narrower above, less obliquely acute than in the type.

Collected on Fremont's Peak of the Santa Cruz Mountains, California, by Mr. L. W. Cushman, March and April, 1893. An unexpected station for an *Isopyrum* and perhaps specifically distinct from *I occidentale*. The red color of the flowers is certainly very remarkable.

RANUNCULUS CALIFORNICUS, Benth. var. **crassifolius**. Stout and low, the flowering branches only assurgent: herbage somewhat succulent, sparingly villous, and equally so throughout; leaves broader than long, 3-lobed to the middle, the lobes rounded and coarsely toothed, the cauline mostly deeply parted into 3 oval or oblong quite entire segments: flowers and achenes decidedly larger than in the type of the species.

Collected at Fort Bragg, Mendocino Co., Calif., by Mr. Michener.

Lupinus eminens. Shrubby, 3 to 6 feet high, with ascending stoutish and very leafy branches ending in a rather short and short-peduncled raceme: growing branches and both faces of the leaves somewhat silvery-canescens with a minute appressed pubescence: leaflets 7 to 9, lanceolate-oblong, acutish, very unequal in size, the longest $1\frac{3}{4}$ inches, the smallest 1 inch long, on petioles of an inch or more: flowers scarcely whorled in the raceme: calyx lobes subequal, the upper very broad, scarcely notched, the lower narrow, entire: corolla about $\frac{1}{2}$ inch long, the banner shorter than the other petals, changing from whitish to tawny; keel naked: pods $1\frac{1}{4}$ inches long, villous, almost erect in maturity, about 4-seeded.

Santa Inez Mountains, Santa Barbara Co., California, G.

ERYTHEA. Vol. I, No. 6, [1 June, 1893].

W. Dunn, June, 1891. Like *L. albifrons* in habit and pubescence but very distinct in characters of flower and fruit.

Lupinus tricolor. Shrubby, 2 to 5 feet high, with ascending branches not densely leafy, ending in a long-peduncled and rather lax raceme a foot long or more; herbage canescently puberulent: leaflets 7 to 9, rather narrowly oblanceolate, acute, not very unequal: flowers in very distinct whorls more than an inch apart: calyx-lips nearly equal, the upper one bifid: corolla $\frac{1}{2}$ inch long, mainly deep violet, but the banner yellow as to the middle portion, soon changing to dark tawny red, the very margin white, changing to rose red; keel naked; banner notably smaller than the other petals: ovules 7 to 9.

Seeds obtained in Gates' Cañon, of the Vaca Mountains, Solano County, Calif., in 1891, by M. Jepson; the plants now flowering in the garden of the University. The species is allied to *L. albifrons*, but has good characters, and, with its three-colored flowers, is one of the most beautiful of lupines.

Lupinus propinquus. Shrubby, much branched and bushy, usually 2 to 4 feet high, all the herbage except the glabrous upper surface of the leaves puberulent; racemes short and short-peduncled, the flowers indistinctly whorled; bracts squarrose-spreading, very caducous: calyx-segments subequal, the upper notched, often deeply so: corolla 5 lines long; petals subequal, violet, the banner reddening in age; keel strongly ciliate.

This plant, known to me for some years, I formerly considered a variety of *L. arboreus*, and in the *Flora Franciscana* so disposed of it. A better acquaintance with it has led to a more careful examination, followed by the conviction that it is a good species. Its habit is never arboreous, but always bushy. It bears no trace of the silkiness that marks the better known species. Its floral bracts being squarrose give to the undeveloped racemes a very different appearance; its upper calyx-lip (entire in *L. arboreus*) is often deeply cleft; and the violet color of the flowers is perfectly constant. Only the hybrids between *L. arboreus* and *L. variicolor* have the

particolored flowers that I have described in the Flora Franciscana. The range of *L. propinquus* is considerable. It is at Santa Barbara and on Santa Cruz Island. I have seen it this year on Point Reyes, and Mr. Howell has lately sent it from Crescent City.

Helianthella castanea. Stems low (a foot long or less), stout, rough-pubescent with short spreading hairs, simple and monocephalous, or as frequently bearing a pair of branches toward the base, these also monocephalous and equaling the main stem: leaves nearly as long as the stem, lanceolate, very scabrous, tapering to a distinct petiole: terminal head nearly 2 inches broad, the lateral ones an inch or more: rays rather short ($1\frac{1}{2}$ inch): achenes cuneate-obovate, 5 lines long, glabrous throughout, comparatively little compressed (the cross-section narrow-rhombic) and not thin-edged, those of the ray very thick and nearly triquetrous, all dull black at the cuneate base, the middle and upper parts chestnut brown; apical notch short and deep, semicircular or subreniform; pappus none.

Plentiful at the very summit of Mt. Diablo, where it was collected by the writer in the beginning of July, 1892. Related to *H. Californica*, which is a tall slender plant with very thin and flat, black and shining achenes; the heads of flowers also much smaller.

Phacelia imbricata. Stems several from a stout perennial root, erect, slender, 2 feet high, simple below, above loosely paniculate, each pedunculiform branch bearing a pair of racemes: herbage pubescent throughout, the petioles and base of stem hispidulous with spreading or deflexed hairs: leaves all broadly lanceolate, acuminate, the lowest with a few lateral leaflets at base: flowers biserial and crowded, with distinct very slender pedicels: corolla small, bluish, the ovate segments in age closing upon the long-exserted filaments and so becoming persistent after flowering: fruiting calyces compressed and closely imbricated, the broad and deltoid-ovate outer segment conspicuous and larger than the others, these ovate-oblong, acutish, the margins of all hispid-ciliate, the

back showing neither distinct midvein nor evident reticulation: seed 1 only in each capsule.

Common on wooded hills of Napa and Sonoma counties, California; perhaps one of several wholly distinct plants latterly confused with the Patagonian *P. circinata*. The calyx is a remarkable one, yet not at all as in var. *calycosa*, Gray.

ZOOSPORES IN SPIROGYRA CONDENSATA.

By L. B. BRIDGMAN.

Through the kindness of Mr. W. E. Loy of the San Francisco Microscopical Society, I obtained a specimen of *Spirogyra condensata* apparently producing zoospores.

The specimen was gathered by him the 26th of last March from a small way-side rill near Petaluma, California. On his first examination he observed several cells containing motile, globular green bodies; in one cell he counted twenty-four,—usually the number was less. I did not see the specimen until the next day, and at no time found as many zoospores as did Mr. Loy, eight being the highest number seen in a single cell, and usually there were but three or four. Where these smaller numbers occurred only a part of the contents of the cell was used in their formation.

The process of formation, judging from different stages observed in several cells, appeared to be as follows:

The contents, which were of a healthy chlorophyll-green color, lose their characteristic spiral appearance and fill the cell with a structureless mass in which soon appear one or more denser portions. Around these the protoplasm, with its contained chlorophyll grains, is gathered and becomes rounded into as many zoospores as there are denser centers. These begin to revolve slowly in the parent cell, through the wall of which they finally escape into the surrounding water where their motion becomes more lively. After "swarming" a short time—from five to ten minutes in the ones I observed—the zoospores come to rest. At this instant the

cilia are seen to form a circular tuft at one end of the zoospores. While swarming, the zoospores appeared to be surrounded by a fringe of cilia. I was unable to determine the number of cilia. Their length was about equal to the diameter of the zoospore, which varied from 10 to 15 microns. They soon disappeared after the zoospore came to rest. Even while in motion, it could be seen that the zoospore was composed of two parts—a dense chlorophyll-green one surrounded by a hyaline mass. After coming to rest, this hyaline portion appeared to form a thick cell wall, the diameter of the central green portion being not more than half the whole diameter of the spore.

I found no zoospores after March 29th. The parent filaments were then rapidly losing their healthy appearance, the contents becoming structureless and turning a yellowish color. By April 4th the cells had separated and had sunk, a brownish mass, to the bottom of the vessel. A few filaments kept in a life-slide did not disintegrate so rapidly, but were found to be infested by the hyphæ of a fungus.

Such an unusual phenomenon as the formation of zoospores in a member of the class conjugatæ led to a search for records of similar instances, and four meager notes were brought to light.

Bennett & Murray in their *Cryptogamic Botany*, p. 264, state: "The reproductive organs of other algæ or fungi, which are sometimes parasitic upon or endophytic in species of *Spirogyra*, have been mistaken for zoospores."

These of which I write, however, were certainly not the spores of a parasite. Both Mr. Loy and I found them forming from the contents of the spirogyra cell, and there were no traces of a parasite in the cells in which the zoospores were formed, though, as stated above, fungal filaments subsequently appeared in cells where no zoospores were formed. These fungal filaments were like the hyphæ of pythium, and had not begun to fruit.

In *Annals of Natural History*, Vol. XIX. (1857), p. 260, is an article by H. J. Carter describing bodies somewhat similar

to the ones which I have called zoospores as occurring in *Spirogyra crassa*. Their mode of formation was different from what I have noted. Mr. Carter states that after coming to rest the spores become brown and finally break up into *colorless* monads. He concludes that this is the origin of the animal rhizopod, *Actinophrys*.

A paragraph from Braun's "Rejuvenescence" quoted in Cooke's Fresh Water Algæ, p. 152, states that these swarming cells of *spirogyra* differ from normal swarming cells "in their irregular form, slower motion, varying size, and mostly brownish yellow contents which become *hyaline finely granular mucilage*."

An account published in the Micrographical Dictionary, p. 715, is as follows:

"In filaments in an unhealthy condition, about to decay, such as are often seen when a collection of them is placed in a jar of water to keep for examination, it is not uncommon to see the green contents gradually lose their spiral arrangement and break up into a number of globular portions; we have sometimes observed these rolling over slowly in the cell. In one case we have seen the contents converted into sixteen distinctly organized *biciliated* zoospores differing only from the ordinary zoospores of the confervoids in the *almost total absence of color*. They were somewhat crowded in the cell and moved lazily about in it, the cilia vibrating."

This last description comes nearer to my own than the others. My specimens, however, *appeared* to be in a healthy condition, and the zoospores were more numerous and more active at the time of collecting. After they had been kept in water a few days, the zoospores did not form. Still the filaments disintegrated more rapidly than in any other specimens of *Spirogyra* which I have kept for examination under apparently the same conditions of environment.

It seems probable that weakness or disease tends to the formation of zoospores in *Spirogyra*, but the detailed history and full significance of these bodies are matters for further investigation.

THE RANGE OF AMORPHA FRUTICOSA.

By JOHN M. HOLZINGER.

Amorpha fruticosa occurs in the eastern and southern United States, ranging westward to the Rocky Mountains, "northeastward to British America," south and southwestward into Texas, Mexico, and southern California. Its occurrence in Mexico is attested by Pringle's plant collected in 1887 in the state of Chihuahua, distributed under No. 1221. Coulter's Botany of Western Texas credits the species to that state, as "apparently throughout Texas." There are in the National Herbarium at least two plants to substantiate this extension of range: the Mexican Boundary Survey plant, No. 243, from Southern Texas, and Elihu Hall's No. 128 from eastern Texas. These two plants had been wrongly referred to *A. lævigata*, Nutt., which also occurs in Texas. Two other specimens from the same state, Hall No. 127, and Lindheimer No. 595, are in the National Herbarium, referred to the variety *angustifolia* of this species. But the difference between the type of the species and the variety is merely one of width of leaves. These vary considerably on the same bush; and after glancing over a series of specimens, one feels strongly dissuaded from holding to the variety. In fact, the four Texas specimens mentioned above are preferably referred to the type of the species, not the variety.

Amorpha fruticosa also occurs in Arizona, as is shown by the following specimens:

1. Dr. Smart's plant, No. 314, from Prescott.
2. Dr. Rothrock's plant from Willow Spring.¹
3. Pringle's, from the Santa Rita Mts.
4. Lemmon's, from the Huachuca Mts.
5. Dr. Palmer's No. 484, from Willow Spring.
6. M. Dougal's plant, from central Arizona.

The only fruiting specimen among these is Lemmon's, which shows, by its glabrous legumes (though they are a

1. This is probably the plant referred to in Bot. Wheeler Surv. VI, 99 (1878) as being possibly referable to *A. Californica*.

little shorter than in eastern specimens), that the Arizona plants should be called *A. fruticosa*, rather than *A. Californica*, which has pods nearly as broad as long, and minutely pubescent, the calyx lobes much longer. Pringle's and Smart's plants had been referred to *A. Californica*, but they hardly agree with Nuttall's description in Torrey and Gray's Flora I. 306 (1838-1840).

Dr. Palmer's No. 47 of the year 1875 is the only specimen in the National Herbarium tending to show that *Amorpha fruticosa* extends into southern California. The specimen was collected at San Diego. This plant, like those from Arizona, is not Nuttall's *A. Californica* but *A. fruticosa* L., not having the petioles "furnished with minute glandular scales." In Professor E. L. Greene's herbarium are two plants of this type, both of which are *A. fruticosa* L. One of them is from southern California, the other from New Mexico.

There seems to have existed a long standing confusion of *Amorpha fruticosa* with *A. Californica*, in the region of Arizona, New Mexico and southern California that must have led Professor Greene to describe Nuttall's true *Amorpha Californica* as a new species, *A. hispidula*. (See Fl. Fr. 14. 1891). *A. hispidula* thus becomes a synonym for *A. Californica*. Dr. Rothrock's statement (l. c.), that "only the fruit will determine" whether his plant is *A. fruticosa* or *A. Californica*, should also be corrected. Nuttall clearly states (l. c.) that the "petioles [are] furnished with minute glandular scales," a character by which even specimens without flower or fruit can be determined.

It is thus seen that *Amorpha fruticosa* extends through Arizona, southern California and New Mexico, into Mexico.

[Mr. Holzinger asks that, in publishing the above, I add any notes of my own that may seem to throw light on the subject. I therefore remark, first, that I wish the writer had been less dogmatical and given us his view of what are the full characters of *A. Californica* and *A. fruticosa*, respectively. He should also, in justice to *A. hispidula*, have stated the characters on which its author based its title to specific rank. I

have no doubt that *A. fruticosa* extends to southern California. But Mr. Holzinger's supposition that I took that for *A. Californica* and then gave to the real *Californica* a new name, *hispidula*, is entirely gratuitous; and, as he does so without making the remotest allusion to the strong characters assigned to it, as distinct from *Californica*, the dogmatism of his paper seems to become stronger and stronger as he proceeds; if, indeed, anything written in the name of science, could be more absolutely dogmatical than his first sentence. The first thing to be settled, before the distribution, or range, of a species be discussed, is, what is the species? What are its characters? If the author had given his view of these, then one would have had the means of judging as to the acceptability of his conclusions. I am really quite with Mr. Holzinger in thinking that *A. fruticosa* is in New Mexico, Arizona and southern California, and I protest against his assuming that I ever mistook any of those shrubs for *A. Californica*. He has no grounds for it. But, agreed though we are, upon this range of *A. fruticosa*, it is only an opinion, and it is either valid or worthless according to the correctness or incorrectness of our estimate of the characters of that species. Between *A. Californica* and *A. hispidula* the same holds good. Possibly the two may be one; for possibly Nuttall, in spite of the keenness of his botanical eye and touch, failed to see or feel the prickles that arm the bush. Or it may even be that there are complete transitions from the type of his species and the type of mine. In either case the two would be proven one, and *A. hispidula* a synonym. But bald opinions that such and such herbarium specimens belong to this or that species, add nothing to knowledge, may mislead the unwary, and should not be too freely given in the name of science.—EDW. L. GREENE.]

NOTES ON WEST AMERICAN CONIFERÆ.—II.

By J. G. LEMMON.

PINUS ENGELMANNI, Carrière, Traite Conif. p. 356 (1855).

Pinus macrophylla, Engelmann, Wislizenus Mem. p. 103, Note 25 (1848).*Pinus latifolia*, Mayr, Sargent in Garden and Forest, p. 496, fig. 135 (16 Oct., 1889).

Trees of medium size with dark brown thick bark, deeply furrowed, spreading limbs and cones at maturity, broken at base—belonging to my group of broken-cone pines. The leaves persistent near the ends of the stout branchlets, have the resin ducts near the epidermis and surrounded by strengthening cells—characters pointed out by Dr. Engelmann as distinguishing his group PONDEROSÆ. The leaf-bracts soon reflexed, are $\frac{3}{4}$ of an inch long, lanceolate, acuminate, subulate, with the scarious margin laciniate: leaves in threes (rarely four or five) stout and long, 12 to 16 inches long and $\frac{1}{16}$ of an inch wide, serrulate towards the tip, sheaths an inch or more long, light brown, becoming black with age, the close-wrapped bracts strongly lancinate-fringed; male flowers (as to the Chirricahui specimens) large, $1\frac{1}{2}$ inches long, erect or spreading; involucral scales 8, large and firm; anthers with large, orbicular, crenulate crests (tardily dehiscent at maturity, leaving basal scales) solitary or in whorls of 2 to 6, spreading or slightly declined, ovate or elongated, 4 to 6 inches long, of few or many developed scales, the apophyses usually not prominently elevated, rarely a few near the base (still more rarely all the scales) conical-tuberculate, in which case they are tipped with slender prickles, usually the low quadrangular apophysis is armed with a stout deltoid, erect or spreading, discolored prickle: seeds oval, $\frac{1}{4}$ inch long, prominently ridged on the upper side and conspicuously brown mottled, wing resembling *P. ponderosa*.

Valuable lumber pines of southern Arizona and northern Chihuahua Mountains, reaching 40 to 60 feet in height with a

diameter of 3 to 5 feet, at elevations of 6,000 to 8,000 feet, mostly on northern slopes, usually in sheltered cañons, or contiguous gravelly plains. The young trees develop robust yearling growths $\frac{3}{4}$ to 1 inch thick, recalling this remarkable character of *P. palustris*, the long-leaved pines of the southern states. The trees when crowded trim themselves, affording limbless trunks for lumber purposes, to which use the largest bodies of this pine have already been devoted, yielding a firm yellowish lumber, not unlike *P. ponderosa*.

This species was first detected by Dr. Wislizenus on the Cosiquiriachi Mts., west of Chihuahua, and was described from a single specimen, by Dr. Engelmann in Wislizenus' Mem., p. 103, note 25, (1848) as *Pinus macrophylla*, the characters given (limited to few data) agreeing fairly well with those hereinbefore set forth, except that the cone scales are described as "tuberculo conico," without qualification. Dr. Engelmann states that "the name was changed by Carrière in *Traite Conif.* (l. c.) because it clashed with Lindley's prior name." Specimens collected recently by Mr. Pringle have been determined for him under both names—which cannot be admitted.

Dr. Henry Mayr's pine "detected in 1889 on the southern slope of the Santa Rita Mts., Arizona," and described by Prof. Sargent in *Garden and Forest* (l. c.) I think belongs here, despite the strong cone tubercles and the slender prickles described and figured. Branchlets and cones collected recently by Mr. Brandegee at Dr. Mayr's locality, are precisely similar to ours collected in the Chirricahui and Huachuca Mountains frequently, during the last dozen years, (but hitherto referred to *P. ponderosa*).

Trees at the mouth of several cañons of the Chirricahui Mts., bore small cones, having few large scales with strong, quadrangular, pyramidal umbos, and large deltoid prickles. We found, as we passed into the forest, that these characters graded into larger and longer cones with smaller scales, less elevated apophyses, etc., etc.

One of Mr. Pringle's specimens in the herbarium of Prof.

Greene at Berkeley labeled "*Pinus macrophylla*, Engelm, collected on the Sierra Madre mountains near Chihuahua," bears an elongated, immature, tuberculated cone not much unlike some of ours from the Huachuca Mts., and Prof. Sargent states that his seeds of *latifolia* are "imperfect and probably not fully grown," from which we may suspect that his cone was immature, in which case the shrinkage in drying would aggravate the appearance of "stout, projecting, mammillary umbos."

The localities where this pine has been detected—the Sierra Madre, Chirricahui, Huachuca, and Santa Rita mountains—are quite near each other and similarly environed with gravelly plains, arguing similarity of tree products; and, excepting the aberrant cone characters described, these pines seem identical in all respects.

CORRECTIONS IN NOMENCLATURE.—II.

By EDW. L. GREENE.

UROPAPPUS, Nuttall.

WHEN more than seven years since I sought and seemed to find a more natural and satisfactory classification of certain Californian plants which Asa Gray had confused under the generic name *Microseris*, I erred in taking up for a certain genus the Candollean name *Calais*,¹ instead of UROPAPPUS of Nuttall. The type of *Calais* was proven to be a genuine *Microseris*; and the species on which I sustained *Calais* had been set apart by De Candolle as a subgenus *Calocalais*. A new name should have been sought, therefore, for a group which De Candolle had excluded from his type-section of *Calais*; and such a name, proposed expressly as generic for this group, we have in *Uropappus*. This was published two years later than *Calais*, and the author of it did not know that *Calais* was destined to fall into disuse as being a mere

¹ Bull. Calif. Acad. ii. 48.

synonym of *Microseris*. However, all this having come to pass, the names of the few species need readjustment.

Very unlike *Microseris* in habit, and enjoying at least two good technical characters, namely, the erect heads, and the pappus-bristle inserted in a deep notch at summit of the large palea, *URO-PAPPUS* is as valid a genus as one can wish for in Cichoriaceæ. It is more clearly distinct from *Microseris* than is *Nemoseris* from *Ptiloria*, or even than *Hieracium* from *Crepis*. The species fall into two subgeneric groups by characters of the achene and pappus.

* *Achenes brownish; pappus brownish, persistent.*

1. *U. LINDLEYI* (DC.), Nutt. Trans. Am. Phil. Soc. vii. 425 (1840). *Calais Lindleyi*, DC. Prodr. vii. 85 (1838); Torr & Gray, Fl. ii. 471 (1843), excl. *C. linearifolia*.

2. *U. Clevelandi*. *Calais Clevelandi*, Greene, Bull. Calif. Acad. ii. 153 (1886): *C. Parryi*, Greene, l. c. 49, but not of A. Gray. Probably will include, as an abnormal state, *C. pluriseta*, Greene, Pitt. i. 34.

3. *U. Kelloggii* (Greene, Bull. Calif. Acad. ii, 49 (1886), sub *Calaide*).

4. *U. macrochaetus* (Gray, Pl. Fendl. 112 (1849), sub *Calaide*).

* * *Achenes black; pappus clear white, deciduous.*

5. *U. LINEARIFOLIUS* (DC.), Nutt. Trans. Am. Phil. Soc. vii. 425 (1840), including *U. grandiflorus*, l. c. *Calais linearifolia*, DC. Prodr. vii. 85 (1838).

MALACOTHRIX PARVIFLORA, Benth. Pl. Hartw. 321 (1849): *M. Clevelandi*, Gray, Bot. Calif. i. 433 (1876). From a comparison of the descriptions of Bentham and Gray, there can be no doubt they had the same yellow-flowered plant in view; and the species is even more common and luxuriant in middle California than in San Diego county.

Micrampelis Rusbyi. *M. macrocarpa* (Britt.) Rusby, Mem. Torr. Club. iii. 41 (1893), not of Greene, Fl. Fr. 236 (1891). Dr. Britton who in 1890 proposed an *Echinocystis macrocarpa*, seems entirely to have overlooked my own species of that name which I published as long ago as 1885; and Dr. Rusby has now reiterated the homonym under *Micrampelis*, where also I antedate him.

A NEW FASHION IN WRITING PLANT NAMES.

By EDWARD L. GREENE.

AT last year's meeting of the American Association for the Advancement of Science, a Committee of the Botanical Club of the Association was charged with the very important work of preparing an authentic list of the Flowering Plants and Ferns of North Eastern North America; one of the most commendable movements that could be imagined. The chairman of this committee, Dr. Britton, in a circular newly issued, reports good progress in the undertaking, and substantial agreement as to principles and methods, at the same time asking the opinions of botanists respecting certain matters of "typography." The gentlemen of the committee appear not to be of one mind about the retention of the old usage of beginning certain classes of specific names with a capital letter. It seems to be in reality a question of grammar; and the reason why it is now raised appears to be that we are threatened with a new fashion in botanogramatics. Some members of this committee are in favor inaugurating the system of decapitalizing such specific names as, by the ordinary rules of grammar, are begun with a capital letter, namely, personal, geographical and old-generic specific names.

I do not know why Dr. Britton in his circular should have spoken of this as being "the system employed in most recent American writings," unless he was writing under the influence

of a leaning to the new proposition, and so, unconsciously, somewhat misrepresented the case; for this practice of capitalizing is not peculiar to American writings of recent date, nor, indeed, to American writings at all, as compared with those of other parts of the world botanical. A much fairer statement would have been made had he said, "the system employed in a very great majority of botanical writings in all ages and all countries."

As for my own opinion about the proposal to dispense with initial capitals, I have to say that, while I am not of that conservative temperament which adheres to any method simply and solely because it has been long in vogue and I am habituated to it, I am decidedly averse to change when there is no rational plea to be made in favor of it; and no one, as far as I am informed, has shown or attempted to show cause why we should now cease to write and print geographical and personal adjectives, personal genitives, etc., with the initial capital. If the majority of our botanists are ready to assume that nearly all our fathers of the last four centuries have been very bad grammarians, not knowing the right use of capital letters even, I should say, let them so pronounce, and proceed with their proofs. These being given, and the need of such a reform being demonstrated, I should accede to the new proposition most cordially and at once. But I hold in contempt all mere fashions, whether in science or in letters; and what virile mind does not? And the promoters of mere fashion here, have also a method of procedure to which I am more than averse. Usually when there are no reasons to be given for an innovation, the innovator comes out with a useful book or monograph in which we see his new rule applied; thus he sets an example which a greater or less number of other people will be likely to follow simply because it is a new usage; so very ready are most people to think that whatever is new is better than the old. In about this way have nearly all our American botanists, within three or four years past, come to practice the wholly illogical and indefensible usage of displacing oldest specific names in favor

of earlier names of lower rank, *i. e.*, varietal; and I am not aware that a single line has yet been written in defense of this absurdity. Very likely this same committee upon the new catalogue are at agreement in giving sanction to this usage in their work. It should form a subject of discussion at the coming meeting of the Association; and doubtless it will.

It is well that the chairman of the committee has put forth this circular; but it had been better that it should have contained some statement of the reasons which call, or in the minds of some may seem to call, for decapitalization in the writing of certain names; and in default of any appearance of such reasons, we are fain to think there are none, and that this movement is in the hands of mere fashion-makers. We therefore refrain, at present, from giving our arguments against any change or departure from the accepted usage in name-writing. It lies with the innovating party first to give their reasons for proposing the innovation. Perhaps they may be able to furnish them, and cogent ones; in which case most heartily, as we said before, shall we accede to the new proposition. We only want to be assured that it is not to be a change for the mere sake of change.

SHORT ARTICLES.

ON A VARIETY OF THE WESTERN SUMACH.—Among the low hills beyond the Valley of Berryessa in north-eastern Napa county, especially in the cañons and narrow strips of land bordering arroyos, are great quantities of *Rhus* bushes. For a distance of forty miles I found this Western Sumach to be by far the most prevalent of all shrubs. It was rarely solitary, usually growing in round clumps or sometimes forming rather extensive thickets seventy to one hundred feet in length and often ten feet in height. It is less abundant northward, and in the Vaca Mountains, many miles southward, it is a rare bush barely two feet in height. Everywhere, how-

ever, it exhibits certain marked peculiarities, and a series of specimens enable me to describe it as

RHUS TRILOBATA, Nutt., var. **quinata**. Lateral leaflets broadly ovate or obovate, crenate above or 3-lobed, at base obtuse or cuneate or even strongly oblique; terminal leaflet 3-cleft, -parted or -divided, the terminal division 3-lobed and sparingly crenate, the lateral divisions similar in size and shape to the lateral leaflets—the leaves thus simulating the *quinata*.

The pulp of the viscidly pilose scarlet fruit is thin with longitudinal fibres of a resinous texture, two of these on the edge of the flattened smooth stone are conspicuously free and attached at the summit of the drupe to the epicarp. This character, however, is not peculiar to this variety but is found in various Pacific Coast forms of the species.

W. L. JEPSON.

ALIEN PLANTS IN CALIFORNIA.—It is well known to field botanists in California that many native plants are being slowly crowded out chiefly through the growth of the agricultural and horticultural interests. It is noticeable in the first place in the reduced size of various species as well as fewer individuals. Specimens of *Linanthus androsaceus* are hardly half as large as those collected ten or twenty years ago. And so with many other Polemoniaceæ. Well marked local forms of *Eschscholtzia*, perhaps not even worthy of varietal names so far as classification goes, have been in certain instances entirely driven out.

In this process of extermination of native plants foreign weeds also play a part, for many native annuals are too feeble to resist the hardy invaders. It is true that many immigrant plants, notwithstanding the favorable conditions, do not spread, and a few survive only for a time. It is likewise true that others take absolute possession of large areas. The behavior of foreigners on our soil should in all cases be carefully observed and will form a distinct contribution to the botanical history of the State. The possibilities of further

additions to our flora, so far as soil and climate go, are almost unlimited.

The following notes were made principally during July and August, 1892. Several of the species are for the first time recorded as occurring in middle California or on the Pacific Coast of North America.

Melilotus alba, Lam. grows in Big Valley, Lake County, and also near Ukiah. It reaches a height of twelve feet in moist lowlands. *Roubieva multifida* (Linn.) Moq. is naturalized in the town of Vacaville. It also grows abundantly in certain places on the sand hills of San Francisco. *Phytolacca decandra*, Linn., the Common Poke or Pigeon Berry of the eastern and southern United States, I found in August, 1892, on the Blue Lakes grade to Ukiah. *Coronopus didymus* (Linn.) Smith, has established itself in the grainfields of the Montezuma Hills near Bird's Landing. It has not been hitherto reported from the interior. Near Fairfield, Solano County, *Scabiosa atropurpurea*, Linn., the Sweet Scabious of the gardens, has become spontaneous in uncultivated places. I also found it near the Montezuma school in the same county, and it is common in the streets of Berkeley and probably in many other towns.

In 1886, Professor Greene detected near Vacaville one of the Old World Star-Thistles, *Centaurea Calcitrapa*, Linn. It has since spread a short distance along country roads and over uncultivated plots of ground. It is not known from any other station in North America except as a ballast-weed at Atlantic sea-ports. Associated with it is *Centaurea solstitialis*, Linn., previously known from various localities southwards. In the same region also is *Lactuca Scariola*, Linn., not infrequent by roadways. I first saw it four years ago, and it has been reported since from towns near the Bay of San Francisco. *Artemisia biennis*, Willd., is thoroughly established at West Berkeley near the Powder Works.

In August, 1892, I found *Datura Stramonium*, Linn., near a deserted saw-mill on Elk Mountain, Lake County, at an elevation of at least three thousand feet. *Verbascum Blattaria*,

Linn., was discovered near Upper Lake in the same region and at the same date as the preceding. This is the first note of its introduction on this coast. *Veronica agrestis*, Linn., is occasional in orchards near Vacaville as an escape from gardens. *Mentha viridis*, Linn., is plentiful in Scott Valley, Lake County, and in Napa Valley. It is common in many portions of the State. *Nepeta Cataria*, Linn., is abundant along streams in Lake County and also about dwellings in the mountains of the same region.

W. L. JEPSON.

HABITAT OF *CARDUUS EDULIS*.—There are writers at the East who handle quite too lightly the names of western plants. In the May issue of *Meehan's Monthly*, for example, the editor speaking of an edible thistle occurring in the Rocky Mountains of Colorado, says Dr. Gray named it *Cnicus edulis*; and the same statement was reiterated in *Garden and Forest* a week or two later. There is no thistle either in Colorado or within seven or eight hundred miles of there which Dr. Gray or any other botanist ever called by the specific name *edulis*. Doubtless many wild thistle are edible; but *Carduus edulis* has never been found in any part of the Rocky Mountain region; and a glance at the nomenclature of species of thistle in the Synoptical Flora would have shown to either of our eastern colleagues that *Carduus edulis* belongs exclusively to the Pacific Coast not far inland.

EDW. L. GREENE.

ANOTHER BAD GUESS AT A NAME.—In last December's issue of his *Monthly*, Mr. Meehan attempts to give to a New Mexican correspondent the botanical name of a plant well known in that region for its use in the process of tanning leather. He ventures to guess that it is a certain chestnut tree, native of California, which is named *Castanea chrysophylla*. This tree not only does not grow in New Mexico, but will not be found within more than a thousand miles of that territory; and the tanning plant, of which Mr. Meehan's correspondent enquires the name, is simply a wild species of dock, namely *Rumex hymenosepalus*. Our friend in Philadelphia is well

known as a botanist; and it is also observed that he is impatient of the action of those who would have a correct and lawful plant nomenclature. Perhaps some reason for his opposition to accuracy in naming things botanical may by and by begin to be obvious.

EDW. L. GREENE.

NOTE ON *SEDUM RADIATUM*.—The account given in the April number of *ERYTHEA* of the small annual *Sedum* found on Mt. Hamilton, and referred to *S. radiatum*, leads me to suspect that it is not of that species. My observations upon the Oregonian plant upon which Dr. Watson founded the species have taught me not that it bears “leafy bulblets in the axils of the lower leaves,” but that it puts out stolons which have bulblets at their apex. They are produced in the fall, after the first rains; and these having attained some size the parent stock dies. This is a very different life history and mode of propagation from that attributed to the Californian plant at page 85 of this volume.

THOMAS HOWELL.

A SECOND SPECIES OF THE GENUS *RAMONA*.—That pretty Californian labiate which Mr. Bentham named *Audibertia humilis*, and which I, in the second volume of *Pittonia*, transferred to *Salvia* (along with most of the species of Bentham’s *Audibertia* No. 2), now flowering in the garden of the University, has quite surprised me by displaying the corolla not of a *Salvia* at all, but of my genus *Ramona*; it must therefore take the name *Ramona humilis*.

EDW. L. GREENE.

BUFFALO AND PLANT DISTRIBUTION.—In confirmation of the merited censure of Mr. Berthoud’s paper I have to say that *Phus glabra* is plentiful in parts of British America, which the buffalo never reached. It is also a fact that *Opuntia Missouriensis* as inhabiting the Lake of the Woods (Winnipeg) district, is found only on islands in that lake, to which places the buffalo never came. I took Mr. Berthoud’s “*Martynia*” to be nothing more nor less than *Xanthium Canadense*, which grows in abundance throughout the buffalo region.

JOHN MACOUN.

NEW CALIFORNIAN FUNGI.

By J. B. ELLIS AND B. M. EVERHART.

Dimerosporium echinatum, E. & E.

On living leaves of *Quercus chrysolepis*, Jackson, Amador Co., Calif., Coll. Geo. Hansen, com. Marshall A. Howe.

Epiphyllous, forming dense orbicular patches 3 to 4 mm. diam., made up of the densely crowded, bristly, black, ovate perithecia, 200 to 300 μ diam., arising from a scanty, sparingly branched, septate, creeping mycelium, and thickly clothed with opaque, black bristles 70 to 110 μ long, 5 to 7 μ thick at the base. Asci clavate-cylindrical, short-stipitate, paraphysate, 8-spored, p. sp. 50 to 55 x 15 μ . Sporidia mostly biseriate, ovate, uniseptate and slightly constricted, yellow, 12 to 15 x 6 to 7 μ .

The perithecia are soon broadly perforated above, and the orbicular patches which they form often cover the entire surface of the leaf.

Metasphaeria Ilicis, E. & E.

On dead and living leaves of *Ilex Aquifolium*, Berkeley, Calif., March, 1893, W. C. Blasdale No. 86.

Epiphyllous. On the living leaves the perithecia are thickly scattered on large (1 cm.), white (reddish-brown below) orbicular spots with a narrow reddish-brown border, but on the dead leaves they are spread evenly over the whole surface of the leaf, not in spots. Perithecia globose, about $\frac{1}{2}$ diam., the apex strongly erumpent and covered by the mostly stellately cleft epidermis, above which the papilliform ostiolum scarcely projects. Asci oblong, abruptly contracted at base into a short nodular stipe, mostly narrower above. Paraphyses stout, septate below, attenuate above, but slightly enlarged at the tip. Sporidia biseriate, clavate-oblong, about 4-septate, strongly constricted at the second septum, but not at the others, hyaline, straight, obtuse, narrower below, 15 to 27 x 6 to 7 μ (mostly not over 20 μ long).

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Eutypella aesculina, E. & E.

Perithecia subcircinate, 3 to 8 together globose, $\frac{1}{2}$ mm. diam., with thick, coriaceous walls, black and shining within, buried in the inner bark which is more or less blackened, but without any distinct circumscribing line, their bases slightly penetrating the wood which is not discolored. Ostiola short-cylindrical or clavate-cylindrical, faintly sulcate or often smooth, united in a dirty black disk erumpent through the epidermis which is scarcely raised. Asci (p. sp.) clavate, $20 \times 4 \mu$, 8-spored, with a slender base, and indistinctly paraphysate. Sporidia biseriate above, allantoid, hyaline (slightly yellowish in the mass), $3\frac{1}{2}$ to $4\frac{1}{2} \times 1\frac{1}{4} \mu$, moderately curved. On dead limbs of *Aesculus Californica*, California, W. C. Blasdale.

Pseudovalsa subrufa, E. & E.

On dead limbs of *Rhus* sp., Berkeley, Calif., Feb. 1893, W. C. Blasdale No. 62.

Stromata plano-convex, $1\frac{1}{2}$ to 2 mm. diam., the base lightly penetrating the inner bark, evenly scattered. Perithecia 6 to 10 in a stroma, closely packed, dark brown, thick walled, about $\frac{1}{2}$ mm. diam., the inner cavity 300 to 400 μ diam., covered above by the reddish substance of the stroma, contracted into slender, converging necks terminating in the large ($\frac{1}{2}$ mm.), subglobose, irregularly perforated, reddish-brown ostiola united in a compact cluster erumpent through the closely embracing epidermis. Asci clavate-cylindrical, 75 to $85 \times 7 \mu$, paraphysate, 8-spored, sessile. Sporidia uniseriate, oblong, 3-septate, scarcely or only slightly constricted, brown, 12 to 15×4 to 5μ .

The reddish tint of the ostiola and of the inner substance of the stroma is very distinct at first but finally becomes more obscure.

Phyllosticta agrifolia, E. & E.

On leaves of *Quercus agrifolia*, Berkeley, Calif., W. C. Blasdale No. 107.

Spots terminal or marginal, rusty brown, with a narrow, reddish border, sometimes none, the entire leaf being dead and dry. Prithecia amphigenous, subglobose, perforated above, 150 to 200 μ diam., semierumpent but loosely covered by the upraised edges of the ruptured and whitened epidermis. Sporules oblong, hyaline, continuous, 6 to 8 x $2\frac{1}{2}$ to 3 μ .

Closely allied to *Ph. Quercus*, Saccardo, but in that species (sec. spec. in Rab. F. Eur. 2896) the spots are obicular and paler, with a narrow raised margin, and the perithecia slightly prominent are closely covered by the epidermis which is not ruptured. The sporules are about the same in both. The Calif. specimens are accompanied by *Pestalozzia Monochaeta*, Desm. on the same leaves.

Cercospora Hanseni, E. & E.

On leaves of *Asclepias ecornuta*, Kell., at Jackson, Amador Co., Calif., Coll. Geo. Hansen, com. Marshall A. Howe.

Amphigenous tufts thickly scattered over dark, dull brown spots 3 to 4 mm. diam., and also more extensively over adjacent green parts of the leaf. Hyphæ short (10 to 15 x 5 to 6 μ), simple, olivaceous, obtuse, continuous, often thickened at the apex, arising from a small globose stromatic base. Conidia cylindrical, olivaceous, 1-to 4-septate, 30 to 50 x 4 to 5 μ , ends obtuse.

NOVITATES OCCIDENTALES.—IV.

By EDW. L. GREENE.

Streptanthus suffrutescens. Allied to *S. tortuosus* but perennial and suffrutescens, the stout caudex-like very leafy trunk 6 or 8 inches high, this parting into several flowering branches 1 or 2 feet long; whole herbage glabrous, light-green, very glaucous: cauline leaves 2 inches long, cuneate-obovate tapering to a somewhat winged petiole, the leaf-margin coarsely and not deeply serrate-toothed, the apex

very obtuse; those of the lower portion of the flowering branches linear-oblong, serrate above the middle, entire below and at the sagittate-clasping base; uppermost and floral leaves round-cordate or more elongated, remotely denticulate, obtuse: sepals purplish-green, subequal, their tips neither acuminate nor reflexed, though spreading: one pair of filaments connate, but all 4 anthers equal and fertile: pod recurved, barely 2 inches long.

A remarkable species, found on Hood's Peak, Sonoma Co., Calif., by Mr. Bioletti.

Cardamine pulcherrima. Slender, 5 or 6 inches high from a rather slender horizontal rhizome; herbage glabrous, rather succulent; radical leaf solitary, palmately 3 to 5-lobed-parted or -divided, the lobes or divisions quite entire; the cauline leaf also solitary, situated very near the inflorescence, digitately 3 to 5-parted into oblong-linear or lanceolate segments an inch long more or less: raceme short, few-flowered: petals nearly $\frac{3}{4}$ inch long, of a rich lilac-purple, with manifest veins of dark-purple: pod unknown.

In eastern Oregon, near Mosier, 9 April, 1893, Thomas Howell. A most beautiful plant, and the only known species of the far West to display the proper rhizome of a genuine *Dentaria*.

Cardamine sinuata. Perennial, tuberous-rooted, the sparingly leafy stem 10 to 14 inches high: radical leaf simple, from round-reniform to almost orbicular, cordate at base, 2 or 3 inches broad, sinuately lobed, the 9 to 15 lobes obtuse or almost truncate, conspicuously mucronate; cauline leaves 2 or 3, divided into 3 to 5 more or less cuneate leaflets which are lobed or coarsely toothed at apex: raceme lax, few-flowered: corolla large, rose-purple: pods (immature) $1\frac{1}{2}$ inches long, conspicuously rostrate.

Redwoods near Crescent City, in the extreme northwest of California, April, 1892, Thomas Howell.

Sidalcea parviflora. Stoutish, erect, 2 to 4 feet high, nearly glabrous, only the stem a little glaucescent and with a

few apparently simple hairs, the foliage beneath, and also the calyx, more densely short-pubescent: racemes few, paniculately disposed: calyx segments acute or almost acuminate: petals very small ($\frac{1}{4}$ to $\frac{1}{3}$ inch long), rose-color, round-ovate, erose at summit but neither emarginate nor even truncate: achenes rather notably angular but smooth.

In brackish or sub-alkaline marshes of Los Angeles and San Bernardino Counties, California; collected by Dr. Hasse at Santa Monica, and by Mr. Parish near San Bernardino (n. 2080); nearly allied to that easterly Rocky Mountain and Mexican species, *S. malvæflora*, to which, indeed, I had referred Mr. Parish's specimen, though Dr. Gray had more unaccountably named it in Mr. Parish's herbarium "*S. glaucescens*, Greene," to which sub-alpine and northern species it is not near of kin.

Ceanothus pumilus. A rigid depressed much branched evergreen undershrub, the branches often rooting at the joints and from a few inches to a foot or more in length: leaves opposite, very small (3 to 5 lines long), rigidly coriaceous, glabrous above, very minutely white-tomentose between the veins beneath, entire except at the usually 3-toothed apex, the general outline from oblanceolate to obovate-oblong: flowers in numerous sessile umbels, rather pale blue: fruit unknown.

On hillsides near Waldo, Oregon, April, 1892, Thomas Howell.

Eriophyllum speciosum. Suffrutescent and very leafy proper stem strictly erect, soon dividing into numerous erect, subequal, long pedunculiform monocephalous branches; herbage in no part either white or hoary, but branches and lower face of leaves canescent with a sparse arachnoid, or more dense and somewhat floccose pubescence; surface of the leaves glabrate and green even when young: leaf-texture soft (not at all coriaceous): leaves 2 or 3 inches long, linear-lanceolate, acute, entire, or the largest with a few coarse teeth of lobes: peduncles a foot long: involucre short-cam-

panulate, of 12 to 15 distinct coriaceous oblong-ovate acute bracts with recurved tips: receptacle strongly convex: rays 12 to 15, linear-oblong, more than $\frac{1}{2}$ inch long sharply 2 or 3-toothed at apex: disk-corollas with narrow and nearly cylindrical 5-toothed limb twice the length of the short pubescent tube: achenes sharply 4-angled, appressed-pilose; pappus conspicuous, of about 5 linear-oblong and as many narrower and much longer paleæ, all laciniate or serrate-toothed at least at summit.

Foothills of the Sierra Nevada, in Amador Co., Calif., Geo. Hansen.

Erigeron Heleniastrum. Perennial, the crown of the root sending forth occasional leafy runners, and one or more monocephalous sparingly leafy and scape-like stems a foot high, with weak decumbent base; herbage minutely glandular (the stem at least), and roughish with a short spreading pubescence: radical leaves 2 or 3 inches long, oblong-lanceolate, short-petioled; cauline broadly lanceolate, sessile, all entire, abruptly acute: heads $\frac{3}{4}$ inch high, $1\frac{1}{2}$ inches broad; narrowly linear and slenderly acuminate brownish-tipped involucre bracts very numerous, subequal, pilose-hispid: rays 40 to 50, golden-yellow, more than $\frac{1}{2}$ inch long, about $\frac{3}{4}$ line wide, abruptly notched at summit: achenes pubescent; pappus-bristles rather few, very slender and fragile: style-tips short-conical, obtuse.

Nevada de Toluca, Mexico, along streams at 12,000 ft. altitude, C. G. Pringle, n. 4239; distributed as a variety of *Aplopappus stolonifer*, DC., which it may well be, but it is manifestly another yellow-flowered *Erigeron*, allied to *E. aureus* of British Columbian high mountains.

Eupatorium Robinsonianum. Shrubby, slender, with numerous leafy and minutely pubescent flowering branchlets: leaves opposite, deltoid-ovate, an inch or more in length, serrate-toothed: corymbs small, terminal, sessile: involucre short-campanulate, 10 to 15-flowered, its bracts 10 or 12, oblong-linear, subequal: corollas pure white, the slender tube

exceeding the bracts of the involucre and nearly as long as the broadish and relatively short limb: achenes small (barely a line long); pappus-bristles few, very slender, fragile or deciduous.

Common in certain districts of middle Mexico; Pringle's n. 4353 from Jalisco, etc., distributed as a variety of *E. occidentale*, from which it differs not only in habit, style of inflorescence, and color of flowers, but in the relative proportions of the tube and limb of the corolla, and in good characters of achene and pappus. We take pleasure in dedicating it to one of the more recent contributors to Mexican phytography, Dr. B. L. Robinson.

Apocynum floribundum. Glabrous, pallid and glaucous, 2 feet high, with numerous ascending and somewhat fastigate branches rising to about the same level, each ending in a cyme: leaves about 2 inches long, from ovate to elliptical, mucronate, the margins sparsely serrulate-scabrous: cymes not dense, many-flowered, erect: corollas erect, lurid-purplish, nearly cylindrical, the lobes erect, or only a little spreading.

Dry ground bordering pine woods, in the higher mountains west of the Mohave Desert, in Kern Co., Calif., 1889. Nearest *A. cannabinum*, but of very different habit; the fastigate branches, each with its own many-flowered cyme, uniting to form a compound corymb often a foot broad. *A. cannabinum*, common in many parts of California, was found in wet ground by streamlets, in the same region, and true to its character, the dense terminal cyme of small greenish flowers, being greatly surpassed by those of the single pair of lateral branches.

Asclepias tithymaloides. Suffrutescent, slender, 2 feet high, very light green, glabrous, the leafy branchlets with very short internodes: leaves opposite, divaricately spreading, 2 inches long or more, short-petioled, narrowly linear, tapering to each end, scarcely more than a line wide: umbels loose, 3 to 10-flowered, on peduncles less than an inch long; the pedicels as long: corolla greenish white, the lanceolate-

oblong lobes $\frac{1}{3}$ inch long; hoods clear white, sub-cylindrical, little exceeding the anthers, the broad and elongated ensiform horn adherent to the hood and long exerted, nearly straight: anthers dark-purple.

Dry limestone ledges near Los Palmas, San Luis Potosi, Mexico, C. G. Pringle, n. 3786.

Muilla serotina. Leaves 12 to 16 inches long, subterete, the upper surface nearly plane (slightly concave), the lower convex and sharply 7-striate, the keel-like raised striæ retrorsely scabrous: scapes 14 to 20 inches high, glabrous, glaucous: umbel 40 to 70-flowered; pedicels nearly 2 inches long: perianth rotate, $\frac{1}{2}$ inch broad, greenish white; sepals oblong-linear, petals oblong: filaments stout-subulate, little compressed; anthers $\frac{1}{2}$ line long, lurid purple.

Common among the mountains in the interior of southern California; much larger than the seaboard species (*M. maritima*), and with very different foliage. Under cultivation at Berkeley, where we have grown it for three seasons past, it flowers in June and July; *M. maritima* in March and April.

CALOCHORTUS ALBUS var. (?) **rubellus.** Tall, slender, few-flowered; the perianth rose-color, more elongated and comparatively narrower than in the type, the transverse lunate gland farther from the base of the petal (well towards the middle of it) and broader, *i. e.*, not as thin-crescent-shaped: filaments nearly linear, fully three-fourths the length of the ovary; anthers surpassing even the stigmas, and of a clear yellow.

A remarkable variety, or subspecies, of which I had heard rumors, but the first specimens of which are now brought to me from Pacific Grove, Monterey Co., Calif., by Mr. Ivar Tidestrom. A point of divergence from *C. albus* more striking than even the form and color of the petals is that which the stamens exhibit; for in the old species the filaments are subulate, not more than half as long as the ovary, and the anthers and pollen are pure white. It may therefore

very likely prove quite distinct. With *C. amœnus* it need not be compared, for that has a floral structure of another kind altogether, so that with *C. albus* no botanist can confound it, even as a variety.

Fritillaria glauca. About 6 or 8 inches high; leaves 2 to 4 alternate, oblong-lanceolate, and, with the stem, very glaucous: flowers 1 or 2, of a very broad open-campanulate figure, greenish or purplish, the segments about 1 inch long: anthers oblong, yellow, about equalling the pistil.

Near Waldo, Oregon, 26 April, 1892, Thomas Howell.

NEW STATION FOR NOTHOLÆNA TENERA.

By S. B. PARISH.

Although nearly twenty years have passed since this fern was first found in North America, it still remains one of our rarest species. Its discoverer was Dr. C. C. Parry, who, while botanically exploring the little known region of Southern Utah in 1874, found it growing on the face of limestone cliffs in a deep cañon of the Beaver Dam Mountains. Dr. Parry published an account of his explorations in the *American Naturalist* for 1875, in a series of five papers, and in the concluding one this fern has its first record.¹ As it is one of the few plants without a number, it was probably not collected in sufficient quantity for general distribution.

Eight years later, in the Spring of 1882, the writer collected it in two cañons near Cushenberry Springs, leading up from the Mojave Desert into the San Bernardino Mountains. In both instances it was growing in the seams of dry perpendicular rocks. In one, the Cushenberry cañon itself, but a single plant was observed, the gathering of which it is to be feared was an act of extermination, no more being found on several subsequent visits. In a nameless cañon a few miles west, the plants filled a crevice less than a foot long, and as

¹Am. Natural. ix, 351.

part of them were left undisturbed, they doubtless still continue to grow there, but the place has not been re-visited.

It was next heard of in 1886, when Mr. John Spence collected a few fronds in the high mountain region of Santa Barbara County, one of these being brought to the notice of Dr. L. G. Yates was identified and recorded by him.¹ The rest are in the herbarium of Prof. Eaton.

To these stations I am now able to add a fourth, having received specimens collected in May of the present year by Dr. Anstruther Davidson near Palm Springs, on the Colorado Desert. This is the place formerly known as Agua Caliente, and is situated at the eastern base of San Jacinto Mountain. It has often been visited by other botanists, who have brought thence many new or rare plants; but Dr. Davidson's discovery is evidence that it still has rewards for a close observer. Dr. Davidson reports it as growing in "fair abundance" on the sides of a cañon making up into the San Jacinto Mountain. His specimens are larger than those heretofore reported, the fronds being from three to six inches high.

It is to be regretted that no particulars are obtainable concerning the Santa Barbara Station, as it is out of harmony with the others both topographically and geographically. The others are all in the lower parts of cañons bordering on the desert, and it is in similar situations of that arid region that future explorations may be expected to add to the small number of places in which it has been found, and the paucity of its growth indicate, that so far as its North American habitat is concerned, it is a species approaching its extinction. Beyond our limits it is known only in Chili and Bolivia, so that it is one of that small but interesting group of plants which connect the North Pacific flora with that of the corresponding latitudes south of the equator.

¹Bot. Gaz. ix, 181.

REMARKS ON THE GENOA CONGRESS.

By DR. OTTO KUNTZE.

I have lately finished and given to the printer a review of fifty-eight different papers upon botanical nomenclature that were published between December, 1891, and April, 1893; most of these having been elicited by my work entitled, *Revisio Generum Plantarum*. The making of certain lists, and the gathering in and arranging of statistics that were necessary, in order that I might show clearly the errors and absurdities in which Professor Ascherson and the Genoa Congress had involved themselves, exacted more labor and consumed more time than I had calculated upon, so that I shall not now be able to prepare that elaborate critique which I had promised should be laid before the International Committee at the end of June; I therefore offer to Americans, through the pages of *ERYTHEA*, a brief syllabus of leading exceptions that are to be taken to the doings of the Genoa Congress of last year. But first of all I have a comment to make upon Professor Ascherson's use of his office as chairman to the Committee. In official documents he has taken the liberty of interpolating many things foreign to the business of the Committee. The members of the Committee certainly are a corona of high authorities in descriptive botany, and the arguments and the opinions of them all are desirable. They will help the next Congress to fulfill its functions, and perhaps to bring order and harmony out of the present confused and unsettled state of affairs respecting nomenclature. But the Congress elected its Committee for the express work of dealing with number IV. of the Berlin Theses, and gave neither its chairman, nor any member, instructions to take up other matters officially.

In a future paper I intend to propose some additions to the Paris Code. For the present I offer a few lines on the mistakes of the Genoa Congress, in order that the one about to be convened in the United States of America may avoid a repetition of them.

The resolutions of the Genoa Congress must fail to obtain the force of international laws, by reason of—

- I. Four illegalities in its organization and methods of procedure.
 - (1.) The Congress, consisting as it did of sixty Italians and only forty men from other countries, lowered itself from an international to a local one by adopting the Italian language, which is not international.
 - (2.) The Congress conceded the privilege of voting to members of the Italian Botanical Society, who were guests in attendance, not members of the Congress.
 - (3.) Neither by any previous Congress, nor by any programme of its own, was the Genoa Congress convoked in legislative session for the purpose of altering the Paris Code.
 - (4.) There was no committee appointed beforehand charged with investigating and deliberating upon the law propositions that might be involved. Through having neglected this precaution, the Congress evinced *ignorantia rerum* in two cases: (a) the amendment proposed by Prof. Prantl, and adopted by the Congress, being founded on a mistake respecting Adanson, against whose genera it was aimed; for Adanson did not reject binary names, but only wished that all specific names might be proper names: (b) in proposing to relegate "useless synonyms" to the category of *nomina nuda*, the Congress proved that it did not know what *nomina nuda* are; it being once established that certain names are synonyms, it becomes at once impossible that any Congress should alter their status, or change them into *nomina nuda* or *seminuda*.

II. Three absurdities, by which the resolutions which they affect, become illegal and impracticable.

- (5.) The Congress made two additions to the Paris Code in the Italian language, which code has never been officially edited in Italian.
- (6.) A manifest *ignorantia legis*; its Resolution I. being unrecognized as an alteration of Paris Code § 15; its Resolution II., a similarly unperceived alteration of §§ 42 and 46 of that code; its Resolution III. was not seen to be subversive of § 66.
- (7.) The Congress changed Berlin Thesis III. so as to have genera and species begin with Linnæus' *Species Plantarum* of 1753, in which book all the genera and two hundred and fifty of the species appear as *nomina seminuda*; then the Congress proceeded to condemn (Resolution II.) all such names; so that the second resolution annuls the first.

III. *Violatio juris quæsitæ*.

- (8.) For instance: I worked out a complete system of nomenclature according to the Paris Code, not making one mistake through a wrong principle; and now a large percentage ($\frac{1}{8}$) of my legally corrected names, the fruit of many years labor and great expense can not be set aside by another Congress, at least, without my consent; for new alterations of a code can never obtain retroactive force.
- (9.) Finally; I must accuse the Genoa Congress as having been superficial and negligent in its procedures. A duly organized and competent Congress would have felt the necessity of taking into consideration, before altering the old code, all earlier proposed amendments, those suggested by De Candolle, by myself and others, and not alone the four latest and most revolutionary Berlin Theses.

OPEN LETTERS.

Mentzelia affinis as a field weed.

I send by to-day's mail a plant (*Mentzelia*, I think) which bids fair to become the worst weed ever known here. It made its first appearance in 1889; but scarcely a dozen plants were then observed in all the region. This year it has choked out and ruined the wheat crop in some places. What is it? Where does it come from? Is it elsewhere known as the terrible pest which it threatens to become in our section?—W. A. SANDERS, Sanders, Calif.

[The specimen sent is not only a *Mentzelia*, but represents a species of southern California which has not long been known to botanists, namely, *M. affinis*, Greene. Mr. Sanders' specimen measures full three feet in height; a size considerably exceeding that which I had attributed to the plant when publishing its character. It is not the only instance in which a native plant, finding the grain fields congenial ground, has become a troublesome weed.—E. L. G.]

Botanical excursion to Mount Gavilan.

I have recently made an excursion of one day to Mt. Gavilan, or Fremont's Peak. The field is not a rich one; and botanically the trip was rather disappointing.

Mt. Gavilan is a ridge about three miles in length, running due east and west, and quite distinct from that section of the Coast Range called the Santa Cruz Mountains. The ridge is surmounted by a series of peaks of igneous rock. The most easterly peak is the highest. The region is almost bare of trees and bushes, except as to the spurs and cañons at the base of the range. It has long been severely pastured down by cattle, even to the very summit of the peak. *Erodium*, and certain common barnyard weeds were, however, quite abundant. *Ranunculus*, dodecatheons and violets were the prevailing flowers. The northward slope of the ridge is more abrupt; and on this side of some of the peaks

there is a considerable growth of oak, buckeye, elder and poison oak. It was here that I found No. 1 of the collection lately sent.¹ It grew in loose mould, and was fairly abundant.

To the east of the peak are woods of oak and conifers; but I did not have time to explore these.

The prospect from Mt. Gavilan is magnificent. I saw the sun go down and the moon rise. At my feet, spread like a picture around me, lay three mountain ranges and as many valleys, two rivers running into the sea, nine towns, and the grand sweep of Monterey Bay.—L. W. CUSHMAN, Watsonville, California, 3 April, 1893.

Extended range of *Quercus densiflora*.

Doubtless you will have received the specimens and postcard which I sent you nearly two weeks ago, and I will now proceed to relate the circumstances of the discovery. I had then just returned from a holiday visit to friends living in the Tajeques Cañon, thirty miles west of Santa Barbara, and ten miles east of the Gaviota Pass, as the road runs. Back of this cañon is a marked depression in the summit of the Santa Ynez Range, extending some three or four miles east and west, with an elevation varying from about 2,000 to 2,300 feet, as measured by my aneroid barometer. This summit, like the San Marcos Pass of similar altitude nearer Santa Barbara, although generally covered with brushwood, is dotted with grassy openings, many of which embrace small groves, and also scattered trees, of live-oak and madroña. On a tramp to this part of the mountains, on the 30th of May, just over the summit, on the northerly declivity, I was surprised to find numerous specimens, both large and small, growing singly and in groves, of a tree which I readily identified in your delightful book on "West American Oaks," as *Quercus densiflora*; and I sent you the specimen, thinking you might be interested to know that the tree grows at least a hundred and fifty miles further south than the Santa

¹ISOPYRUM OCCIDENTALE COLORATUM, published at page 125 preceding.

Lucia Range, which you mention as probably being about the southerly limit of the species.

The larger trees, usually growing singly, were very stately in appearance, and some were fully three feet in diameter and sixty or seventy feet high at the least. These large trees are commonly encircled, beyond the spread of their branches, by a thick growth of small ones, seeming as if they might have sprung from the roots of the parent.—BARCLAY HAZARD, Santa Barbara, Calif., 13 June, 1893.

MISCELLANEOUS NOTES AND NEWS.

MR. JOHN MACOUN is devoting the season of 1893 to the botany of Vancouver Island.

MESSRS. SANDBERG and LEIBERG are at present engaged in botanical exploration on the Columbia plains. The late summer and early autumn they expect to give to the eastern slope of the Cascades and the desert plains beyond. The gentlemen are at work under the auspices of the Department of Agriculture at Washington.

MR. B. DAYDON JACKSON, in the latest issue of the *Bulletin de l'Herbier Boissier*, has given a valuable contribution to botanical bibliography in a list of dates of publication of the various parts of the second volume of Hooker's *Flora Boreali-Americana*. The dates are taken from a copy in the Library of the British Museum, as those when the parts were received by the Principal Librarian, and denoted by stamping. They are so important as to need reprinting for the use of American students and critics, and read as follows:

- Part 7, pp. 1-48 in 1834.
- “ 8, “ 49-96, July, 1838.
- “ 9, “ 97-144, “ “
- “ 10, “ 145-192, Jan. 1, 1839.
- “ 11, “ 193-241, Nov. 15, 1839.
- “ 12, “ 242 to end, July 8, 1840.

THE REDWOOD IN THE OAKLAND HILLS.

By WILLIAM P. GIBBONS, M. D.

The habitat of the Coast Redwood, *Sequoia sempervirens*, extends from southern Oregon to near San Luis Obispo, California, a distance of some five hundred miles, more or less, and in the Coast Range proper. In the inner, or Mt. Diablo Range, it does not grow. The only exception to this rule is found just opposite to where the Coast Range proper is interrupted by the Golden Gate, or entrance to that inland sea called San Francisco Bay. At this point, the Oakland Hills, being exposed immediately to the influences of the sea-winds and fogs, bear—or at least once bore—a group of redwood trees about five miles square. This group is entirely isolated from the great body of redwood forest by a distance of about twenty-five miles in either direction. This isolated group at one time included some of the most gigantic trees of the species. But for the sad havoc wrought there forty years ago by lumbermen and wood choppers, these Oakland Hills at the point indicated might still have presented one of the noblest natural parks conceivable. But in the days of the early settlement of California by the American people, large draughts were made upon this forest for building, and other mechanical purposes, as well as for firewood; and these processes went on until this isolated redwood forest was almost obliterated. But many smaller trees survive; and a goodly growth of young specimens have now for some years past been rehabilitating in a small way these once devastated slopes.

A history of these sequoias must needs be introduced by some suggestions of the topography and soils of the region.

An extensive plain lies to the west of the Oakland Hills, forming the valley of San Francisco Bay, which, on an average, is barely above high water mark. The soil of this plain is nearly homogeneous, and consists of what is commonly called adobe, the product of the decomposition of

certain kinds of rock. The different stages of decomposition from the solid rock to well formed adobe may be seen near the summit of the hills, where the county road crosses them, to the eastward of the Institution for the blind and deaf-mute.

This rock has undergone many vicissitudes since its early day. Allied to the hornblende series, and in geological terminology called serpentine, it occurs in these hills under a variety of forms as modified by heat, pressure and glacial action. The large proportion of magnesia which it contains renders it of a greasy texture easily polished. Several modifications of this rock appear largely in mass along and near the summit of the hills. Alternating with this, to the south-eastward of the redwood, is a compact hard metamorphic blue rock containing sulphate of iron. This rock is much used in macadamizing streets. Immediately to the eastward of this, on the northern slope of the range, it is exceedingly compact and exhibits crystals of calcium. Then to the south-eastward again, about a mile beyond Mills' College, is a large hill of jasper, beyond which there crops out a metamorphic rock, fragments of which are scattered over a large area.

Such is a very general and imperfect account—imperfect because so general—of the locality on which this singular portion of the redwood belt has retained a foothold. Perhaps it would be more in consonance with its history to speak of it as having survived the exterminating casualties which have interrupted the continuity of the forest to the northward and southward from this point.

One particular portion of this redwood tract under discussion lies just below and to the westward of the highest point of the Oakland Hills. It occupies a small depression in the hill somewhat resembling a moraine, about two acres in extent. In this small area, on my first visit to the locality, which was in 1855, there were about a hundred and fifty stumps of redwood, the great majority of which were from twelve to twenty feet in diameter, the trees having been cut from one to eight feet above the surface of the ground. One

stump, located on the hillside, two feet high on the upper side and eight on the lower, measured twenty-one feet across without the bark, this having been stripped off; and the bark would have increased this diameter to twenty-two feet and a half. The most remarkable thing in this group consisted of the united stumps of three trees which had grown from their youth in such close proximity that their trunks had coalesced, so as to give the appearance of one enormous tree whose trunk presented below, a body of solid wood fifty-seven feet in diameter. The places of coalescence were traceable, so that the separate factors entering into this triple trunk could be measured, their diameters being respectively eighteen, twenty-one, and eighteen feet. A very reasonable and moderate estimate of the stature of these trees when standing would make them three hundred feet high. The writer has seen a Sugar Pine (*Pinus Lambertiana*) twelve feet in diameter the height of which was three hundred feet; and another eight feet thick, the measurement of which when felled was something over three hundred feet.

The phenomenon of a lateral coalescence in the trunks of trees standing in close contact, though rarely mentioned, is perhaps not so very uncommon. I am familiar with a pair of spruce trees in an Oregon forest whose trunks, each about twelve feet in thickness, are firmly coalescent for about twelve feet from the ground upward, where they separate and present two symmetrical shafts, neither of which can be estimated at less than three hundred feet. At a meeting of the California Academy of Sciences on July 1st, 1867, I read a paper on the redwoods, in which, reference was made to this connate growth. In the course of a discussion which ensued, Mr. R. E. C. Stearns mentioned that in Del Norte County, on coming into a redwood forest, he had observed quite a number of such trees. In one instance there were four trees grown together, forming a solid trunk for fifteen feet above ground level. Dr. Veatch stated that near Arcata, on Humboldt Bay, there were two trunks growing together

for a distance of twenty feet, above which point they separated and formed two distinct and about equal tops. Col. Ransom spoke of having seen a Yellow Pine (*P. ponderosa*) that had two separate bodies so inclined toward each other, that at a distance of fifteen feet from the ground they united and formed a single trunk; and that in Ohio he had seen a pair of Ash trees similarly conjoined from about ten feet from the earth.

I have mentioned first this nearly extinct group of Alameda County redwoods, on account of this prodigious triple trunk which it contains. And now I shall make mention of another group which is located at a distance of a half-mile to the southwestward from it, on the brow of a hill which overlooks the Golden Gate and its environs. Here we have many living trees, not only of redwood, but of other Coast Range arborescent and shrubby plants; such as *Arbutus*, *Arctostaphylos*, *Vaccinium* and others. At this point, partly concealed by a dense growth of ambitious saplings, are to be found the relics of a redwood tree that once must have been among the most remarkable and gigantic individuals of its species; now forgotten and despoiled of its glory, showing nothing but a shell of wood and bark as a memorial of its past. Entering the hollow, one finds himself within an area circumscribed by a wall of solid wood, the greatest diameter of which is thirty-two feet at a distance of four feet from the ground; this measurement not including the bark, which would raise the diameter to thirty-three and a half feet. Four other cross measurements give a clean average of thirty feet excluding the bark, or thirty-one and a half with it. These are proportions falling little below those of the largest individuals of the larger species, *S. gigantea*. Within this wonderful reception hall on the brow of the Oakland Hills I have had the pleasure of entertaining at basket lunches a goodly number of eminent men of science, Professors Le Conte and Greene, Dr. Albert Kellogg, Mr. W. G. Harford, John Muir, Alfred R. Wallace and several others.

Our older citizens remember the time when lofty trees of

redwood, at this and neighboring points on these hills, served as a landmark to vessels at sea when about to enter the Golden Gate, before light houses or other artificial guides to mariners had been established along our coast.

It is observable that around almost every redwood stump a great many suckers are developed. They are mainly to be seen within a foot or two of the ground. Partly by count and partly by estimate based thereon, the writer determined the number of shoots growing around the external periphery of a single stump to be upwards of five hundred. Such extreme tenacity of life and capability of propagation in a species would insure its perpetuity in this isolated locality, but that the settlers in the region are continually working up the huge roots for fuel. One of these vandals boastingly stated that he had unearthed and cut from one of these stumps seven cords of four-foot firewood.

Besides the points indicated, several spurs of these higher hills had, within the memory of some now living, goodly forests of redwood, the whole area of which appears to have been, as I said at the outset, about five miles square. But at present a few young trees, occasionally the upright trunk of a dilapidated old one, and the still numerous stumps of very large trees that have otherwise no record, are almost the only relics of the now almost extinct redwoods of Alameda County.

I shall conclude this paper with some account of the evidences that, in prehistoric ages, this whole range of hills—or mountains, as they then may well have been—were clothed with redwoods.

Not many years ago, laborers were in the employ of the Alameda Water Company, while excavating ground for a reservoir well up the cañon at the head of Fruitvale, unearthed a large redwood tree twelve feet below the surface. At about the same time, in the course of a botanical ramble up the Laundry Farm Cañon, I discovered three large redwood trees lying across the channel, the upper and the nether

parts of which were embedded in drift from ten to thirty feet deep. An artesian well was then being bored at the mole in Oakland. At two hundred feet below the surface a redwood log was encountered. These are very substantial hints of a very ancient history of this patch of forest overlooking Oakland and now so nearly extinct; and the half denuded slopes, the dark cañons still untraversed by either botanist or geologist, and the hidden depths over which we build securely our villages and cities hold records yet to be unfolded.

THE VEGETATION OF THE SUMMIT OF MOUNT DIABLO.

By EDWARD L. GREENE.

As seen from the northward, and all around to the south-eastward, Mount Diablo is a darkly outlined but imposing pyramid rising quite abruptly from the western side of the plains of the lower Sacramento and San Joaquin rivers. It is the chief landmark to residents within and travelers through the great interior valley of middle California. It is also the culminating point of the inner Coast Range in the latitude of San Francisco. Its summit, according to the best of authorities, Dr. George Davidson of the U. S. Coast and Geodetic Survey, has an altitude of 3848½ feet. Its nearest neighbor in the same range of hills, Mount Hamilton,¹ is 40½ miles distant a little east of southward, and is some 360 feet higher.

The climatic differences between Mt. Diablo and Mt. Hamilton must needs be considerable. The peak last named, besides being much farther inland, is separated from the ocean by the Santa Cruz Mountains, an elevated section of

¹For a sketch of the Botany of Mt. Hamilton see pages 77—97 of this volume.

the Coast Range proper, and by the broad stretches of the Santa Clara Valley. Mt. Diablo, on the other hand, is scarcely more than thirty miles from the ocean, about twenty miles from San Francisco Bay, and has neither any stretches of plain, nor any ridge of very lofty hills intervening as barriers against the influences of the ocean. Indeed Mt. Diablo and its outlying northern and western spurs are formed almost into a peninsula by those connected and half encircling bodies of water, the bays of San Francisco, San Pablo and Suisun.

Neither the higher slopes nor the summit of this mountain have ever been tenanted except for a few weeks at a time, and that at the dry season of the year; consequently there are no statistics meteorological from which to speak of the humidity of the summit during the rainy season; but the summer fogs that prevail in the Coast Range generally envelop the top of Diablo as they do no other summit belonging to the inner Range. Its vegetation is therefore naturally much more rank than that of Mt. Hamilton; and all the middle and higher slopes, even the southern and sunward, yield the dense thicket of brushwood usual to higher parts of the Coast Range proper, and also scattered trees, or even considerable groves, of oak and pine. *Adenostoma* and *Ceanothus cuneatus* are abundant here, though they are absent from Mt. Hamilton and other more inland peaks.

It is almost certain that no botanical collector had ascended Mt. Diablo before 1862, in which year Professor Brewer of the State Geological Survey made the ascent and brought from the mountain the type of several species new to science. From Professor Brewer's time until now this summit has remained the only known locality for *Streptanthus hispidus*. Until ten years ago *Phacelia Breweri*, obtained as new at this station, by Prof. Brewer, had not been rediscovered; but it is now known from the hills not far back of Monterey, and from Mt. Hamilton. The most remarkable rediscovery made by the present writer while on Mt. Diablo is that of

Phacelia circinatiformis, which was known only from Douglas' collection. Where he obtained it seems doubtful; but it may yet, perchance, be found in Monterey Co., for the trend of rare plants, all through middle California, is north and south, and that in defiance of the fact that mountain ranges are crossed in keeping this line of distribution. This rule, hints of which began to be noted by me ten years ago, was strengthened by the study of the Mt. Hamilton Flora, and is further confirmed by what was seen on Mt. Diablo. *Capnorchis chrysantha*, *Monolopia gracilens*, *Calochortus splendens*, and some others, are in the Coast Range southward, but at or near Santa Cruz they abandon the seaboard hills, taking a northward line and reappearing on these mountains of the interior. *Psoralea Californica* and *Eschscholtzia ambigua* are local plants as far as known, whose other stations, seemingly much isolated, are away to the southward of Mt. Diablo. But a peculiar leap to the eastward is made by an otherwise quite local plant; for *Silene verecunda*, of the peninsular sandy hills about San Francisco seems to have planted itself on the topmost peak of Mt. Diablo. However, plants growing from seed of the Diablo specimen have a behaviour of their own, and if brought into flower alongside the type of the species, may possibly overthrow my present view that they are specifically identical.

At present only three of the Mt. Diablo plants may be claimed as endemic on this summit. They are *Streptanthus hispidus*, *Sanicula saxatilis*, and *Helianthella castanea*. *Campanula exigua*, discovered on Diablo in the summer of 1886 by Mr. Rattan,—who, by the way, was the first botanist to explore this summit after the times of Brewer and Bolander—has since been found on Tamalpais and Hamilton, but is certainly a mountaineer, and not likely to be found on summits much less elevated than these.

The appended list of 156 species will be seen to fall far short, numerically, of the Mt. Hamilton list; and this notwithstanding that we attribute to Diablo a moister climate and a

really more fertile summit. This will all be explained by the fact that the area of Mt. Diablo summit is only a small fraction of that of Mt. Hamilton. It is furthermore to be noted that, as there have been only some temporary encampments made at the top of Diablo, the number of introduced and foreign plants,—whose names considerable lengthened the Mt. Hamilton catalogue—is very small. Under the genial hospitality and with the assistance of Dr. Geo. Davidson and his party, who were there on Coast Survey work during June and July of 1892, I found a day and a half quite enough time for cataloguing somewhat thoroughly the anthophyte vegetation of all that which can be called the summit. The appended list will nevertheless fall short of completeness, as future explorations may well prove.

LIST OF SPECIES.

1. *LATHYRUS VESTITUS*, Nutt; Torr. & Gray, Fl. i. 276. A depressed form with stems only a few inches long, occurring in stony ground at the summit.
2. *PSORALEA CALIFORNICA*, Wats., Proc. Am. Acad. xii. 251. Very plentiful at the summit, on open stony ground; the root large, fusiform or variously branching. The species was known heretofore only from the head waters of the Salinas, and the present station becomes a very notable extension of its range. How the plant could have escaped the notice of the State Survey collectors, when on Mt. Diablo, it is difficult to conceive.
3. *LOTUS HUMISTRATUS*, Greene, Pitt., ii. 139.
4. *LOTUS GLABER* (Vogel), Greene, l. c. 148.
5. *LOTUS CRASSIFOLIUS*, (Benth.), Greene, l. c. 147. Frequent at the summit; more robust than on Mt. Hamilton.
6. *TRIFOLIUM MACRÆI*, Hook. & Arn.; Bot. Misc. iii. 179.
7. *TRIFOLIUM TRIDENTATUM*, Lindl. Bot. Reg., under t. 1075.

8. TRIFOLIUM MICROCEPHALUM, Pursh, Fl., ii. 478.
9. LUPINUS MICRANTHUS, Dougl.; Bot. Reg. t. 1251.
10. LUPINUS ALBIFRONS, Benth.; Bot. Reg. t. 1642.
11. OSMARONIA CERASIFORMIS, (Torr. & Gray), Greene, Pitt. ii. 191. On the north side.
12. HETEROMELES ARBUTIFOLIA (Ait. f.), Roemer, Syn. Monogr. iii. 105.
13. HOLODISCUS DISCOLOR (Pursh), Maxim. Adn. Spir. 150. Only very near the summit.
14. ADENOSTOMA FASCICULATUM, Hook. & Arn. Bot. Beech. 139. Forming extensive and dense thickets on all the more elevated slopes, at least to the southward.
15. RHUS DIVERSILOBA, Torr. & Gray, Fl. i. 218. Reduced in size, but more frequent than on Mt. Hamilton.
16. RHAMNUS TOMENTELLA, Benth. Pl. Hartw. 303. In dry ground only, less pubescent than the type.
17. RHAMNUS ILICIFOLIA, Kell. Proc. Calif. Acad. ii. 37. Not rare near the summit, forming dense well rounded clumps of bushes four to six feet high. Although this was admitted, in the Flora Franciscana, as but a variety of *R. crocea*, we have now seen so much of the constancy of character in the seaboard undershrub that we no longer doubt the distinctness of the larger and much more common species of the higher hills and farther foothills which Dr. Kellogg was first to segregate and name. At the eastern base of Mt. Diablo, along Marsh's Creek and elsewhere near the plains the species attains the height of ten feet or more, and is more tree-like in aspect.
18. CEANOTHUS CUNEATUS (Hook.), Nutt.; Torr. & Gray, Fl. N. Am. i. 267. Frequent, along with *Adenostoma*, as on other like elevations of the middle Californian mountains.
19. ERODIUM CICUTARIUM (Linn), L'Her.; Ait. Kew. ii. 414.

20. **Malveopsis Fremonti.** *Malvastrum Fremonti*, Torr. & Gray, Pl. Fendl. 21. *Sphæralcea Lindheimeri*, Gray, Bot. Calif. i. 85, by mistake. Scarce, and not seen very near the summit; nevertheless all botanical climbers of Mt. Diablo bring it in, for the species is a very attractive one. Dr. Otto Kuntze in revising the nomenclature of *Malveopsis* (name by Presl, and antedating *Malvastrum*) overlooked this species.

21. **SILENE VERECUNDA**, Wats. Proc. Am. Acad. x. 334. A single tuft, under high rocks at the summit; not otherwise known except very near the sea at San Francisco and for a few miles southward.

22. **STELLARIA NITENS**, Nutt.; Torr. & Gray Fl. i. 185.

23. **ARENARIA DOUGLASHII**, Torr. & Gray, Fl. i. 674.

24. **ARENARIA MACROPHYLLA**, Hook. Fl. i. 102. t. 37. Not as common as on Mt. Hamilton.

25. **ERIOGONUM STELLATUM**. Benth. Trans. Linn. Soc. xvii. 409.

26. **ERIOGONUM NUDUM**, Dougl.; Benth. l. c. 413.

27. **ERIOGONUM GRACILE**, Benth. Bot. Sulph. 46. The small variety with buff flowers.

28. **OXYTHECA HIRTIFLORA** (Gray), Greene, Fl. Fr. 153.

29. **CHORIZANTHE MEMBRANACEA**, Benth. Trans. Linn. Soc. xvii. 419.

30. **CHENOPODIUM ALBUM**, Linn. Sp. 219. Only one plant seen, and this at the camping ground on the summit.

31. **LEWISIA REDIVIVA**, Pursh, Fl. ii. 368.

32. **CLAYTONIA NUBIGENA**, Greene, Pitt. ii. 294.

33. **COTYLEDON CÆSPITOSA**, Haw. Misc. Nat. 180.

34. **RIBES MALVACEUM**, Smith in Rees Cycl. xxx. Not very near the summit.

35. **RIBES QUERCETORUM**, Greene, Bull. Calif. Acad. i. 83(?) With the preceding, but in immature fruit only, and possibly some other species.

36. *RIBES SUBVESTITUM*, Hook. & Arn. Bot. Beech. 346. In thickets at the summit.
37. *RIBES CALIFORNICUM*, Hook. & Arn. l. c. Near the summit.
38. *ZAUSCHNERIA CALIFORNICA*, Presl. Rel. Hænk. ii. 28.
39. *EPILOBIUM MINUTUM*, Lindl., Hook. Fl. i. 207.
40. *EPILOBIUM PANICULATUM*, Nutt.; Torr. & Gray, Fl. i. 490.
41. *GODETIA VIMINEA*, Spach. Nouv. Ann. Mus. iv. 389.
42. *CLARKIA CONCINNA* (F. & M.), Greene, Pitt. i. 140.
43. *CLARKIA ELEGANS*, Dougl.; Bot. Reg. t. 1575.
44. *MENTZELIA DISPERSA*, Wats. Proc. Am. Acad. xi. 137.
45. *MENTZELIA MICRANTHA* (H. & A.), Torr. & Gray, Fl. i. 535.
46. *MICRAMPELIS FABACEA* (NAUD.), Greene, Pitt. ii. 129.
47. *VIOLA PURPUREA*, Kell. Proc. Calif. Acad. i. 56. Two or three specimens observed at the eastward and very highest point.
48. *CARDAMINE CALIFORNICA* (Nutt.), Greene, Fl. Fr. 266.
49. *ARABIS BREWERI*, Wats, Proc. Am. Acad. xi. 123. On rocks of the southern slope, not far below the summit; original station for this neat species, which is now known to be as common on Mt. Hamilton, and about Mt. St. Helena.
50. *STREPTANTHUS HISPIDUS*, Gray, Proc. Calif. Acad. iii.
101. With the preceding and rather plentiful; not yet known from any other locality.
51. *THELYPODIUM LASIOPHYLLUM* (H. & A.), Greene, Bull. Torr. Club. xiii. 143.
52. *BARBAREA VULGARIS*, R. Br. Hort. Kew, 2 ed. iv. 109.
53. *BRASSICA CAMPESTRIS*, Linn. Sp. 666. On the camping ground at the summit.

54. *ERYSIMUM ASPERUM*, (Nutt.), DC. Syst. ii. 505.
55. *LEPIDIUM MENZIESII*, DC. l. c. 539.
56. *THYSANOCARPUS CURVIPES*, Hook., var. *PULCHELLUS*, Greene, Fl. Fr. 276.
57. *THYSANOCARPUS LACINIATUS*, Nutt.; Torr. & Gray, Fl. i. 118. Very near the summit, at the northward.
58. *CAPNORCHIS CHRYSANTHA* (H. & A.), Planch. Fl. des Serres, viii. 193. t. 820.
59. *ESCHSCHOLTZIA AMBIGUA*, Greene, Fl. Fr. 286. Very abundant in open space among the bushes on the southward slope not far below the summit; previously known only from far to the southward; but our Mt. Diablo plant, compared with the type, is less scabrous, has a broader torus-rim, much larger pods, etc. Cultivated in the University garden, the earliest flowers have usually six petals.
60. *UMBELLULARIA CALIFORNICA* (Arn.), Nutt. Sylv. i. 87.
61. *CLEMATIS LASIANTHA*, Nutt.; Torr. & Gray, Fl. i. 9. Climbing over shrubs at and near the summit.
62. *DELPHINIUM CALIFORNICUM*, Torr. & Gray, Fl. i. 31. In open spaces among the bushes; plentiful about the summit and elsewhere.
63. *DELPHINIUM NUDICAULE*, Torr. & Gray, Fl. i. 33.
64. *CAUCALIS MICROCARPA*, Hook. & Arn. Bot. Beech. 348.
65. *APIASTRUM ANGUSTIFOLIUM*, Nutt.; Torr. & Gray, Fl. i. 644.
66. *PEUCEDANUM TOMENTOSUM*, Benth. Pl. Hartw. 312.
67. *ARRACACIA HARTWEGI*, Wats. Proc. Am. Acad. xxii. 415.
68. *SANICULA MENZIESII*, Hook. & Arn.; Hook. Fl. i. 258.
69. *SANICULA SAXATILIS*, Greene, Eryth. i. 6.
70. *GARRYA FREMONTI*, Torr. Pac. R. Rep. iv. 136.
71. *SAMBUCUS GLAUCA*, Nutt.; Torr. & Gray, Fl. ii. 13.

72. SYMPHORICARPOS MOLLIS, Nutt. l. c. 4.
73. GALIUM APARINE, Linn. Sp. 108.
74. GALIUM ANDREWSII, Gray, Proc. Am. Acad. vi. 537.
75. STENOTUS LINEARIFOLIUS (DC.), Torr. & Gray, Fl. ii. 238. A quite characteristic shrub of the southward slope. In most of the current literature it is placed under *Aplopappus*, which generic name is wholly untenable.
76. GRINDELIA ROBUSTA, Nutt. Trans. Am. Phil. Soc. vii. 314.
77. ERIGERON PETROPHILUS, Greene, Pitt. i. 218.
78. ERIGERON FOLIOSUS, Nutt. Trans. Am. Phil. Soc. vii. 309. Common near the summit on the southward slope.
79. MICROPUS CALIFORNICUS, Fisch. & Mey. Sem. Petr. ii. 42.
80. GNAPHALIUM MICROCEPHALUM, Nutt. Trans. Am. Phil. Soc. vii. 404.
81. WYETHIA HELENIOIDES (DC.), Gray, Pl. Fendl. 82 (1849): *W. robusta*, Nutt. Trans. Am. Phil. Soc. vii. 352 (1840). *Alarçonia helenioides*, DC. Prodr. v. 537 (1836). Not uncommon near the summit.
82. HELIANTHELLA CASTANEA, Greene, Eryth. i. 127.
83. MADIA DISSITIFLORA, Torr. & Gray, Fl. ii. 405.
84. HEMIZONIA HEERMANNI, Greene, Bull. Torr. Club. ix. 15. On the southern slope, at middle elevations only; but enumerated, as being here at its northern limit.
85. LAGOPHYLLA RAMOSISSIMA, Nutt. Trans. Am. Phil. Soc. vii. 391.
86. BLEPHARIPAPPUS PLATYGLOSSUS (F. & M.), Greene, Pitt. ii. 246.
87. BAERIA GRACILIS (DC.), Gray, Proc. Am. Acad. ix. 196.
88. ERIOPHYLLUM CONFERTIFLORUM (DC.), Gray, l. c. xix. 25.

89. *ERIOPHYLLUM CÆSPITOSUM*, Dougl.; Bot. Reg. t. 1167.
90. *MONOLOPIA GRACILENS*, Gray, Proc. Am. Acad. xix. 20. Plentiful at the southward not far below the summit; otherwise known only from the Santa Cruz Mountains.
91. *RIGIOPAPPUS LEPTOCLADUS*, Gray, l. c. vi. 548.
92. *ACHILLEA MILLEFOLIUM*, Linn. Sp. 899.
93. *ARNICA DISCOIDEA*, Benth, Pl. Hartw. 319. Borders of thickets at the summit, on the north side, as on Mt. Hamilton.
94. *SENECIO ARONICOIDES*, DC. Prodr. vi. 426. With the preceding.
95. *CARDUUS CALIFORNICUS* (Gray), Greene, Proc. Philad. (1893), 359. *C. venustus* (found at the summit of Mt. Hamilton) is common enough on the lower flanks of Mt. Diablo, but only *C. Californicus* at the summit.
96. *CENTAUREA MELITENSIS*, Linn. Sp. 917.
97. *UROPAPPUS LINEARIFOLIUS* (DC.), Nutt. Trans. Am. Phil. Soc. vii. 425. Same as n. 127 of the Mt. Hamilton list.
98. *AGOSERIS RETRORSA* (Benth.), Greene, Pitt. ii. 178.
99. *Agoseris intermedia*. Perennial; leaves canescently somewhat tomentose, erect, 6 or 8 inches long, deeply pinnatifid into falcate narrow segments, the terminal segment long and entire, narrowly lanceolate or almost linear: scapes stout, striate, nearly glabrous, 1 to 1½ feet high: outer involucre bracts of the very large head ovate, abruptly acuminate, inner linear-lanceolate: ligules large, pale yellow, the expanded head nearly 2 inches broad: achenes about 2 lines long, glabrous, acute at each end, wing-angled; capillary stipe of the bright-white pappus nearly an inch long.
- Middle and higher slopes of the mountain. Species intermediate between *A. grandiflora* and *lacinata*; not rare in Californian mountains of the inner Coast Range.
100. *PTILORIA VIRGATA* (Benth.), Greene, Pitt. ii. 130.

101. NEMOSERIS CALIFORNICA (Nutt.), Greene, l. c. 193.
102. MALACOTHRIX OBTUSA, Benth. Pl. Hartw. 321. Common here, as in the higher elevations of the middle Coast Range generally; not observed on Mt. Hamilton, which may be beyond the limit of the species southward.
103. CAMPANULA EXIGUA, Rattan, Bot. Gaz. xi. 339. In open sunny places among the brushwood, at the broad southern extremity of the summit; not different from the Mt. Hamilton plant.
104. ARCTOSTAPHYLOS MANZANITA, Parry, Bull. Calif. Acad. ii. 491. The shrub was not observed by me; but subsequently to my visit good leafy twigs were communicated by Professor Davidson.
105. PHLOX GRACILIS (Dougl.), Greene, Pitt. i. 141.
106. GILIA MULTICAULIS, Benth. Bot. Reg., under t. 1622.
107. GILIA GILIOIDES (Benth.), Greene, see page 93 *supra*.
108. NAVARRETIA PUBESCENS, Hook. & Arn. Bot. Beech. 368.
109. LINANTHUS FILIPES (Benth.), Greene, Pitt. ii. 255.
110. PHACELIA CIRCINATA, var. CALYCOSA, Gray, Proc. Am. Acad. x. 317.
111. PHACELIA DISTANS, Benth. Bot. Sulph. 36. On Mt. Hamilton, where this one is not, the southern *P. hispida* seems to attain its northern limit.
112. PHACELIA CIRCINATIFORMIS, Gray, Proc. Am. Acad. x. 325. Abundant on the southwestward slope very near the summit, in open ground and among dead brushwood that had been burned over during the previous year. Not before collected since Douglas' time, now nearly sixty years ago; and his specimens were always supposed to have been collected somewhere not far from Monterey, which may well have been the case.

113. *PHACELIA BREWERI*, Gray, l. c. 317. Common as on Mt. Hamilton; also found in Monterey Co., by Dr. Parry, Mr. Hickman and others; but otherwise confined to these mountain tops.
114. *PHACELIA DAVIDSONII*, Gray, l. c. 324. Apparently the northern limit of this, another species of the rather distant South.
115. *PHACELIA NEMORALIS*, Greene, Pitt. i. 141.
116. *EMMENANTHE PENDULIFLORA*, Benth. Trans. Linn. Soc. xvii. 281.
117. *NEMOPHILA PARVIFLORA*, Dougl., Benth. Trans. Linn. Soc. xvii. 275.
118. *HYDROPHYLLUM CAPITATUM*, Dougl. l. c. 273.
119. *CRYPTANTHE TORREYANA* (Gray), Greene. Pitt. i. 118.
120. *CRYPTANTHE FLACCIDA* (Lehm.), Greene, l. c. 115.
121. *PLAGIOBOTHRYIS NOTHOFULVUS*, Gray, Proc. Am. Acad. xx. 285.
122. *CONVOLVULUS VILLOSUS* (Kell.), Gray, l. c. xi. 90.
123. *CONVOLVULUS LUTEOLUS*, Gray, l. c.
124. *CUSCUTA SUBINCLUSA*, Dur. & Hilg. Pac. R. Rep. v. 11.
125. *SOLANUM UMBELLIFERUM*, Esch. Mem. Acad. St. Petersb. x. 281.
126. *ANTIRRHINUM VAGANS*, Gray, Proc. Am. Acad. vii. 373.
127. *COLLINSIA BICOLOR*, Benth.; Bot. Reg. t. 1734.
128. *COLLINSIA TINCTORIA*, Hartw.; Benth. Pl. Hartw. 328. Plentiful among loose rocks in very shallow clayey soil just below the summit. Perhaps here at its southern limit, though a very common plant in the mountains northward.
129. *PENTSTEMON CORYMBOSUS*, Benth.; DC. Prodr. x. 593. Forming mats on rocks, as on Mt. Hamilton.
130. *PENTSTEMON AZUREUS*, Benth.; Pl. Hartw. 327.

131. *SCROPHULARIA CALIFORNICA*, Cham.; Linnæa, ii. 585.
132. *EUNANUS* ———. I do not remember which species, and do not find any specimen preserved.
133. *PEDICULARIS DENSIFLORA*, Benth.; Hook. Fl. ii. 110.
134. *APHYLLON FASCICULATUM* (Nutt.), T. & G. in Gray, Man. 2d ed. 281.
135. *MONARDELLA VILLOSA*, Benth. Lab. 332.
136. *MONARDELLA DOUGLASII*, Benth. l. c. Very common on the dry southern declivities.
137. *SPHACELE CALYCINA*, Benth. l. c. 568.
138. *SALVIA COLUMBARIÆ*, Benth. l. c. 302.
139. *SCUTELLARIA TUBEROSA*, Benth. l. c. 441.
140. *QUERCUS DOUGLASII*, Hook. & Arn. Bot. Beech. 391.
141. *QUERCUS CHRYSOLEPIS*, Liebm.; Benth. Pl. Hartw. 336. Abundant in a low scrubby state; no large or even middle-sized trees.
142. *QUERCUS WISLIZENI*, A. DC. Prodr. xvi, part 2, 67. Bushy specimens only.
143. *ALLIUM FALCIFOLIUM*, Hook. & Arn. Bot. Beech. 400.
144. *ALLIUM LACUNOSUM*, Wats.? Bulbs not obtained, but the flowers answering to Watson's description. Found on a very rocky northeastward declivity just below the summit.
145. *BRODIÆA CAPITATA*, Benth. Pl. Hartw. 339.
146. *HOOKERA CORONARIA*, Salisb. Parad. Lond. ii. t. 98.
147. *CALOCHORTUS PULCHELLUS*, Dougl.; Lindl. Bot. Reg. t. 1662.
148. *CALOCHORTUS LUTEUS*, Dougl. l. c. t. 1567.
149. *CALOCHORTUS VENUSTUS*, Benth. Trans. Hort. Soc. i. 412, t. 15, fig. 3.
150. *CHLOROGALUM POMERIDIANUM* (DC.), Kunth. Enum. iv. 682.

151. ZYGADENUS FREMONTI, Torr. Pac. R. Rep. vii. 20.
152. FESTUCA MYURUS, Linn. Sp. 54.
153. BROMUS RACEMOSUS, Linn. Sp. 2d ed. 114.
154. HORDEUM MURINUM, Linn. Sp. 85.
155. ELYMUS SITANION, Schult.; R. & S. Mant. ii. 426.
156. PINUS SABINIANA, Dougl.; Lamb. Pin. 146.

MISCELLANEOUS NOTES AND NEWS.

It is announced that an International Botanical Congress will be held at Madison, Wisconsin, August 23, 1893, and continue for several days thereafter. The call has been made by a committee of American botanists consisting of J. C. Arthur, L. H. Bailey, N. L. Britton, D. H. Campbell, J. M. Coulter, F. V. Coville, B. T. Galloway, Conway MacMillan, B. L. Robinson and L. M. Underwood. All botanists are eligible to membership. It is set forth that the purpose of the Congress "is the presentation and discussion of botanical questions of general interest relating to the advancement of the science"; and it is furthermore "expected that the International Standing Committee on Nomenclature, appointed last year by the Genoa Congress, will present its first report at this time."

PROFESSOR GREENE has been devoting the last weeks of July to botanical journeys in the high Sierras and in the Rocky Mountains of Wyoming. From the latter region he goes in August to the Madison (Wisconsin) meetings.

THE American Association for the Advancement of Science convenes this year at Madison, Wisconsin, August 17 to 24. The botanists will meet for the first time in an independent section.

THE Boston Society of Natural History offers a first prize of from \$60 to \$100 and a second prize of a sum not exceeding \$50 for the best memoirs on one of three scientific subjects, two of which appeal in a greater or less degree to students in

botany, viz: 1. The relations of inflorescence to cross-fertilization illustrated by the plants of eastern Massachusetts. 2. Experiments affording evidence for or against the theory of evolution.

ONE of the most useful compilations to systematists throughout the country is the yearly Index to New Species of North American Phanerogams and Pteridophytes issued from the National Herbarium. That for 1892, the work of Miss J. A. Clark, has just been published. It is noticeable that new varieties are recorded as trinomials and that personal, geographical and similar specific names are invariably decapitalized. The list shows that about five hundred and forty new plant names relating to North American Phanerogams were published during 1892, a large proportion of which were due to necessary changes in nomenclature.

FOUR new British Hawkweeds were published in the June and July numbers of the *London Journal of Botany*.

A bacteriological laboratory has been equipped by the post-graduate medical department of the University of California and is now open to students.

PART I of the Index Kewensis, dealing with the nomenclature of all known flowering plants, has just been issued in London. It had been confided that such a work was in progress at the Kew Herbarium and the promise of its publication excited curiosity and interest in many quarters.

THE Botanical Society of France held its annual session May 20 at Montpellier and celebrated the third centenary of the founding of the Botanic Garden of that city by Henri IV in 1593. Busts of three Montpellierian botanists, Dural, Martines and Planchon, were unveiled.

ON THE DISTRIBUTION OF SOME WESTERN PLANTS.—I.

By EDWARD L. GREENE.

I desire to put upon record here, in the first place, some observations upon the topographical distribution of certain plants common in middle California, and universally regarded as native there, but which demean themselves always as foreigners. A student once asked me if I considered *Lepidium Menziesii* indigenous to the region of San Francisco Bay. He had observed that it occurs nowhere but along hard and sterile waysides, in yellow gravelly soil that has been beaten smooth by the footsteps of men and animals; and such places are usually occupied by the hardest and most irrepressible of alien weeds. In any country the native plants thereof are sought in the open field, by lake or river, or in the forest. That a species grows only in cultivated lands, or along the public highways, or about buildings, argues for it a foreign derivation. It seems a natural and reasonable inference that plants which in any district decline to plant themselves in virgin soil, but stay only where the plow has done its work, or where man has built his highways, or the domestic animals have beaten their paths—where the conditions of growth are more or less artificial—are immigrants. There are possibly some exceptions to the rule, nevertheless; for if the *Lepidium* in question be not native in the middle seaboard counties of California, probably no one can say where it is indigenous. And yet the observer of its behavior, if he go back, in imagination, to the time when this part of California had no old roads, or hard-beaten gravelly by-paths, will not be able to conceive of this plant as a denizen of this country at such a time. According to all that is known of its habits, a region not tenanted by civilized man would not have a single spot of earth adapted to its growth.

The native sorts of pepper-grass are rather numerous in California, but no other species, not even *L. lasiocarpum*, its

nearest ally, demeans itself like *L. Menziesii*; and there is but one other that ever becomes a wayside weed. That is *L. nitidum*, the most generally disseminated of all the species, making itself at home in almost all kinds of soil except the low and subsaline places, showing no preference for waysides though often growing there, but never associating with *L. Menziesii* in those excessively hard-packed old roads and paths which that species exclusively affects. It is also entirely disassociated from the other native species, each one of which seems to require its own peculiar kind of soil, and never to appear in any other.

Neither roadside nor sandy plain nor gravelly hill nor rolling prairie ever furnishes a habitat for the coarse *Lepidium latipes*. It abounds on low rich plains of the interior, seldom if ever appearing except where water stands upon the ground in broad pools during the early months of the year. *L. oxycarpum* is another which need not be sought save where the land is moist and subsaline; it may be about a mineral spring in the hill country, or it may be along the border of a seaboard salt marsh. It is even occasionally associated with *L. latipes*. The other two species that are native in middle California are *L. dictyotum* and *L. Oreganum*. The first of these is seldom seen; and belongs only to low plains where the soil is very strongly alkaline. *L. Oreganum*, as far as known in California, likes a sandy and slightly alkaline soil. Though brought to light in the first place from Oregon, there is no doubt this species is native, perhaps all up and down the foothills of the inner Coast Range of California.

Among West American composites there is one native species very widely dispersed which I have never yet found growing in virgin soil. I refer to *Matricaria discoidea*. No wayside weed is more common in California, and not even Mayweed, its Old World relative, is more strictly domestic in all its habits. Around buildings, along the paved streets of cities, fringing the most beaten paths of men and animals, and seldom anywhere but in the hardest, yellowest, and most impermeable soil, grows this small, innocuous, and even sweet-

scented weed of spring and early summer. In wild woodland or thicket, or in open uncultivated plain no one ever encounters it; and if anywhere to the northward or north-eastward of California it should be found to behave differently, then might we conclude that in California it is, what it always seems to be, an immigrant; and that it came there from the north, since the settlement of Oregon and California by our race of people. That it is indigenous to the coast region of the northwest, no one ever doubted; and it does not readily migrate eastward. It is not one of those plants that follow the railways to regions east of the Sierra Nevada and the Cascades. If it has been found in Utah, it no doubt made its way thither from the north. But it has a very near relative, *M. occidentalis*, which has not yet been found outside of central California. This is a tall and coarse weed chiefly of the middle Californian grain fields. It prefers a rich adobe soil, but has been also observed in sandy ground. Belonging as it does to a genus whose species are mostly European, and being a grain-field weed, when I first discovered this plant and remarked its specific characters as distinct from *M. discoidea*, I went at once to books of Old World botany in expectation of proving it a foreigner—a search which ended in its establishment as a native of California and a new species. As this plant is found in abundance nowhere but in the rich fields of the interior valleys of Sacramento and San Joaquin, the occurrence of scattered individuals about Berkeley and San Francisco, and elsewhere along the seaboard, may possibly bespeak a tendency on the part of this plant to become domesticated, after the fashion of its congener.

Very characteristic of the Californian flora in general are those composites of the genus *Madia* and its allies, commonly called tarweeds. In the State Survey Botany a considerable aggregate of most distinct species was passed off as *Madia sativa*. The herb to which this name was first given is South American, a native of Chile. Probably the very common roadside tarweed of the Bay region of Califor-

nia—a tall coarse clammy weed with inconspicuous flowers, and involucral bracts deciduous with the ripe seed—is the true *M. sativa*, and not native. This plant is thoroughly domestic in its behavior; is never found at all in the mountain districts, nor even on uninhabited islands in the Bay. Moreover, from those plants undoubtedly Californian to which it is most related it differs in having a much later flowering period. I have long considered this plant a foreigner in California. But there is a native species so much like it in general appearance that no one since Nuttall seems to have distinguished the two. They do not grow together. The native is of the north, coming down from Oregon into Sonoma and Solano counties. It is stout and strict, like *M. sativa*, but is vernal rather than æstival in its flowering period, and its fruiting bracts are persistent, so that the most mature herbarium specimens retain them. I suppose this plant to be the *M. congesta* of Nuttall. At all events, it is a native tarweed, and one that grows preferably in the wildest lands, never particularly affecting waysides or cultivated fields; and it belongs to the open country, not to the wooded or hilly districts.

A third species once mixed with *M. sativa* is of the woodlands, an open freely branching and somewhat bushy annual, having the deciduous fruiting bracts of true *sativa*, but never associated with that species at all, a thorough native in all its manners, and flowering early in the year. This was published in the old Flora of North America as *M. dissitiflora*, and, after having been suppressed in the State Survey, was rightly restored to the rank of a species in Dr. Gray's Synoptical Flora.

EARLY SCIENTIFIC EXPEDITIONS TO
CALIFORNIA.—I.

By WILLIS L. JEPSON.

It has been generally accepted that the first botanists to visit California were Thaddæus Hænke and Luis Nee who came with the Spanish scientific expedition under Malaspina. That this should have been so accepted seems easy and natural. Spanish navigators on their voyages of adventure and discovery were the first to touch these remote coasts; Spanish exploring parties bent on conquest and in search of fabled treasure were the first to enter Alta California; the Franciscans, advancing along the Pacific shore from Mexico, left the monuments of their zeal as far northward as the frontier missions of San Rafael and Sonoma.

But notwithstanding the dominating influence of Spain in Mexico and in the wide area to which the name California was applied, I discover what does not seem to be at all known, particularly to American botanists, that the first scientific expedition to visit the Pacific Coast was not that of Malaspina and that the first botanists to make a botanical collection within the borders of California were not those of the scientific corps of the famous navigator.

The only general account of botanists and botanical explorations in California is an annotated list by W. H. Brewer in the second volume of the Botany of the California Geological Survey. He places the arrival of the earliest botanists in 1791 in the persons of Thaddæus Hænke and Luis Nee. Neither is one likely to find elsewhere in botanical literature an account of an earlier visit. No flora or botany of California, nor monograph or paper dealing more or less exclusively with Californian plants credits any collector earlier than Hænke.

I shall therefore proceed to give an account of the visit of an earlier expedition, the circumstances under which it was made, and the incidents and length of its stay. For, from the date of its arrival, begins the botanical history of

California; and, by reason of its being the earliest, I shall give details that might not interest if this particular voyage of exploration had been made at a later period.

In 1785 there sailed from the port of Brest, France, the finely equipped scientific expedition of La Perouse. Its object was to explore remote regions of the earth, gather data for the confirmation or rejection of many disputed geographical questions, and to prosecute researches in the natural sciences for the benefit and welfare of mankind. This expedition is coeval with the beginning of the era when voyages of discovery were no longer only for conquest of new lands—but the scientific results were looked to as of vast importance to a nation and to the whole of civilization. The treaty of 1783 made this enterprise possible; it afforded to Europe, and to France in particular, a period of needed rest and recuperation anterior to the struggles of the Revolution and the Napoleonic wars. The French nation was undoubtedly incited by the splendor of the achievements of the English discoverers, Anson, Carteret, and Cook. Two of the finest frigates in the French service, the *Astrolabe* and the *Boussole*, were selected. The commander, La Perouse, was noted for his splendid record in the French wars, his enterprising character, his scientific acquirements and his manly accomplishments. The National Assembly spared no expense; the Academy of France issued manifold instructions regarding the observations to be made and the care and preservation of collections. The scientific staff, which included some of the most distinguished Frenchmen of the day, numbered ten on the *Boussole* and seven on the *Astrolabe*. A botanist, a botanical gardener, and two botanical draughtsmen were among the number. Everything pointed to a successful and brilliant issue.

It was this expedition that in the course of its long voyage about the world anchored in the Bay of Monterey September 14, 1786, five years prior to the visit of Malaspina. The headland of Point Pinos rose to the south covered with forest-trees then as now; along the low eastern shore bounded

by sand-dunes the waves of the ocean broke with a sullen roar commented upon by the journalist of the voyage. The navigators were given a royal reception by the inhabitants of this outlying province of Spain. The guns of the presidio fired a salute and soldiers came off in their long boats to greet the strangers. In the course of a few days the explorers went to visit the ecclesiastical dignitaries of Carmel. They crossed a little plain where scattered trees sheltered the herds from the noon-day heat, ascended the hills, and the mission bells rang out their welcome; passing between the long rows of neophytes whose stolid faces manifested no surprise at this procession of Europeans, they found the church edifice lighted as on the occasion of the grandest festival and a hymn of thanksgiving was sung because of the happy success of the voyage.

After ten days the expedition sailed away into the western seas in quest of strange people and strange lands. On the coast of Kamtchatka one of the scientific staff was sent overland to France with the records of the expedition. At the Navigator Islands, De Langle, Captain of the *Astrolabe*, Lamanon, the naturalist, and many of the ship's crew were massacred by the natives. Dispatches were again sent home from Botany Bay on the coast of New Zealand by English vessels. After this the expedition was never heard of again. With the loss of the ill-fated navigators in the South Seas, perished the major part of the scientific results of the expedition, including the first botanical collection made in California, with the accompanying notes and drawings.

However there was something saved. The packages of dispatches sent to France contained the journal kept by the distinguished commander, La Perouse, and monographs by members of the scientific corps on various subjects, geographical, anthropological, pathological, entomological, and botanical. The monographs were necessarily more or less fragmentary and incomplete. The foresight of the commander is best evidenced in the fact that he lost no opportunity of dispatching his journal home to France, as he

realized that he might himself never return. He also sent directions as to the choice of an editor which is a model of its kind and might with profit be read to this day by editors of posthumous scientific works who have no clear conception of their responsibilities and duties.

The journal, with the accompanying manuscripts and drawings, was published at Paris in 1797 in four quarto volumes. A wood-cut of La Perouse faces the title of volume one. It is a fair, somewhat rounded face, with arching eyebrows, high forehead, pleasant mouth, and just a trace of a double chin. Although we know the face belongs to one of high rank and long experience in affairs of state, inured, too, to wars and hardships, it is easy to detect, in addition, the natural vivacity of the southern Frenchman. Below the inscription reads: Jean Francois Galaup de la Perouse, Chef d'Escadre des Armees Navales né a Alby en 1741.

The journal of this man is highly prized by Californian historians by reason of its accuracy and fairness in the discussion of political and church affairs at Monterey; nor in the brief time at the disposal of the gifted commander did he fail to record his impressions of the aspect of the country, its climate and resources, its animals and vegetation. His notes in regard to the last concern us only, and they are chiefly interesting as being the first made in regard to the plants of any part of California published in a scientific work.

The traveler naturally viewed the vegetation and other resources from an economic standpoint. "The soil," he says "is of inexpressible fertility, vegetables of all species succeed there perfectly . . . The harvests of wheat, barley, corn, and peas can only be compared to those of Chili; in no other way can our cultivators form an idea of a similiar fertility; the medium product is sixty to one hundred fold . . . Fruit trees there are still very rare, but the climate which differs little from the southern provinces of France is exceptionally favorable for them; at least the cold is not so great and the heat of the summer is much more moderate caused by the prevalent fogs which procure for the country a humidity very

favorable to vegetation . . . The trees of the forest are the stone-pine, the cypress, the evergreen oak, and the western plane-tree; there is no underwood, and a sward upon which it is very agreeable to walk covers the ground of the forest." The gardener of the expedition furnished him the common names of various indigenous and cultivated plants of which he mentions the following: Common absinthe, littoral absinthe, abrotanum, artemisia, Mexican tea, golden-rod of Canada, aster, milfoil, nightshade with the black fruit, samphire or sea-fennel, and water-mint.

The botanists of the expedition were Martiniere and Collignon. "From the day of our arrival," says La Perouse, "our botanists lost not a moment in augmenting their collection of plants, but the season [September] was not favorable; the heat of the summer had entirely dried everything, and the seeds were scattered upon the earth." From this it seems likely that the collection was not a large one. In any event, the botanists were permitted to send home with the dispatches a limited number of seeds and dried plants. They undoubtedly selected what they regarded as new and most remarkable. Two of the packets of seeds thus sent were gathered at Monterey. The seeds of one packet were sown in the Jardin des Plantes in Paris,¹ and produced a number of "beautiful herbaceous plants." This species was first observed by Jussieu who recognized it as belonging to his order Nyctagines and made for it a new genus which he called *Abronia*, a full diagnosis being given in his *Genera*, published at Paris, in 1789. Two years later Lamarck in his *Illustrations* gave to the new plant its specific name *umbellata*. *Abronia umbellata*, collected by Collignon at Monterey, is the earliest described Californian plant. It is one of the most characteristic and abundant of the native denizens of our sea-shore from the Columbia River to San Diego.

¹ The seeds of the other packet came with herbarium specimens of a pine collected at Monterey by Collignon. Previously to its arrival on the Californian coast the expedition had visited Chili, Easter Island, the Hawaiian group, and the coast of Alaska in the neighborhood of Mt. St. Elias. Of seeds and specimens sent from localities other than Monterey, I have no definite knowledge. The genus *Collignonia*, which includes some six species of herbs and undershrubs of the temperate region of the Andes from New Granada to Peru, was founded by Endlicher in his *Genera Plantarum* (1836-40). The type of the genus is *Abronia parviflora*, Kunth.

There is little more on the subject that could be added, but what has been given is a matter of historical record. Such was the character of the first scientific expedition to California; such was the manner of man who commanded it and who recorded in his journal the first notes of a scientific traveler on our vegetation; and of Martiniere and Collignon, who in the autumn of 1786 botanized among the forest trees of Monterey and on the sand-dunes of the bay-shore, there is hardly a word preserved that is worth the pains of record.

CALIFORNIAN HERB-LORE.—I.

By IDA M. BLOCHMAN.

That the inhabitants of rural districts and remote settlements in California make more or less use of native plants for the cure or relief of many bodily ailments, is a well-known fact. This was true in a greater degree in the early days of the American occupation when the services of a physician were not to be possessed except in the more populous centers. Medicine chests were even more scarce than physicians, for such doctors as abandoned their profession for the gold fields of the West, often neglected to bring with them around the Horn, or in the toilsome journey across the continent, a stock of drugs with which to continue their calling. Consequently it became of necessity the custom to depend on plants from the garden or on those from the woods and mountains and stream banks. Something was learned, doubtless, from reputed Indian remedies; much, too, from the Spanish inhabitants and their priests; and little by little, aided by experience, the knowledge of simples grew, until the sum total, handed down from generation to generation, included cures for almost every disease or ill. The present generation has grown more dependent on the regular practitioner and the apothecary, and the herb-lore is being forgotten; but there are families still to be found whose only pharmacopœia is the old grandmother and whose

dispensary is an attic stored with herbs, or perhaps more commonly, a large sack, the contents of which are renewed yearly from the field, wood, shore, hill, and plain.

Perezia microcephala, distributed through the Coast counties from Monterey to San Diego, is a composite with rose-colored bilabiate flowers, the single representative of the tribe Mutisiaceæ in California. The medium-sized heads are arranged in corymbs at the ends of the branches. The large, thin leaves have denticulate margins. It is a vigorous plant in early spring, attains a height of about three feet and blooms during the summer. The corollas are finally superseded by the copious pappus and for the rest of the year the plant stands like a gray-haired beggar by the wayside. The roots are coarse, yellow fibers, containing when fresh, a pungent yellow sap. The Spanish name for this plant is *sacapellote*. It is used with really excellent results for asthma. A decoction is made from the roots which is taken internally, and also applied as a wash to the throat.

Trichostema lanatum is highly prized for its medicinal qualities and is administered with confidence for many ills that flesh is heir to. It is found on the mountains in rocky soil and is geographically distributed from near Monterey to San Diego. It is a shrub, two or three feet high, the branches thickly set with narrow, revolute-margined leaves. The dark-blue flowers with long exserted style and stamens grow in spikes which are densely clothed with purple-hued wool. As a remedy for ulcers or any other kind of sore, whether old or new, it is efficacious either alone or in combination with wine or sweet oil; it is used too for inflammation, either external or internal. Furthermore, it is said to have virtues as a cosmetic. This testimony I had from a wrinkle-faced senora, who promised personally to demonstrate its powers to regain the charms of youth and beauty. The Californian Mexicans call this plant *romero*, which is the Spanish for "*rosemary*."

TERATOLOGICAL NOTES.

LEPTOSYNE GIGANTEA, Kellogg. A plant of *Leptosyne gigantea* under cultivation in the Botanic Garden of the University of California has this season developed heads sufficiently abnormal to be considered worthy of note. As was the case with the specimen of *Leptosyne maritima* described by Mr. Howe in the January number of ERYTHEA, p. 18, the paleæ of the receptacle in the examples now before me are much elongated and foliaceous: one head has the same peculiarities of calyx-tube, ovary and protruding bifurcate style, but differs in that a number of the florets are racemed on a prolongation of the axis two inches in length: a second specimen has two of the ray- and five of the disc-florets, on one side of the head, with ovaries and adherent calyx-tubes considerably prolonged, in one case to $16\frac{1}{2}$ lines, and their styles protruded, in some cases $7\frac{1}{2}$ lines, beyond the corolla-tube, each bearing a secondary head at the summit and a single foliaceous bract at about half its length; the total prolongation of the longest floret is thus 2 inches; the remaining florets in the primary head are much crowded out of position by this abnormal development. All the parts of the head are green, but more or less tinged with yellow, the ligules exhibiting most color. It should be noted that these heads were produced early in June, some time after the rainless season had set in.

AGOSERIS HIRSUTA, (Hooker), Greene. On June 11th of this year, I found a plant of *Agoseris hirsuta* growing by the roadside near Lorin station, Berkeley, which bore a number of abnormal heads. The ovaries and calyx-tubes are borne on pedicels sometimes 5 lines in length, the style being thickened and prolonged in some cases 3 lines beyond; pedicels, ovaries and styles are clothed with stout simple jointed glandular hairs. The most striking feature, however, is the development of the pappus into linear foliaceous green sepals ciliated with hairs similar to those on other parts of the floret, these hairs being very much longer than

the teeth on the normal pappus bristles. The anthers appear to be barren and are ruptured by the enlarged style. One head has developed perfect achenes on about one-third of the receptacle, the remainder of the florets, though not prolonged and developing corolla, stamens, style and normal pappus, are colored green and are barren.

Plants of this species seem to be very liable to fasciation. During the present season I have met with quite a number of cases, in Berkeley, where fusion of two (in some cases perhaps more) flower stems has taken place: one of these examples exhibited two perfectly distinct sessile heads borne on a single *terete* flower stalk; in other cases the heads were more or less fused and the stems somewhat flattened and striated. One specimen, brought from Marin County, had a broad and very flattened stem, enlarged at the top, bearing the florets, all of which were perfect, on a convex arc-like receptacle, very narrow one way and broad the other, giving something of the appearance of *Celosia cristata*.

SALVIA COLUMBARIÆ, Benth. Plants of *Salvia Columbariæ* under observation in the Botanic Garden of the University, at Berkeley, show considerable tendency to floral proliferation; this tendency is not confined to, though most frequently observed in, the central capitulum of the cymose inflorescence, the two branches being also subject to it: the secondary head is borne on a peduncle usually as long as that of the primary head. It is noticeable that cutting off the ripened heads induces the plants to throw out a fresh crop of heads on secondary and even ternary branchlets of the primary cyme; the same effect is produced with prolific heads, with this modification, that in none of the examples before me have I observed branches of the cyme produced from both sides of such heads. It is to be regretted that no plants were left uncut by which to determine whether the second crop was certainly the result of cropping, as is often the case with plants under cultivation. J. BURTT DAVY.

MISCELLANEOUS NOTES AND NEWS.

PART I of Prof. Underwood's Index Hepaticarum was issued in June as one of the Memoirs of the Torrey Botanical Club. This part is an author catalogue of the publications relating to the hepatics, together with a topical index. It was a much needed work and its publication is a matter for rejoicing among those interested in this group of plants. The announcement is made that Part II will be "an index of all the species described, with a reference of each to the genera recognized at the present time," and Part III, a classified arrangement of the species to show our present knowledge of their geographic distribution. It is hoped that these remaining parts will soon be issued.

THE San Francisco Microscopical Society is apparently one of the most steadily progressive of the scientific organizations of Western America. The publication of Part I of its transactions may be taken as an evidence of its present vigor. Of the original contributions which this issue contains two are paleo-botanical and relate to the famous Santa Monica diatomaceous deposit and to marine fossil Diatomaceæ from California. It also appears from the list of papers read before the Society, that a goodly proportion of those more recently presented are botanical studies on lower forms of plant life, in which knowledge of microscopical manipulation and technique is essential. The Society's library is claimed to be the best collection of microscopical literature on this continent.

THE Academy of Science of Indiana has determined upon a biological survey of that state. It is the intention of the promoters of this survey to publish a complete bibliography of materials bearing on the botany, zoology and paleontology of Indiana, in order to ascertain what has been already accomplished regarding the character and extent of life in the state. The main purpose will be to make known the extent, distribution, biological relations, and economic

importance of the entire fauna and flora of Indiana. In order to do this it will be necessary to associate the various workers and co-relate their labors that all may work together towards a definite end. L. M. Underwood is one of the directors of the Survey and Chief of the Division of Botany. The special work of this season in botany will be a study of distribution, particularly of the lower cryptogams and of the rarer forms of flowering plants and ferns. Surveys of such a character are quite the fashion and it is gratifying to note that the gauge of this enterprise is broad enough to accommodate with equal ease the two members of biological science.

PHANEROGAMIC botanists are familiar with the tuberous growths on the roots of species of Leguminosæ, particularly those of lupines and clovers. In this connection an article in the May number of *Nature* on "Bacteria, their Nature and Function," is interesting. It is there stated that the excess of nitrogen in Leguminosæ is obtained from the atmosphere by the instrumentality of bacteria in the soil around the roots of the leguminous plants, that these bacteria "fix" the free nitrogen contained in the soil, derived of course, from the atmosphere; and that if the soil be sterilized, by which the bacteria are killed, no fixation of nitrogen can take place, and the growth of the leguminous plants remains appreciably attenuated. The nodular growths on roots growing in ordinary soil have been thoroughly investigated by a large number of observers, and their importance in the process of fixing the nitrogen, and in the proper development of the plant, has been satisfactorily worked out. It has, too, been shown that the nodules on the roots owe their origin to the growth in the tissues of the root of certain bacteria, and it is these bacteria which are instrumental in fixing the free nitrogen.

AN International Congress of Botanists convened August 24th at Madison, Wisconsin, succeeding the meetings of the American Association for the Advancement of Science. Professor Greene was elected President of the Congress.

Various committees on nomenclature, terminology, bibliography, and geographic botany submitted reports which were discussed and acted upon. The session is of such recent date that a full account of the proceedings cannot appear in this issue.

THE Australasian Association for the Advancement of Science, which numbers nine hundred members, meets September 25th at Adelaide, South Australia.

THE Scientific Alliance, composed of the scientific societies of New York city, has determined to raise a sum of not less than \$25,000 to be known as the John Strong Newberry Fund, the income derived from which is to be devoted to the encouragement of scientific work in geology, paleontology, botany, and zoology. Professor N. L. Britton is secretary of the committee which has the matter of subscriptions in charge. The name of the late Professor Newberry is on the list of botanists who in the early days of California's statehood made explorations on this Coast. He was connected with several of the Pacific Railroad survey parties as geologist and botanist, and while on such duty accumulated material for several papers on Pacific Coast botany. His "Forest Trees of Northern California and Oregon" is a well-known contribution to western botany.

IT is not often that a scientific work evokes widespread criticism so suggestive and instructive in its character that it is worth while to gather together scattered critiques and publish them because of their living value and great importance. Yet this has been done for the much abused *Revisio Generum Plantarum* of Kuntze, and appears as Part III. The author has collected and collated all opinions, whether favorable or adverse, and reviewed his reviewers. Although not intended to be such, Part III is proof of the great importance of the parts which preceded it. Those whose criticisms were intended to be of a suppressive nature may be interested in knowing this.

NEW WEST AMERICAN FUNGI.

By J. B. ELLIS AND B. M. EVERHART.

Nectria cytisporina, E. & E.

On dead fir twigs. Seattle, March, 1892, Miss Adella M. Parker.

Stroma cytisporoid, subcuticular, convex, unicellular, olive-gray with a white center, raising the epidermis in distinct pustules, and filled with ovate, dark brown, 2-nucleate stylospores 8 to 10 x 4 to 5 μ . Perithecia 3 to 8, originating in the white central part of the stroma, but soon cespitose erumpent and superficial, ovate, bright red, about $\frac{1}{4}$ mm. diameter, perforated above. Asci cylindrical, short-stipitate, p. sp. about 60 x 6 μ , without paraphyses, 8-spored. Sporidia uniseriate, hyaline, unseptate, not constricted, narrow-elliptical, 7 to 8 x 8 to 4 μ .

Resembles *N. cucurbitula* (Tode), but distinguished by its accompanying stylospores and its smaller asci and sporidia.

Lasiosphæria dichroospora, E. & E.

On clay loam in woods, Seattle, Wash., April, 1892, Chas. V. Piper, No. 170, about 1 mm. diam.

Perithecia densely gregarious, ovate, rugose, black, tough-membranaceous, clothed with a few slender brown hairs. Ostiolum broad convex-papilliform, sometimes sub-compressed. Asci lanceolate, 150 x 8 to 10 μ , p. sp. 100 to 120 μ long, paraphysate, 8-spored. Sporidia biseriate, cylindrical, bent near the lower end, and hyaline below, for about $\frac{1}{3}$ the length of the sporidium, abruptly black above, each end mucronately pointed, about 40 x 4 μ .

A well marked and curious species. The base of the perithecia is sunk in the soil, with the upper half or more free.

Rosellinia pulcherrima, E. & E.

On a piece of fir bark partly covered with earth, Seattle, Wash., Sept., 18, 1892, Adella M. Parker, No. 160.

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Perithecia gregarious, hemispherical, 1 to $1\frac{1}{4}$ mm. diameter, black and shining, coriaceo-carbonaceous, ribbed below, and connected by a thin, mouse-colored, loosely interwoven subiculum. Ostiolum broad-conical, seated in a shallow depression. Asci cylindrical, 110 to 120 x 7 to 8 μ , pseudo-paraphysate, stipitate, 8-spored. Sporidia uniseriate, oblong-fusoid, 2-nucleate, nearly hyaline at first, becoming brown and more or less opaque, 14 to 16 x $3\frac{1}{2}$ to $4\frac{1}{2}$ μ , with a straight, awl-shaped, hyaline appendage at each end, 8 to 10 μ long.

The ribs around the base extend about half way up and are generally quite distinct.

***Anthostomella cornicola*, E. & E.**

On dead twigs of *Cornus*, Seattle, Wash., August, 1892, Adella M. Parker, No. 115.

Scattered, buried. *Perithecia* globose, $\frac{3}{4}$ mm. diameter, partly sunk in the wood and raising the epidermis into convex pustules covered by the black and shining epidermis, which is perforated in the center by the papilliform ostiolum. Asci cylindrical, paraphysate, 8-spored, p. sp. 150 x 8 μ . Sporidia uniseriate, narrow-elliptical, 20 to 22 x 7 to 8 μ , at first with a hyaline coat and a short, hyaline, mucronate tip above, at length opaque.

***Sphærella sidæcola*, E. & E.**

On living leaves of *Sidalcea delphinifolia*, Pasadena, Calif., March, 1893.

Perithecia amphigenous, minute, subcircinate, on small (1 mm.) dead brownish spots. Asci oblong or obclavate, 35 to 40 x 8 μ , fasciculate, mostly curved. Sporidia biseriate, pyriform, greenish-hyaline, 10 to 12 x 4 μ .

***Physalospora agrifolia*, E. & E.**

On leaves of *Quercus agrifolia*, Berkeley, Calif., March, 1893, Blasdale, No. 107.

Perithecia epiphyllous, on large wood-colored spots 1 to 2 cm. diameter, or often occupying half or more of the leaf, and bounded by a narrow, reddish line, sunk in the substance of the leaf, but raising the epidermis into pustules and finally

rupturing it. Contents of the young perithecia pale orange-yellow at first, becoming black, 150 to 200 μ diam. Asci clavate-cylindrical, 45 to 60 x 8 to 10 μ , short-stipitate, 8-spored, without paraphyses. Sporidia biseriate, ovate, hyaline, continuous, 10 to 15 x 5 to 6 μ , subacute below.

Quite different from *P. bina*, Hark., on the same host.

The *Physalospora* is accompanied by a *Phyllosticta* (*P. agrifolia*, E. & E.), with sporules oblong-elliptical, 5 to 6 x 2 μ , and a *Pestalozzia* agreeing with the diagnosis of *P. Saccardoi*, Speg.

Melogramma Columbiensis, E. & E.

On small dead limbs of some tree or shrub, British Columbia, May, 1893, Dr. J. Macoun.

Stromata thickly scattered, small, about 1 mm. diam., sub-angular or hysteriiform, black, soon raising and rupturing the epidermis by which they are closely embraced and partly covered, mostly flattened above. Perithecia buried in the stroma, small, 150 to 200 μ diam., white inside. Ostiola minute, papilliform. Asci clavate-cylindrical, paraphysate, 8-spored, about 100 x 12 μ . Sporidia biseriate, oblong or clavate-oblong, hyaline, 5-septate, constricted at the middle septum, 18 to 20 x 6 to 7 μ , sometimes one of the inner cells is divided by a faint, longitudinal septum. Has the habit of *Botryosphaeria fuliginosa*, (M. & N.).

Montagnella abietina, E. & E.

On dead fir twigs, Seattle, Wash., March, 1892, Miss Adella M. Parker.

Erumpent superficial, cespitose. Perithecia ovate-globose, hard (almost sclerotoid), black and shining, about $\frac{1}{3}$ mm. diam., connected at base by an obscure stroma. Ostiolum papilliform. Asci clavate-cylindrical, short stipitate, paraphysate, 8-spored, 75 to 80 x 10 μ . Sporidia biseriate, oblong-fusoid, yellowish-hyaline, 3-septate and slightly constricted, 15 to 20 x 5 to 6 μ .

Peziza (Dasyscypha) Gaultheriæ, E. & E.

On living leaves of *Gaultheria Shallon*, Seattle, Wash., Sept., 1892, Adella M. Parker, No. 160.

Maculicolous, hypophyllous, ascomata stipitate, nearly closed at first, then open and cup-shaped, $\frac{3}{4}$ to 1 mm. diam., pale orange, hymenium, more deeply colored, clothed outside with a dense coat of short, white hairs. Stipe cylindrical, rather less in length than the diameter of the cup. Asci clavate-cylindrical, slender, 40×3 to 4μ , short-stipitate, aparaphysate. Sporidia biseriate, oblong or clavate-oblong, hyaline, continuous, 4 to $5 \times 1\frac{1}{4} \mu$.

The fungus is seated on large, round spots, 2 to 3 cm. diam., grayish white above, rusty brown below, with a dark purple border shading into red.

Psilopezia trachyspora, E. & E.

On rotten wood, North Bend, King Co., Wash., Aug., 1872, Adella M. Parker, No. 92.

Applanate, $\frac{1}{2}$ to $1\frac{1}{2}$ cm. diam., glaucous brown, margin narrowly incurved, wrinkled outside, reddish brown below, substance white inside. Asci cylindrical, stipitate, 200×18 to 20μ , p. sp. 110 to 130μ long. Paraphyses cylindrical, stout, yellow-brown, 4 to 5μ thick, subequal throughout. Sporidia uniseriate, elliptical, hyaline becoming slightly brownish, 18 to 20×12 to 14μ , epispore coarsely and densely warted.

Distinguished from *Ps. nummularia*, Berk. (which it most resembles), by its smaller size, glaucous color and rough sporidia.

Camarosporium Eriogoni, E. & E.

On dead stems of *Eriogonum* sp. Fort Collins, Colorado, June 13, 1893, C. F. Baker, No. 94.

Perithecia scattered, erumpent, black, globose-hemispherical, about 100μ diam. Ostiolum subpapilliform, perforated. Sporules subglobose or elliptical or subcubical, light brown, 1-septate, and often with one or both cells divided by a septum at right angles to the first (sarcinuliform).

Septoria Araliae, E. & E.

On leaves of *Aralia Californica*, Mill Valley, July 24, 1893, W. C. Blasdale, No. 163.

Spots amphigenous, dirty yellow, whitening out, sub-orbicular, 2 to 3 mm. diam., with a narrow rather darker raised border on both sides of the leaf. Perithecia epiphyllous, minute (70 to 75 μ), collected in the center of the spot, semierumpent. Sporules cylindrical, mostly straight, faintly nucleate, 20 to 28 x $1\frac{1}{4}$ to $1\frac{1}{2}$ μ .

The spots are concave on both sides of the leaf and generally dark brown at first.

Rhabdospora Artemisiae, E. & E.

On dead stems of *Artemisia dracunculoides*, Fort Collins, Colo., July, 1893, C. F. Baker, No. 132.

Perithecia minute, black, prominent, gregarious on slightly blackened spots surrounding the stems or interruptedly confluent along them. Sporules vermiform-cylindrical, hyaline, faintly 1 to 3-septate, undulate, 40 to 50 x 3 μ (at the thicker end).

Differs from *R. pleosporoides*, Sacc. in its smaller perithecia and thicker sporules.

Gloeosporium phyllachoroides, E. & E.

On leaves of *Artemisia vulgaris* var. *Californica*, Pasadena, Calif., July, 1893, Prof. A. J. McClatchie, No. 371.

Acervuli epiphyllous, in compact groups of 4 to 12 together, covered by the blackened epidermis which is raised into pustules about 1 mm. diam., resembling the stromata of some *Phyllachora*. Conidia oblong, curved, obtuse, granular, hyaline, continuous, 14 to 20 x $3\frac{1}{2}$ to 5 μ . Var. *maculicolum* has the acervuli on definite round, dirty brown spots about 2 mm. diam., but does not differ otherwise.

Marsonia ribicola, E. & E.

On leaves of *Ribes aureum*, Fort Collins, Colo., Sept. 1892, C. F. Baker, No. 139.

Spots amphigenous, at first greenish-cinereous, becoming light brown with a darker center and margin, 3 to 5 mm. diam. Acervuli collected around the center of the spots, epiphyllous, pale yellowish, becoming dark, 110 to 150 μ

diam., erumpent. Conidia elliptical, yellowish, uniseptate and slightly constricted, 10 to 14 x 5 to 6 μ , one cell often smaller, ends rounded and obtuse, not curved.

This is quite distinct from *Gloeosporium Ribis* (Lib.)

Cylindrosporium Ceanothi, E. & E.

On leaves of *Ceanothus divaricatus*, Pasadena, Calif., July, 1893.

Acervuli large ($\frac{1}{4}$ to $\frac{1}{2}$ mm. diam.), on small, subangular dark spots on faded, yellow parts of the leaf, prominent below, dark. Conidia elongated, 40 to 55 x $3\frac{1}{2}$ to 4 μ , multinucleate, becoming 3 to 4 or more septate, nearly straight.

Cylindrosporium lactucicolum, E. & E.

On leaves of *Lactuca Ludoviciana*, Fort Collins, Colo., June, 1893, C. F. Baker, No. 110.

Spots amphigenous, indefinite, 2 to 3 mm. diam., light dirty brown above, cinereous below. Acervuli minute (about 60 μ), buried, pale, finally blackened above and appearing like punctiform, suberumpent perithecia. Sporules cylindrical, subundulate, hyaline, nucleate, 20 to 30 x $2\frac{1}{2}$ μ .

On the same leaves are black, subangular spots, limited mostly by the veinlets, 2 to 4 mm. diam., the substance of the leaf in these spots being filled with millions of minute sporules (conidia)? from a size too small to be measured, up to 2 to $2\frac{1}{2}$ μ , subovate, or subballantoid (*Gloeosporium?* *myriosporum*, E. & E.)

Stilbum albocitrinum, E. & E.

On dead twigs, Seattle, Wash., Oct., 1892, Adella M. Parker, No. 105.

Gregarious, about 1 mm. height. Stem white, glabrous or slightly pruinose, subattenuated above. Head subglobose, $\frac{1}{3}$ to $\frac{1}{2}$ mm. diam., pale orange. Conidia narrow-elliptical, hyaline, 3 x $1\frac{1}{4}$ μ .

Differs from the other smooth-stemmed species in its smaller conidia.

Scolecotrichum Typhæ, E. & E.

On dead leaves of *Typha latifolia*, Fort Collins, Colo., June, 1893, C. F. Baker, No. 149.

Hyphæ erect, simple, brown, continuous, or occasionally with a single septum, straight or subundulate, mostly toothed or lobed at the apex, 30 to 40 x 5 to 6 μ . Conidia elliptical, uniseptate (exceptionally biseptate), olivaceous-brown, 14 to 22 x 8 to 10 μ .

The crowded hyphæform short ($\frac{1}{2}$ to $1\frac{1}{2}$ x $\frac{1}{2}$ to $\frac{3}{4}$ mm.), black, subquadrangular, subseriate patches on both sides of the leaf.

Differs from *S. maculicola*, E. & K., in the absence of any spots and the rather smaller conidia.

Scolecotrichum Asclepiadis, E. & E.

On leaves of *Asclepias eriocarpa*, Pasadena, Cal., July, 1893, Prof. A. J. McClatchie.

Epiphyllous; forming dark colored patches 2 to 4 mm. diam., scattered over the leaf and finally subconfluent. Hyphæ in small but dense tufts, simple, straight, continuous, brownish, about 20 x $3\frac{1}{2}$ to 4 μ , bearing at their tips the pale olivaceous, obovate or elliptical, uniseptate conidia, 15 to 20 x 9 to 11 μ , sometimes constricted at the septum.

Hadotrichum Blasdalei, Sacc., in litt.

On leaves of *Vicia gigantea*, Mill Valley, Calif., May, 1893, W. C. Blasdale, No. 126.

Forming small ($\frac{1}{2}$ to 1 mm.), gregarious, erumpent, superficial, dirty olive-colored, thin, appressed patches, mostly on the lower face of the leaf, which here becomes pale yellowish. Conidia elliptic-ovoid, mostly subapiculate at base, 12 to 26 (mostly 15 to 20) x 10 to 14 μ , variously guttulate, olive-brown, continuous. Basidia fasciculate, obclavate, continuous, concolorous, 22 to 26 x 7 to 9, μ , bearing a single conidium at the apex.

Heterosporium tuberculans, E. & E.

On dead herbaceous stems, Fort Collins, Colo., June, 1893, C. F. Baker, No. 155.

Hyphæ subfasciculate, erect, sparingly septate, olive-brown, 100 to 150 x 5 to 6 μ , simple, of about the same diameter throughout, subnodulose or subgeniculate above, subundulate,

arising from a subhemispherical tubercule formed from the substance of the stem and 1 to 2 mm. diam. Conidia elliptical, oblong or ovate, olive-brown, 1 to 3-septate, minutely granular-roughened, 15 to 30 x 8 to 12 μ terminal and lateral.

Uromyces Coloradensis, E. & E.

On *Astragalus* or *Spiesia*, Fort Collins, Colo., June, 1893, C. F. Baker, No. 118.

Æcidium (*Æc. porosum*, Ph.?) evenly and thickly scattered over the lower face of the leaf which is somewhat swollen, erumpent, hemispherical at first, then open, $\frac{1}{2}$ to $\frac{3}{4}$ mm. diam., margin spreading, lacerate-toothed, *æcidiospores* globose, ovate and angular 15 to 22 x 12 to 15 μ , deep orange yellow. Teleutospores, ovate, obovate, globose, angular or otherwise irregular, light chestnut color, smooth, epispore thickened at the apex and generally with a distinct papilla, forming minute ($\frac{1}{2}$ to $\frac{3}{4}$ μ), amphigenous, irregularly scattered sori nearly black while covered by the epidermis, chestnut color when exposed and bare. Pedicels fragile, hyaline, 30 to 40 μ long.

U. Astragali (Opiz.) has smaller, more regularly shaped spores and no *Æcidium*.

Uromyces Gnaphalii, E. & E.

On leaves of *Gnaphalium* sp., Fort Collins, Colo., Nov. 29, 1892, C. F. Baker, No. 71.

III. Sori scattered, hypophyllous, 1 mm. diam., naked, dark chestnut brown. Teleutospores globose or elliptical, smooth, strongly thickened at the apex, but not distinctly papillate, 22 to 30 x 19 to 22 μ , with granular contents. Pedicels hyaline, cylindrical, 80 to 100 x 4 to 5 μ .

Puccinia heterantha, E. & E.

On *Cenothera heterantha*, Basin, Montana, July, 1892, Rev. F. D. Kelsey; Sheridan, Montana, Mrs. L. A. Fitch; on *Oe. ovata*, Berkeley, Calif., March, 1892, W. C. Blasdale.

I. *Æcidia* abundant, scattered over the entire leaf, epiphyllous, though sometimes hypophyllous, short, 2 to 3 mm.

in diameter; border, whitish, spreading, irregularly torn; spores subglobose, smooth orange in color and 18 μ in diameter. Spermogonia abundant.

II and III. Hypophyllous. Uredospore sori scattered, round, $\frac{1}{2}$ to 1 mm. diam., bordered by the ruptured epidermis, cinnamon color. Uredospores, subglobose, 16 to 22 μ in the longer diameter, faintly echinulate. Teleutospore sori same as those of the uredospores, only darker. Teleutospores ovate or oblong-elliptical, smooth, slightly constricted, rounded at both ends, 24 to 32 x 16 to 22 μ , epispore moderately thickened at the apex and mostly with a distinct papilla.

Uredo Californica, E. & E.

On leaves of *Vicia gigantea*, Mill Valley, Calif., May 25, 1893, W. C. Blasdale, No. 126.

Sori mostly hypophyllous, small ($\frac{1}{2}$ mm. or less), soon naked and often subconfluent, olivaceous, not many spots, but the leaf is a little paler (pale yellow above) in the parts occupied by the fungus. Uredospores globose or elliptical, nearly hyaline, faintly aculeolate, 15 to 20 x 10 to 14 μ .

In the effused state this resembles some hyphomycetous fungus. Differs from the Uredo of *Uromyces Fabæ* (Pers.), in its smaller, olivaceous sori and nearly hyaline spores.

Æcidium Gauræ, E. & E.

On leaves of *Gaura parviflora*, Fort Collins, Colo., June, 1893, C. F. Baker, No. 127.

Spots amphigenous, suborbicular, 3 to 8 mm. diam., reddish-purple above, becoming yellow with a reddish-purple border, border paler below. Spermogonia honey-color or yellow, prominent, occupying the spots on the upper surface; Æcidia hypophyllous, innate-erumpent, crowded, small ($\frac{1}{4}$ to $\frac{1}{2}$ mm.), soon open with the spreading margin coarsely lacerate-toothed; æcidiospores globose, smooth, 14 to 17 μ diam., orange-yellow.

This is entirely different from *Æcid. gaurinum*, Pk., which has scattered æcidia.

***Æcidium Columbiense*, E. & E.**

On leaves of *Hieracium* sp., British Columbia, July, 1893,
Dr. J. Macoun.

Hypophyllous, evenly scattered, cups shallow, open, 300 to 400 μ diam., margin dentate-toothed. Spermogonia scattered among the æcidia. Spores orange-yellow, globose, elliptical or subangular, smooth, 15 to 20 μ in the longer diameter.

Differs from *Æc. Hieracii* in its scattered mode of growth.

***Æcidium solidaginicolum*, E. & E.**

On leaves of *Solidago*, Fort Collins, Colo., June, 1893,
C. F. Baker, No. 135.

Spots yellow, 3 to 5 mm. diam. Æcidia amphigenous, but mostly hypophyllous, innate, hemispherical, $\frac{1}{2}$ to $\frac{3}{4}$ mm. diam., pierced at the apex with a small, round opening with a toothed margin, but never open as usual in most Æcidia. Spores globose, orange colored, 20 to 24 μ diam.

The structure of the cups is about the same as in *Æc. hemisphericum*, Pk. This is quite different from *Æc. Solidiganis*, Schu.

CORRECTIONS IN NOMENCLATURE.—III.

By EDWARD L. GREENE.

The name *Glossopetalon* which the late Dr. A. Gray assigned to a western genus being only a homonym, I propose that these shrubs shall bear the generic name

FORSELLESIA.

Glossopetalon, A. Gray, Pl. Wright. ii. 29 (1853), not of Schreber, Gen. i. 205 (1789).

The new name is commemorative of James Henry Forselles, a swedish mining engineer and botanical writer of a half century ago. The species known are the following:

1. *F. spinescens* (Gray l. c. *sub. Glossopetalo*).
2. *F. Nevadensis* (Gray, Proc. Am. Acad. xi. 73 (1875), *sub Glossopetalo*).

As given by Dr. Gray in the Synoptical Flora, the genus *Keerlia* stands for an altogether different group of plants from those to which De Candolle assigned that collective name; and I offer as a needed substitute for this second *Keerlia* the name

BOURDONIA.

Keerlia, A. Gray, Pl. Wright. i. 92 (1852) not of De Candolle, Prodr. v. 309 (1836).

J. Bourdon, a Parisian botanist of some reputation in an earlier part of this century. Of this genus only two species are known.

1. *B. bellidifolia*, (Gray & Engelm. Proc. Am. Acad. i. 47 (1846) *sub Keerlia*).

2. *B. effusa* (Gray, Pl. Lindh. ii. 222 (1850) *sub Keerlia*).

Lotus Davidsonii. *L. sulphureus*, Greene, Pitt. ii. 293 (1892), not of Boissier, Diagn. Ser. I, ii. 35 (1843). This recently detected Californian *Lotus* may take the name of its discoverer, Dr. Anstruther Davidson, since the adjective name at first assigned it was long since applied to an oriental species.

Lotus eriophorus. *L. tomentosus* (H. & A.), Greene, Pitt. ii. 150 (1890), not of Schrader, Neue Journ. 42 (1809).

Butneria occidentalis. *Calycanthus occidentalis*, Hook. & Arn. Bot. Beech. 340 (1840). There seems no room for doubt that Duhamel's *Butneria* is the oldest of the several names that were proposed for this genus between 1755 and 1759.

Astragalus convallarius. *A. campestris*, Gray, Proc. Am. Acad. vi. 229 (1864), not of Linnæus (1753). Inhabits valleys among the Rocky Mountains.

Astragalus elegantulus. *A. pectinatus*, Boiss. Diagn. Ser. I, ii. 54 (1843), not of Douglas in Hook. Fl. Bor.-Am., (1833). A Syrian species, to which Boissier inadvertently gave a homonymous adjective name.

ASTRAGALUS DIVERSIFOLIUS (Gray, Proc. Am. Acad. vi. 230) has precedence over *A. junceus* of the same author, and must be taken up instead of the latter, if, as it is now conceded, there is but one species represented by the two names and descriptions. In any case the name *A. junceus* must fall, on account of the more than thirty years earlier *A. junceus* of Ledebour (Spreng. Syst. iii. 297).

PROCEEDINGS OF THE MADISON BOTANICAL CONGRESS.¹

During the summer of 1893, a committee of American botanists was appointed by C. E. Bessey, Chairman of the Section of Botany, American Association for the Advancement of Science, and W. P. Wilson, President of the Botanical Club, associated with the same institution, to arrange for a Botanical Congress, to be held at Madison, Wisconsin. The call of this committee for such a congress will be found in the July number of the *Bulletin of the Torrey Botanical Club*.

The Congress met in Science Hall, University of Wisconsin, at 10 a. m., Wednesday morning, August 23, 1893, and was called to order by J. C. Arthur, Chairman of the Organizing Committee.

The following resolution, offered by C. E. Bessey, was unanimously adopted:

Resolved, That inasmuch as the attendance of European botanists at this meeting has fallen much below the expectation of the Organizing Committee, so that the desired international character of the assemblage has not been realized, the name of this body be the "Madison Botanical Congress."

A committee consisting of N. L. Britton, C. E. Bessey, J. J. Davis, S. M. Tracy and Conway MacMillan, was appointed to nominate officers for the Congress.

¹This and the succeeding article are essentially reprints of articles in the *Bulletin of the Torrey Botanical Club* for September, proofs of which were kindly sent in advance for our use by Dr. Britton.

On the report of this committee, the Congress was organized as follows:

President—EDW. L. GREENE.

Vice-Presidents: { HENRI L. DE VILMORIN.
LUCIEN M. UNDERWOOD.

Secretaries: { J. C. ARTHUR.
F. V. COVILLE.
B. L. ROBINSON.

Treasurer—C. R. BARNES.

M. Vilmorin presided over the first session of the Congress. Communications were received from Professor Acherson and Professor Engler, of the International Committee on Botanical Nomenclature, appointed at the Congress held last August at Genoa, Italy, and from Dr. Otto Kuntze. They were referred to the American members of the International Committee, Profs. N. L. Britton, John M. Coulter and E. L. Greene.

Topics for consideration by the Congress were suggested by the Organizing Committee, and the following were selected and referred to committees for preparation before presentation:

1. The Nomenclature of Plant Diseases. Byron D. Halsted, Chairman; W. T. Swingle, L. R. Jones.

2. The Terminology of Anatomy and Morphology. Douglas H. Campbell, Chairman; Conway MacMillan, C. E. Barnes.

3. The Terminology of Physiology. J. C. Arthur, Chairman; W. T. Swingle, A. S. Hitchcock.

4. The Nomenclature of Horticultural Forms. Wm. Trelease, Chairman; Henri L. de Vilmorin, B. L. Robinson.

5. Bibliography and Typography. C. R. Barnes, Chairman; A. B. Seymour, N. L. Britton.

A committee consisting of M. Vilmorin and Mr. Coville were appointed to draft suitable resolutions regarding the death of M. Alphonse DeCandolle, and one consisting of Professors Coulter and Britton, to draft similar resolutions relative to the death of Dr. Geo. Vasey.

The Congress convened again on the following morning, the President in the chair.

Professor L. M. Underwood suggested as an additional topic for discussion: 6. The Terminology of Plant Geography. The suggestion was adopted, and the following committee appointed to prepare for its presentation: Mr. F. V. Coville, Chairman; Mr. W. T. Swingle, Professor L. M. Underwood.

In the absence of Professor Coulter, Professor Bessey was appointed to serve on the committee to submit resolutions relative to the death of Dr. Geo. Vasey. W. A. Kellerman, Miss Susan Hollowell and B. L. Robinson were appointed a committee on resolutions.

The committee appointed to submit resolutions regarding the death of M. Alphonse DeCandolle reported as follows:

In response to a common sentiment, the members of the Madison Botanical Congress desire to express their sorrow at the death of Alphonse De Candolle, and at the same time their profound admiration for the greatness of his life and his work.

To him we have looked up as the patriarch, in our times, of systematic botany; and from him we have received not alone the example and incentive for the highest standard of scientific work, but the greater lessons of magnanimity, dignity and simple truth.

We feel deeply the loss of such a friend, notwithstanding the ripeness of his age and the completeness of his work.

HENRI L. DE VILMORIN,

F. V. COVILLE,

Committee.

The report was accepted, ordered engrossed, signed by the officers of the Congress and transmitted to the family of the deceased.

Professor Halsted presented the report of the Committee on the Nomenclature of Plant Diseases. This and the other reports together with their discussion will be published in the official proceedings of the Congress. After much discussion the report was referred to a standing committee of seven, consisting of the three members presenting the report

and Professors Bessey, Kellerman and Atkinson and Mr. Galloway; the committee was requested to report at the next meeting of Section G, A. A. A. S.

The report of the committee on the Terminology of Plant Physiology was presented by Professor Arthur. After full discussion, it was referred to a committee of five, consisting of the three members presenting the report and Professors Barnes and MacMillan; the committee was requested to report at the next meeting of Section G, A. A. A. S.

The report of the Committee on the Terminology of Anatomy and Morphology was presented by Professor Mac Millan. A committee of five, formed by the addition of Professor Farlow and Mr. Roland Thaxter to the three members making the report, was appointed to elaborate the subject and report it as in the two preceding cases.

Professor Trelease presented the report of the Committee on the Nomenclature of Horticultural forms, recommending that for the present the nomenclature of Nicholson's Dictionary of Gardening and the Index Kewensis be followed, looking forward to the ultimate readjustment of the names on the principles approved at Genoa and in the United States. The report was adopted as read.

Professor Barnes reported for the Committee on Bibliography and Typography, submitting a typographical scheme for the citation of authors, which was adopted, and recommendations for securing a complete bibliography of literature relating to American botany, and the production of uniform card indexes to species, plates and papers, which were referred to a committee of five with power to consider and approve means of publication. This committee consists of Professors Barnes, Hitchcock and Britton, Mrs. Alice F. Stevens and Mr. Seymour. This committee subsequently met and recommended the continuation of the Index to Recent Literature relating to American Botany published in the *Bulletin of the Torrey Botanical Club*, with some modification of its present arrangement and typography, and approved the issue of card indexes to American species and

illustrations of American plants as submitted by Mrs. Stevens and Miss Clark of the United States Department of Agriculture.

Professors Bessey, Britton and Kellerman were appointed a committee to memorialize the United States Congress, and the Secretary of Agriculture to provide safe and commodious quarters for the National Herbarium.

The committee appointed to prepare resolutions relative to the death of Dr. Geo. Vasey, reported as follows:

The death of Dr. Geo. Vasey, Botanist of the United States Department of Agriculture, which occurred on March 4th, 1893, has called from us one of America's most widely known botanists. Dr. Vasey occupied for more than twenty years the most prominent botanical position in the gift of our national government, and administered the duties of his office in a most effective and enlightened manner. It is due to his continued exertions that our National herbarium has attained its present rank as one of the chief centers of botanical research. His extensive contributions to the literature of the Gramineæ have made his name familiar to botanists of all countries. Be it therefore

Resolved, That the Madison Botanical Congress realizes that in the death of Dr. Vasey, botanical science has suffered a most serious loss; and

Resolved, That this preamble and resolutions be entered on the minutes of the Congress, and that a copy be engrossed, signed by the officers of the Congress, and transmitted to the family of the deceased.

CHARLES E. BESSEY,
N. L. BRITTON,

Committee.

Mr. Coville presented the report of the Committee on the Terminology of Geographical Botany. The report was accepted and the committee requested to continue the consideration of the subject and submit it at the next meeting of Section G, A. A. A. S.

It was resolved that the secretaries of the Congress be authorized to publish and distribute the proceedings, and that the expense of such publication not met by funds available to the Organizing Committee be assessed on the members of the Congress.

The committee on memorializing the government relative to the National Herbarium reported as follows:

Whereas, The National Herbarium, with all its wealth of specimens of inestimable value, is at present deposited in a building which from its construction and use is peculiarly liable to destruction by fire; and

Whereas, Such destruction would be an irreparable loss to the science of botany. Therefore, be it

Resolved, That we, the members of the Madison Botanical Congress, hereby appeal to the Senators and Representatives of the National Congress to make early provision for a suitable fire-proof building for the preservation of this scientific treasure, and we would respectfully request the Secretary of Agriculture to urge upon Congress the desirability of prompt action in this matter.

CHARLES E. BESSEY,
N. L. BRITTON,
W. A. KELLERMAN,
Committee.

Resolutions tendering the cordial thanks of the Congress to Professor Chas. R. Barnes and other members of the local committee of arrangements for their arduous labors in behalf of the comfort and entertainment of the members, and to Dr. Otto Kuntze of Friedenau, Germany, for a supply of his pamphlets containing proposed amendments to the Paris Code of Nomenclature, were reported by the Committee on Resolutions and unanimously adopted.

The Congress then adjourned.

PROCEEDINGS OF THE BOTANICAL CLUB OF THE AMERICAN ASSOCIATION.

The American Association for the advancement of science met at Madison, Wisconsin, August 18 to 22 inclusive. A synopsis of each day's proceedings of the Botanical Club of the Association is given below.

FRIDAY, AUGUST 18.

In the absence of the President, W. P. Wilson, the meeting was opened by the Vice-President, W. A. Kellerman.

In the absence of the Secretary, W. A. McBride, his office was filled by the election of W. T. Swingle.

The report of the Committee on Nomenclature, appointed at the Rochester meeting of 1892 to prepare a check-list of the flowering and fern plants of Northeastern North America, was made by N. L. Britton, Chairman. The list was presented nearly complete for printing. Discussion of the report occupied the remainder of the day's session. The report was received, and the following recommendations of the committee were adopted:

1. The amendment of Section III of the Rochester Code of Nomenclature by striking out all after the word "retained." This recommendation is based on the mature judgment of the committee after watching for a year the progress of the demand for a rule which shall admit no exceptions whatever and affect the closest approximation to the immutability of the specific name. This action authorizes the use of specific names identical with the generic, such as *Catalpa Catalpa*, and preserves the immutability of the specific name, in whatever genus it is first published, even if the same binomial has been published between the time of the first publication of the species and its transfer to the accepted genus, as for example:

SISYMBRIUM PINNATUM (Walt.), Greene.

Erysimum pinnatum, Walt. Fl. Car.—(1788).

Sisymbrium canescens, Nutt., Gen. ii., 68 (1818), not

Sisymbrium pinnatum, Barn. in Gay. Fl. Chil. ~~1825~~
(~~1825~~), which is to receive another name.

2. That the general sequence of natural orders as taken up in Engler and Prantl's "Naturliche Pflanzenfamilien" be adopted. The check-list will therefore begin with the Pteridophyta, followed consecutively by the Gymnospermæ, Monocotylodoneæ and Dicotylodoneæ.

3. That in determining the name of a genus or species to which two or more names have been given by an author in the same volume or on the same page of a volume, precedence shall decide. For instance: *Tissa* stands on the same page

as *Buda* in Adanson's "Familles des Plantes," but has precedence by a few lines, and is therefore to be adopted.

MONDAY, AUGUST 21.

The report of the Treasurer was received and accepted. It indicated a deficit of \$6.16, which was made up by voluntary contributions. Professor A. S. Hitchcock and Dr. Erwin F. Smith were appointed a committee to nominate officers for the next meeting of the Club.

Discussion of the remainder of the report by the Committee on Nomenclature was postponed until Tuesday, and the matter was referred to the committee for reconsideration. It consisted of recommendations relative to the time and method of publication of the list and to the maintenance of the original name in case of plants first published as varieties but subsequently elevated to species, and of plants first published as species but subsequently reduced to varieties.

Mrs. Britton read a paper on "The Genus *Bruchia* in North America," illustrated by specimens and drawings. The paper will be published in a future issue of the *Bulletin*. Mrs. Britton remarked also on the necessity of the examination of types of critical species in the preparation of monographs or other works of reference. Professor Greene alluded to the method of certification of types and duplicate types adopted by him, by the statement of the place of publication on the labels. Miss Harrison remarked on the identification of types in the National Herbarium.

W. A. Kellerman stated that the original drawings of the plates of Sullivant's "Icones Muscorum," together with many of the specimens used in executing these drawings, had recently been incorporated with the bryological collections of the Ohio State University.

A. S. Hitchcock exhibited specimens of the recently-described *Ampelopsis quinquefolia*, var. *vitacea*, Knerr., and remarked on the relationship of the plant to the Virginia Creeper. He demonstrated the difference of leaves, tendrils, inflorescences and canes, remarked on the difference in time of blooming, and maintained that they are specifically distinct.

J. C. Arthur exhibited and described a new centrifugal machine for physiological investigations.

A paper by D. T. MacDougal, on "The Intertwining of Tendrils," was read by J. C. Arthur. The plant most studied in this investigation was *Micrampelis lobata*.

Mrs. Britton described the Jæger Moss Herbarium recently acquired by Columbia College.

Professor Kellerman alluded to the Ohio State Forestry exhibit at Chicago, and stated that *Ilex opaca*, hitherto not certainly known from that State, had been found by him in Sim's Creek, Lawrence County, near the Ohio River; he doubted the occurrence of *Magnolia tripetala* in the State, although it had been reported, and remarked that all the localities given for *Chamæcyparis thyoides* had yielded only *Thuja occidentalis*. *Polypodium Polypodioides* had been found on rocks in Scioto County.

A. S. Hitchcock described the pollination of *Cenothera Missouriensis*: This plant was in flower in the vicinity of Manhattan between May 23d and June 6th. The flower opens in the latter part of the afternoon, but the stigmas may protrude from the bud as early as 2 p. m. The calyx tube is narrow and about eleven centimeters long, and is as much as half filled with nectar. Just before 8 p. m. the flowers were abundantly visited by a sphinxmoth (*Deilephila lineata*). An individual would support itself above the expanded flower, insert its proboscis, which usually measures about 45 mm., and push its head as far into the throat as possible. Excepting ants, no other insects were observed to visit the flowers, and the visits of the moths ceased at dark. Only the uppermost portion of the nectar is obtained by the insect, but the latter is detained in the flower by its endeavor to secure more. It would seem that the flower was adapted to a moth with a larger proboscis, but none are known to occur in the vicinity except the potato moth. Professor Hitchcock also described the pollination of *Pentstemon Cobæa*.

Dr. Erwin F. Smith called attention to the fact that a tumor, not due to nematodes, was becoming increasingly

prevalent in the United States on the roots of peaches, almonds and other stone fruits. These tumors vary in size from a pea to that of a man's fist. Nursery stock is especially subject to attack, and the roots of a small tree may often bear half a dozen, nearly the whole energy of the plant being used up by these abnormal growths. The disease occurs from New Jersey to Georgia and west through Michigan and Missouri to Arizona and California. It is now most prevalent on the Pacific Coast, where its depredations are serious and increasing every year. A microscopic examination of the inner tissues of fresh young tumors has not shown the presence of animal or vegetable parasites, and their cause is still a mystery. The most suggestive hypothesis is that they may be caused by external irritation, *i. e.*, to some parasite acting from without. It is a subject becoming economically more and more important, and will soon demand critical study by some vegetable pathologist.

D. H. Campbell remarked on a preliminary study of the prothallium in Ophioglossaceæ, and exhibited this organ in *Botrychium Virginianum*.

C. E. Bessey read a paper on "The Use of Personal Names in Designating Species." He strongly condemned the practice. N. L. Britton called attention to the propriety of the use of personal adjectives in genera of a very large number of species, where all the available descriptive adjectives have been exhausted, and also of the valuable historical feature in the association of the first collector's name with a species. A. B. Seymour approved the position taken by Dr. Bessey. Professor Coulter favored the use of personal names for the reasons advanced by Dr. Britton and on the ground that they were conducive to stability.

TUESDAY, AUGUST 22.

J. C. Arthur exhibited and described a new form of registering auxanometer.

W. T. Swingle read a paper on "The Southernmost Botanical Laboratory of the United States." He described the

Subtropical Laboratory of the Division of Vegetable Pathology, United States Department of Agriculture, established at Eustis, Florida. The building has been erected by the citizens of Eustis, is 46 feet long and 34 feet wide and contains six rooms, one of them a visitor's Laboratory, which is provided for the use of students not connected with the institution. There is also an experimental garden of one and one-half acres. The Library consists of about 1,000 volumes and 1,000 pamphlets, and all the more important botanical serials are received. Mr. Swingle also exhibited and described a new Florida palm, related to *Sabal Palmetto* and known as the Etonia palm. He called especial attention to the fact that Florida still contains a large number of new or imperfectly known species of plants.

Byron D. Halsted described a new species of *Exobasidium*, *E. Peckii*, occurring on *Andromeda Mariana* and causing the enlargement and modification of its flowers. He also showed specimens of *Rhamphospora Nymphaeæ*, an Indian fungus now found on water-lily leaves in America, of a *Phyllosticta* following insect work and an Ascomycete on *Pistia stratiotes*.

Mrs. Britton remarked on some of the more interesting mosses collected on Saturday's trip to the dells of the Wisconsin River.

A. B. Seymour read a paper on "The Synonymy of *Valsa stellulata* and its Synonymical Allies." He also exhibited copies of a dichotomous key to the lichen genus *Cladonia*, arranged by Dr. F. Le Roy Sargent.

A paper by S. A. Beach, "Some Observations on Black Knot," was read by Dr. B. D. Halsted and discussed by Professors W. H. Brewer and H. L. Bolley. The infection was noticed as much worse adjoining a row of old and badly infested plum trees. Proof was also adduced that infection must have taken place a year previous to the appearance of the disease.

The following papers were read by title: "Sand Dune Weeds," by L. H. Bailey; "Propagation of *Ranunculus*

delphinifolius by Runners," by W. W. Rowlee; "Some Notes on the Germination of the Spores of *Enteridium Rozeanum*," by Elias J. Durand; "Herbarium Entomology," by C. V. Riley; "Yucca Pollination," by C. V. Riley; "Notes on a hexenbesen of *Rubus*," by B. T. Galloway; "The Falling of Pine Leaves," by B. T. Galloway; "Some Methods Employed in the Investigation of parasitic Fungi and other Organisms," by B. T. Galloway.

The committee appointed at the Rochester meeting to consider and report on the advisability of forming a national botanical society presented a majority report disapproving the formation of such an organization at the present time, and Professor C. R. Barnes presented a minority report recommending its immediate establishment by the selection by the Club of a committee of ten who shall select fifteen others, these twenty-five to be the charter members of the society. The minority report was accepted, and a committee of ten selected by ballot. The Committee on Nomenclature was authorized to proceed with the publication of the checklist, and matters concerning it not determined by the Club were referred to the committee with power, and the committee increased to nine members by the appointment of Professors Edward L. Greene and Wm. Trelease.

Officers for the next meeting were elected as follows: President, Professor Douglas H. Campbell; Vice-President, Professor Daniel C. Eaton; Secretary and Treasurer, Mr. W. T. Swingle. Brooklyn will probably be the place of the 1894 meeting and San Francisco that for the gathering of 1895.

ORGANIZATION OF A SOCIETY OF AMERICAN BOTANISTS.

By N. L. BRITTON.

At the meeting of the Botanical Club of the American Association for the Advancement of Science, held at Madison,

Wisconsin, August 23, 1893, a committee of ten botanists was selected by ballot to choose fifteen others, these twenty-five to be charter members of a new botanical society. The committee met the following morning and performed the duty assigned, the charter members thus chosen being as follows: J. C. Arthur, G. F. Atkinson, L. H. Bailey, C. R. Barnes, C. E. Bessey, E. G. Britton, N. L. Britton, D. H. Campbell, J. M. Coulter, F. V. Coville, Daniel C. Eaton, W. G. Farlow, E. L. Greene, B. D. Halsted, Arthur Hollick, Conway MacMillan, B. L. Robinson, C. S. Sargent, F. L. Scribner, J. Donnell Smith, Roland Thaxter, Wm. Trelease, L. M. Underwood, Lester F. Ward, W. P. Wilson.

Two informal meetings of those of the above list in attendance on the Madison Botanical Congress were subsequently held, and a committee of organization appointed consisting of Wm. Trelease, Chairman; J. M. Coulter, Conway MacMillan, L. H. Bailey and C. S. Sargent.

This committee was instructed to inform the others of the twenty-five charter members of the action taken to draw up a constitution and to report at a meeting to be held beginning on the Monday preceding the next meeting of the American Association for the Advancement of Science, and at the same place selected for the meeting of that association. Numerous topics were discussed at these informal meetings, among them the name of the new organization for which the terms Americal Botanical Society, Botanical Society of America and Society of American Botanists were proposed; the standard of membership to be maintained; the question of one or more classes of members; the fees for membership and initiation; the work of the organization, including publication, the number of annual meetings and the encouragement of research. No formal action on any point was taken, but the opinions of those present were obtained and ordered placed in the hands of the chairman of the committee of organization.

NOVITATES OCCIDENTALES.—V.

By EDWARD L. GREENE.

Astragalus supervacaneus. Perennial, very sparingly strigose-pubescent, the decumbent stems a foot long: leaflets 10 to 14 pairs, oblong-linear: peduncles elongated and with the rather short and few-flowered racemes little surpassing the leaves: calyx with slender almost filiform teeth about equalling the tube: pod on an exserted rather slender stipe, coriaceous, transversely rugulose, of oblong-ovate outline, strongly obcompressed and incurved, $\frac{3}{4}$ inch long, the cross section almost ∞ -shaped by the intrusion of both sutures.

At middle elevations in the mountains of Fresno Co., Calif.; communicated by Mr. Frank Nutting. Species with aspect of *A. lentiginosus*, but pod very different.

Astragalus demissus. Stems slender, tufted from a perennial root, nearly prostrate, a foot long; herbage almost cinereously strigulose-pubescent: stipules triangular, distinct: leaflets about 9 pairs, linear-oblong, $\frac{3}{4}$ inch long: racemes short-peduncled, elongated, exceeding the leaves, many-flowered though not dense: calyx-teeth subulate from a broad base, very unequal, the upper shorter than the tube, the lower exceeding it: pod oblong, 4 lines long, appressed-pubescent, slender-stipitate, 1-celled, obcompressed, the ventral face slightly channeled on either side of the prominently raised suture.

Valley of the Humboldt River near Palisade, eastern Nevada, July, 1893. Species as much like *A. flexuosus* as any other in point of habit and general appearance; but the peculiarities of the pod determine its affinities to be with *A. bisulcatus*.

AMELANCHIER PALLIDA, Greene, var. **arguta.** Habit bushy and compact, the leaves pallid and coriaceous, as in the type of the species; but bark of mature stems very dark: twigs, foliage and winter buds cinereously tomentulose: leaves

broadly obovate, coarsely and incisely serrate all around except at and near the acutish base, those of vigorous sterile shoots even somewhat lobed and the lobes with a serrate tooth or two: petals unknown: fruit nearly as in the type, but calyx-segments narrower.

North sides of desert hills near Humboldt Wells, in eastern Nevada, July, 1893. The leaf-outline in this shrub is sufficiently characteristic to indicate for it specific rank, and both the habit and habitat are quite peculiar for an *Amelanchier*. If a mere variety, the hue and texture of the foliage determine its place to be under *A. pallida* rather than *A. alnifolia*.

Saxifraga umbellulata. Perennial, fibrous-rooted, the crown proliferous by numerous sessile bulblets: leaves all radical, dark-reddish beneath, $\frac{1}{2}$ to $\frac{3}{4}$ inch long, the blade from rhombic-ovate and -obovate to spatulate-oblong, tapering to a broadly winged petiole of nearly or quite its own length, surface glabrous, margin dentate or entire: scape simple, 3 to 5 inches high, glandular-pubescent: flowers in a terminal almost flat-topped cluster made up of sessile 3-flowered umbellules: calyx-lobes as long as the tube, obtuse, ascending: petals spatulate-obovate, obtuse, white or pinkish: filaments stout, linear: ovary neither flattened above nor surrounded by any disk: carpels stout, recurved.

On high and dry gravelly spots at 7000 to 8000 feet altitude in the Sierra Nevada of California, from near Donner Lake southward at least to Mt. Dana; usually referred to *S. nivalis*, but entirely distinct in vegetative as well as floral characters.

Saxifraga nidifica. Near *S. integrifolia*, but crown and roots embedded in a dense subglobose mass of small bulblets: leaves ovate or obovate, entire or merely denticulate, an inch long, on dilated petioles rather shorter: scape 8 to 12 inches high, stoutish, glandular-hirsute: cymes several-flowered and pedicellate, forming a thyrsoid panicle toward the summit: calyx-segments ascending, oblong-ovoid, acutish

and mucronulate: petals round-obovate, not unguiculate, white: filaments very short; anthers dull red: ovary very broad at summit, depressed and even slightly concave: carpels not known.

In wet springy places at about the same elevations as the preceding, in the Californian Sierra. Readily distinguished from *S. integrifolia* by the firm almost coralline dense mass of bulblets from the midst of which spring the leaves and scape. But being a much smaller plant than *S. integrifolia*, such specimens of it as are extant in herbaria may well be sought among those of *S. nivalis*.

Arabis atrorubens, Suksdorf in herb. Perennial, erect, a foot high, pale and glaucescent or the herbage becoming purplish in full maturity: radical leaves spatulate-oblong, an inch long, stellate-pubescent; cauline ones glabrous, ovate to ovate-lanceolate, sessile and auriculate-clasping, all rather remotely and coarsely serrate-toothed: raceme simple, strict, few-flowered: sepals and petals (the latter twice the length of the former) dark-red, the sepals sparsely pubescent with short branching hairs: pods suberect, narrowly linear, acute, 3 inches long or more: seed flattened, narrowly wing-margined.

A beautiful species, obtained by Mr. Suksdorf on rocky summits of mountains in Klickitat Co., Washington, May, 1892.

Senecio lactucinus. Glabrous throughout; stems solitary, erect from a perennial root, a foot high or less, leafy at base, gradually less so above, at summit thyrsoid-paniculate: radical leaves oblong-ovoid, 2 or 3 inches long, tapering to a narrow winged petiole of equal length; cauline spatulate, sessile, auriculate; all coarsely irregularly and somewhat runcinately dentate: heads numerous, small, few-flowered; involucre not calyculate-bracted, the scales about 7: rays none.

Dry shades at the northern base of high rocks near Sherman, Wyoming, 1 Aug., 1893. Plant quite resembling, when

not yet in flower, some small lettuce or sow thistle; its affinities apparently with *S. cernuus* of the Colorado Mountains, though the rather crowded very small heads are quite erect.

Ptiloria divaricata. Perennial, the tufted and diffusely branching stems in no degree woody at base, the monocephalous flowering twigs rather long, slender and divaricate: early leaves 2 inches long, linear-lanceolate, runcinately toothed; those of the growing branches subulate, less than an inch long, spreading or recurved, commonly with a few small runcinate teeth at base, those of the ultimate branchlets reduced to the short-subulate and almost spinescent: heads 4 or 5 lines high, 6- to 9-flowered, the involucre subtended by imbricated bractlets: achenes angular, nearly smooth: pappus-bristles 12 to 15, brownish, slightly dilated and more or less joined into bundles of 3 at the naked base, the upper half strongly plumose.

Foothills of the Kern Co. mountains, near Caliente, Calif., Norman C. Wilson, 1893.

NOTES ON WEST AMERICAN CONIFERÆ.—III.

By J. G. LEMMON.

Bibliography of Two Californian Pines.

The confusion which has prevailed concerning the Monterey Pine and the Knobcone Pine invites an examination of the earlier descriptions and of the many names that have been given these Californian species.

MONTEREY PINE.

The earliest writer who is known to me to have treated of a Californian pine is Loiseleur de Longchamps, who published—1810 to 1825—what has become a classical treatise on trees and shrubs, usually referred to as “Nouveau Duhamel,” being an enlargement and continuation of the “Traite” of Duhamel, the leading French dendrologist of the eighteenth century.

This earliest reference being of unusual interest on account of the rarity of the volume containing it, an authenticated copy of the original follows:

Pinus Californiana. P. foliis geminis ternisve, gracilibus; strobilis folio multo longioribus.

Pin de Californie. P. à feuilles géminées ou ternées, grêles; à cônes beaucoup plus longs que les feuilles.

Je n'ai pas cru devoir négliger de faire connaître cette espèce, quoique le seul individu que j'aie vu au Jardin des Plantes n'eût ni fleurs ni fruit; la note qui m'a été communiquée par M. le professeur Thouin ne pouvant laisser de doute sur l'existence de ce Pin, comme espèce distincte. "Cet arbre croît dans le voisinage de Monte-Rey, en Californie. Un de ses cônes, recueilli par Colligon, jardinier de l'expédition de La Peyrouse, fut envoyé au Muséum d' Histoire en 1787. Ce cône avait la forme de celui du grand Pin maritime, mais il était plus gros d'un tiers dans toutes ses dimensions. Sous chacune de ses écailles se trouvaient deux semences de la grosseur de celles du Pin Cembro, et dont l'amande était bonne à manger. Ces graines, semées au Muséum, ont produit douze jeunes plants, qui, cultivés dans l'orangerie, se sont conservés pendant long-tems. La plupart ont été donnés à des cultivateurs des départemens méridionaux. Il en existe encore un pied au Jardin des Plantes, placé depuis quelques années en pleine terre dans le lieu nommé la petite butte; sans être trèsvigoureux il se maintient en santé." J'ajouterai que cet arbre a environ sept pieds de haut; que ses feuilles sont longues de trois pouces, très-menues, d'un vert peu foncé, et qu'elles sont réunies deux ou trois ensemble dans la même gaine.—From Duhamel's *Traité des Arbres et Arbustes*, 2d Ed., Vol. 5, page 243-244.

Herein is described a pine, doubtless from Monterey, California, with "leaves three inches long, slender and in pairs, the cones much longer than the leaves." The cones are described as resembling those of the great Maritime pine, but one-third larger in every dimension, i. e., three to six inches long, three to four thick at the broadest part, which is below the middle—terms which might designate a large cone of the pine in question, but the description of the seeds, large as those of the Cembra pine and good to eat, show confusion with one of our nut pines, although the *planted* seeds produced trees similar to our Monterey pine.

J. C. Loudon, in his *ARBORETUM*, (iv, 2268, (1854), pub-

lishes *Pinus Californiana* of Loiseleur, quoting the latter's description, and adds: "M. Vilmorin informs us that the tree in the nursery of M. Godefroy, at the Hort. Soc. gardens, from which all the young plants sold by him have been produced by inarching, is supposed to be the only one existing of those sent home by Colladon. It is protected every winter; those planted in the open ground in the Jardin des Plantes are all dead. The species is interesting," Mr. Loudon continues, "especially to the French, as being the only plant that has been preserved of those sent home by the expedition under La Peyrouse." *Pinus Montereyensis*, Godefroy; *P. montheragensis*, Ranuch; *P. Llaveana*, Otto, and *Pin de Monterey* are names met with in early writings and are quoted as synonyms for *Pinus Californiana*, Lois, but mostly without a word of description.

An early description (1816) of a tree—*Pinus adunca*, Bosc., by Poiret (in the Supplement to Lamarck's Encyclopædia, iv, 418)—is supposed to apply to this tree. Although Poiret seems to have seen the Loiseleur pine in the Jardin des Plantes, his account taken by itself contains little besides a good description of the leaves—so *adunca*, as a name, must be rejected.

In the Botany of Beechey's Voyage, Hooker and Arnott declared Loiseleur's description "too indefinite and uncertain." Spach, Nuttall, Endlicher, Bigelow, Newberry, Gordon, Torrey, Murray, Parlatores, Carriere, Lawson, Bentham, all ignore Loiseleur's *P. Californiana*.

Dr. Engelmann, in the Botany of California (ii, 128), under *Pinus insignis*, Douglas, admitted: "This species is probably the old *P. Californiana* of Loiseleur," but he adds: "which has never been identified." The writer of the present article published in Mining and Scientific Press (January 16th, 1892), and also in Garden and Forest (February 10th, 1892), a brief paper advocating the resumption of Loiseleur's name, *P. Californiana*.

It requires but a slight acquaintance with the tree in question and a casual reading of the descriptions of Loiseleur,

Thuin and Poiret, to incline one to believe that the Pine of Monterey was certainly alluded to by them, for, besides being partially described, as to leaves, the tree was then, as now, abundant around that ancient embarcadero, visited by Collignon, and is, practically, the only pine that would be noted for miles around, except by keen-eyed botanists like Douglas and Coulter, who did not visit the region until 1830–1831.

Nevertheless, all that has been said and written about the Loiseleur pine will apply to any three-leaved, maritime pine which the members of the Peyrouse expedition might have collected on their long voyage, and which, subsequently, was grown, feebly for a few years, at the Jardin des Plantes. Consequently, *P. Californiana* must be rejected; and the first name followed by a description sufficiently full for identification must be employed for this species.

When preparing in 1887 the Botanist's Report upon the Pines of the Pacific Slope for the California State Board of Forestry, I entered into the discussion of the nomenclature of this pine with some detail and argued that David Don's name of *Pinus radiata*, published in 1837, (Linn. Trans. xvii, 442), was the rightful name of the species. Don's description (being translated) reads:

Pinus radiata. Erect trees attaining the height of about 100 feet, with copious spreading branches reaching almost to the ground. Cones in clusters, ovate, about six inches long, ventricose at the external base; scales bright brown, shining, radiately-cleft, cuneate, dilated at the apex, quadrangular, truncate with a depressed umbilicus, those at the external base three times larger than the others, with the apex elevated, gibbous and somewhat recurved.

The leaves were not seen by Prof. Don. They were rightly conjectured to be in threes. All these terms correctly designate the large-coned form of the Monterey pine. The character ascribed to the cone-scales—"radiato-rimosis," variously translated as "radiate-scaled" and "radiate-spreading"—perhaps was suggested to Don by the radiating lines often found marking the apex of the larger, knob-like scales.

Don also described another pine from the same locality, "near the sea at Monterey," under the name of *Pinus tuberculata*, the description being in the same volume, on the same page just beneath the description of *P. radiata*, and not before it on page 441, as usually quoted. The leaves are wanting as in the other, but rightly supposed to be in threes. "Cones oblong with unequal sides, four inches long, two and one-half thick, scales quadrangular truncate, those at the exterior base larger and conical, with an elevated apex."

The trees are described as like those of preceding species, and Don adds: "Found by Coulter along with the preceding, which it resembles in size and habit, but essentially distinguished by the form of its cones." All these terms accurately describe a small-coned form of Monterey pine.

Another pine should be referred to in this connection: *Pinus Sinclairi*, Hooker and Arnott in the Botany of Beechey's Voyage, p. 392, (1840,) which is described as found abundantly at Point Pinos, near Monterey. A beautiful figure accompanies the description of a cone shaped like that of the Monterey pine, but over 12 inches long! Dr. Engelmann, who examined the specimens in the Kew herbarium in 1879, writes in the Botany of California, Vol. II, p. 128: "*Pinus Sinclairi*, Hook. & Arn., is a factitious species founded upon a cone of *P. Montezumæ* and the foliage of *P. insignis*, Douglas, while *P. radiata* of the same authors (not of Don) is made up of the foliage of the former species and cone of the latter."

Mr. Lambert in his *PINUS*, 3rd ed., iii, 133, fig. 86, 1842, described *Pinus radiata*, quoting Don's language, and added a good figure of a large cone, presumably the one upon which Don based his description.

Mr. Loudon, two years later, published in his *ARBORETUM* Don's name and description, also giving a good but reduced figure.

Mr. Loudon, also in the same volume, publishes fully our tree, giving its characters of trunk, fruit, foliage, etc., adding good figures of a middle-sized cone and of the seeds and leaves—the latter much twisted—all under a name assigned

by David Douglas, *Pinus insignis*. Loudon's being the first exact description was adopted by most botanists of the period; and if description in fullness of detail, with figures of important organs, may be insisted upon, the selection of *Pinus insignis*, Douglas, must be commended. But over this name Don's *P. radiata* has priority by seven years; and this last is the one which, in my judgment, must hold for the Monterey pine.

KNOB-CONE PINE.

Theodor Hartweg must be credited with the discovery of the Knob-cone pine. He found it in 1846, while exploring the Santa Cruz mountains at a point about twenty miles by sea northward from Monterey. His account of it was published in Jour. Hort. Soc., London, ii, 189, (1847). Thinking the tree "probably the doubtful and little known *P. Californica* of Loiseleur," he described it at some length: "The tree seems to be of slow growth, seldom more than twenty-five feet high and eight inches in diameter; the leaves are in threes, about $4\frac{1}{2}$ inches long; cones oblong, five to five and one-half inches long by two inches wide, the outer surface much developed, enclosing the winged seeds. The cones are only produced on the main stems; when ripe they are of a light brown color, and they stand off at right angles from the tree; when old they are of a silvery gray." He concludes with a most important character concerning the cones, describing them as "pressing firmly upon the stem for a series of years without opening and shedding their seeds." If he had happened to have given it a name he might have become the author of the species, but "*Californica*" cannot be distinguished except grammatically from *Californiana*, so Hartweg's name falls among the synonyms.

Two years later (1849), Geo. Gordon described in Jour. Hort. Soc., iv, 212, "Some newly-introduced conifers collected by Mr. Hartweg in California." The list embraces three species of pine, and the paper is preceded by the remark, "As Professor Don's materials were very imperfect, so his descriptions were defective and inaccurate, which led Mr.

Hartweg into the error of giving new names to trees previously published. "As Professor Don's names have priority, I propose," continues Mr. Gordon, "to cancel such of Hartweg's names as require it." He then proceeds to describe correctly, at great length, with an excellent figure of the cone, (but representing leaves too large,) Mr. Hartweg's little slender-cone pine—but under Don's name of *Pinus tuberculata*.

A. B. Lambert, in 1842, in his PINUS, 3rd ed., iii, 131, Tab. 85, had published a pine as *Pinus tuberculata*, Don, giving Don's description of his small form of Monterey pine; but Mr. Lambert gives two figures, a front and back view of a true Knob-cone pine, four and one-half inches long by two inches thick, widest near the middle, outer scales largest, elongated, conical or quadrangular, attenuate, surmounted by a small incurved prickle—precisely the characters of our narrow, Knob-cone pine. The cone for these illustrations must have been obtained from Mr. Douglas, and he perhaps collected it in Oregon, for the species extends to the southern mountains of that State. Further, it is perhaps his "Oregon Pitch pine," a name that has been confounded with his "Remarkable pine" from Monterey.

The name *tuberculata* comes up again in that peculiar "Report of the Oregon Committee," published anonymously, but credited to Prof. Balfour. Copies of it are very rare and I am fortunate in being able to consult one in the possession of the widow of the late Dr. C. C. Parry. The report treats of the collection of John Jeffrey in northern California, and five species of pine are described and figured, one of them "*Pinus tuberculata*, Don, found near Mt. Shasta in Lat. 41 degrees, at an elevation of 5,000 feet."

Mr. Gordon, in his two editions of PINETUM, 1858 and 1875, still employed Don's name for this species of pine—as also have, subsequently, Parlatore, Carriere, Koch, Bolander, Vasey, Lawson, Engelmann and Masters—all crediting the authorship, however, not to Don, but to Gordon. We agree with these writers for holding that Don's description, as far as it goes, refers to a form of Monterey pine, and that the

tree which Gordon described was different and unnamed; and why did they not, therefore, assign it a name?

Dr. Engelmann's language concerning this procedure (illustrating the practice of botanists only a few years ago) is given in *Bot. Calif.*, ii. 128 (1880), in a note under *P. tuberculata*: "The name *P. tuberculata* originally given to a form of the last species (Monterey pine) was transferred to this after Jeffrey's discoveries in 1852, and having been so used invariably since, should be retained."

Finally, in the brief article published by the present writer in *Mining and Scientific Press*, January 16th, 1892, and in *Garden and Forest*, February 10th, 1892, attention was called to the fact that Gordon, when he described the narrow, Knob-cone pine, supposed it was the same species that Don had described, but since it is known that Don was dealing with a form of the Monterey pine (a species to which he had already given the name of *radiata*), his name of *tuberculata* was unavailable for this second species, and has been so ever since the distinctness of the species was known.

The name *Pinus attenuata* was then proposed for the unnamed pine, a name suggested by the long, tapering character of the cone, as well as the slender habit of the tree when compressed by others in groves, which is its usual condition. The name *Pinus attenuata*, Lemmon, has been taken up by Sargent, Fernow, Sudworth and others.

CALIFORNIAN HERB-LORE.—II.

By IDA M. BLOCHMAN.

In sylvan seclusion, usually on hillsides where the tired collector is fain to rest and enjoy the woodsy things about him, dwells a favorite, the *Aspidium rigidum* var. *argutum*. If one seek to domesticate it, it is a disappointment unless conditions are very favorable; it survives perhaps, but does not thrive; the fronds become cramped and stiff and lose much of their woodland grace. But under the hillside oaks,

thrifty bunches two or three feet across may be found, the result of many seasons' growth; the tender incoiling and the fully-formed fronds stand in the midst of others long since dead. The stalk is chaffy with light-brown scales, as is also the massive rootstock. It is the *Yerba del Golfe* of the Spaniards, and as its name would indicate, is used by them to cure contusions. A decoction made from the roots is applied warm to the affected parts and I have been told by intelligent people that bruises, even very painful ones, thus treated, lose their soreness and discoloration with a promptness that is quite remarkable.

A widely disseminated plant in California is *Daucus pusillus*, or *Yerba del Vibora* of the Spanish-Californians. It is a far-famed plant and the American settlers who were not long in learning of its reputed virtue, called it "Rattle Snake Weed," a rude translation of the more expressive Spanish. It is common on rocky inland hillsides where it is likely to be of immediate service. To a certain degree, it resembles its near relative, the common Carrot; the bipinnate leaves are delicately cut; the minute flowers of the flat or concave umbel are greenish-white; and later in the season the fruit by means of its barbed prickles clings closely to wool and clothing. The plant has acquired celebrity by reason of being used as a remedy for the poisonous bite of the rattlesnake. A poultice is made from the herbage and applied to the wound inflicted by the venomous fang; and so implicit is the faith in its virtues as an antidote that not only the Spanish but American residents count it improvident not to have a bundle of the dried plant conveniently near for immediate use when occasion demands.

There is not the least suggestion of anything so disagreeable as medicine in the beautiful *Zauschneria Californica*. It is common in the hill lands of the Coast Range, now hanging its scarlet trumpets over the cliffs as if to hail us from the bluff, now lying prone by the dusty roadside, and now in great colonies standing straight and tall in dry creek beds, everywhere the most beautiful flower of late summer

and autumn. And now it appears that to be beautiful is not its only mission in life; under the name *Balsamea* it is used by the Spanish, and by others who have learned its value from them, to heal cuts and other sores whether old or new, especially on horses. It is applied as a wash and afterward the powdered leaves are sifted over the affected part.

If nature places the disease and the remedy in juxtaposition, as it is averred she does in the case of rattlesnakes and *Daucus pusillus*, then every wire fence should have its cordon of *Zauschneria*; for it is particularly for the modern disease known as "cut terribly on a wire fence" that this plant has the reputation of being a specific.

OPEN LETTERS.

Indefinite stamens and sessile pods in *Cleome*.

WHEN De Condolle in 1824 took up the Capparideæ in his *Prodromus*, and recognized *Polanisia* as a genus, he knew but few species, and seems to have relied solely on definite stamens for *Cleome* and indefinite ones for *Polanisia*. It seems that this character holds good for the North American plants; and when we think of the perfect validity of this character in Cruciferæ, we are led naturally into attaching undue importance to it in connection with the capparids. When in 1855 and 1856, I travelled widely with Gregory in tropic Australia, I had opportunity to observe that in *Cleome tetrandra*, while the stamens are never numerous, they are often more than four, and that in *C. oxalidea* they vary between six and eight; I have therefore since that time suppressed *Polanisia* in my writings. In this I was followed by so careful and accurate an observer as Prof. Oliver, on far more extensive material from tropic Africa, in 1868; his *Cleome Bororensis* having from six to ten stamens. Even De Candolle did not consider the stipe of the fruit as a character of generic value in this family; and Martius, in the *Flora Brasiliensis* (1865), has on his fine plates *C. paludosa*, *C.*

psoralifolia C. and *C. diffusa* with but short stipes, and *C. aculeata* with this organ nearly obsolete.—F. VON MUELLER, Melbourne, Australia, Aug. 21st, 1893.

[The above commentary relates to my article on page 114 of this volume, in which I suppress Robert Brown's *Jacksonia* after having restored that of Rafinesque; and Baron von Mueller's comments show that he wholly misapprehends the characters on which Rafinesque's JACKSONIA is based, though we have twice announced them very distinctly in *Pittonia* (Vol. ii, pp. 174 and 274). Neither the number of the stamens nor the presence or absence of a stipe need be considered in discussing the merits of this genus as distinct from *Cleome*. It is, I believe, also true that our *Jacksonia* (afterwards renamed *Polanisia* by Rafinesque himself), is exclusively North American. It was De Candolle who extended the limits of *Polanisia* to include Old World plants which, whatever else they have, do not possess the real characters of the genus. We are at full agreement with Baron von Mueller as to the insufficiency of the absence of stipe and the multiplied stamens; but if he will examine typical species of *Jacksonia*, Raf., and the only species known to that author, he will find it a thoroughly acceptable genus; and also that the validity of the name JACKSONIA, as the prior one, cannot be gainsaid.—E. L. G.]

Carduus heterolepis.

IN looking over your Philadelphia Academy paper on the Thistles, I note that you describe a *Carduus heterolepis*, and state that you cannot find any published description of it under *Cnicus*. It appeared in the tenth volume of the Proceedings of the American Academy (p. 44), in a foot note by Dr. Gray. It is also the *Cnicus subcoriaceus* of Hemsley.—J. N. ROSE, Washington, D. C., 14 July, 1893.

MISCELLANEOUS NOTES AND NEWS.

AT last as early as the tenth of July, 1893, a prospectus was circulated in London announcing as "just ready" Part I. of the long-expected Index Kewensis. As a matter of fact it was not ready. The prospectus was, however, shortly after on its way to America, and the August number of *ERYTHEA* announced in "Notes and News" the publication of Part I of the work. This was contradicted in the *London Journal of Botany* for September, and we were further informed that the readers of that journal were kept tolerably well acquainted with the progress of the Index. We were left to infer that the Index was not out; was not even expected, for the prospectus seems not to have been heard of there. Another month passed. The October number of the *Journal* reviewed the Index Kewensis, Part I. The prospectus had finally come to the light of the astute London editor, and its premature circulation was set down as a fault of Kew, and not due to any creative imagination on the part of the editors of *ERYTHEA*.

Notwithstanding all that has been said, we shall only know in an indefinite way the date of publication of the first part of the Index. According to the transcript of the title in the *Journal* no actual date is given other than the month and year. This is a criticism which applies equally well to the October, or any other number of the *London Journal of Botany*. Furthermore, the editor in his eagerness to locate responsibility for news notes in *ERYTHEA* does not guess at all well. He should confine himself to berating the Kew people, which is his forte.—W. L. J.

M. HENRI DE VILMORIN, Director of the Jardin des Plantes, Paris, his brother M. Maurice de Vilmorin, and Dr. Hans Solereder, Docent in Botany, University of Munich, are among the botanists who have visited California during the past summer while on American tours.

THE legislative body of Victoria, Australia, concerns itself with the alien plants of that province detrimental to agriculture. A fine "Illustrated Description of Thistles" by

Baron F. von Mueller relates to such thistles and their allies as are included within the provisions of the Thistle Act of 1890. These plants are all species of European origin, and without exception have also proved obnoxious in America. In several of the older states of the Union, there have been legislative enactments looking to the extermination of introduced weeds of this tribe.

THE eminent American dendrologist, Prof. C. S. Sargent, whose good services in the cause of correct nomenclature have been everywhere recognized, has newly discovered that *Halesia*, long in use for certain American shrubs, is but a homonym, and in a recent issue of *Garden and Forest* (Vol. vi, p. 434) has offered MOHRIA as a substitute. In this choice he does not discover that he has made another homonym; but this is certainly the case; for, as a spoken name—and the language of plant nomenclature is unquestionably a spoken language—*Mohria* is identical with *Morea*, a name already twice employed, first by Medicus and afterwards by Salisbury. Had Prof. Sargent written **Carlomohria** he would have given us a tenable generic name; and we have no doubt that this, which would be our name for the genus, will have to be adopted. It is to be regretted that this perfectly unquestionable and thoroughly appropriate name, as fitly commemorating Dr. Charles Mohr's services to botany, did not suggest itself to our friend before he had transferred the species. Another transfer is now called for, and this when done must send another set of binomials—those made under *Mohria*—into the ever increasing store of silent synonyms.—E. L. G.

TWO RARE LOBELIACEOUS PLANTS.

By EDWARD L. GREENE.

Among the Lobeliaceæ, the Californian *Nemacladus* is one of the most distinct and remarkable of genera. Nuttall, the discoverer of this type, having seen only one out of the six species now known, expressed the opinion that it could hardly be referred to the Lobeliaceæ or any other family, but would probably stand as the type of a distinct natural order.¹ True it is that in characters of flower and fruit there is nothing about *Nemacladus* that is incongruous with Lobeliaceæ, unless it be that the anthers are separate rather than joined together around the style. But that by which *Nemacladus* differs so widely from all other genera of this order that no botanist at first glance would refer them to it, is its very unique habit. The plant when full grown and in flower or fruit presents nothing that could be called herbage. It is a diffuse and intricate wiry mass of delicate almost capillary purple branchlets and pedicels, without trace of foliage. The leaves are a mere rosulate tuft near the ground, and these disappear as soon as the plant is well in flower. There is no flowering plant of any alliance to which this genus makes any near approach in point of habit and general aspect. We were therefore a little disturbed in mind when we observed that one of Mr. Pringle's Mexican plants of this family, a plant totally incongruous with *Nemacladus* in habit, had been described as a new species under this genus, by Dr. Robinson of Cambridge.

Dr. Robinson's defense of his proposition is that the plant has the distinct and stellately radiating anthers of this genus, though he admits that in habit the herb is utterly at variance with *Nemacladus*. In our judgment the technical character by which it agrees with *Nemacladus* can not outweigh the fact that in habit it is so very different. On the contrary, habit is always the test to which characters are put, to try their value. Radiating anthers might run through a dozen

¹Trans. Am. Phil. Soc. n. ser. viii. 254.

genera, just as syngenesious anthers run through some hundreds of genera in four or five different natural orders; but the remarkable habit of *Nemacladus* would, we suppose, in the judgment of most botanists, exclude from it any plant with erect, simple, racemose stems and an abundant herbage of opposite leaves.

We purpose denominating this very interesting plant

Baclea² oppositifolia. *Nemacladus oppositifolius*, Robinson, Proc. Am. Acad. xxvi. 168.

The seeds of this plant are not only perfectly smooth, but somewhat compressed. In *Nemacladus* they are never in the least flattened, and are always striate or reticulate, or both. Dr. Robinson seems not to have mentioned the fact that this plant has a perennial and somewhat fleshy root; peculiarities which may be construed as connecting it the more intimately with the S. African *Cyphia* and the S. American *Cyphiocarpus*.

Bolelia læta. Stems simple, erect, 2 to 5 inches high, sparingly leafy and few-flowered: tube of corolla very short, turbinate; larger lip cleft to the middle into ovate acute, not widely diverging, lobes; smaller lip half as large, the lobes similar, not reflexed but only ascending; the whole corolla almost white, or with a yellowish central spot indistinctly encircled by pale blue.

At Humboldt Wells, Nevada, July, 1893. A very distinct species; the most easterly known member of this far western genus.

²In honor of the Swiss botanical collector, Bacle, who traveled in Senegal and in South America, and died at Buenos Ayres before the middle of this century.

THE RIPARIAN BOTANY OF THE LOWER SACRAMENTO.

By WILLIS L. JEPSON.

The Sacramento River is the great interior waterway of northern California; it drains the northern half of the Californian valley as the San Joaquin drains the southern half.

Its course for one hundred and fifty miles from its mouth at the head of Suisun Bay is bounded by brackish marshes which stretch away from the river ten to fifteen miles on either hand. These marshes are given a decided, although not local, character by the prevalence of one or two species of bog-rush or "tule," and are commonly referred to as "tule lands," a Californian provincialism adapted from one of the Spanish-American dialects. Near the mouth of the river, and for forty miles above as the waters run, are many islands, some small and others of considerable area. These have been formed by the delta-making process, by changes in the main river channel, and by ramifications of the tide-water sloughs which often reach far into the marsh country.

The expression "Lower Sacramento" was first used as the geographical designation of that portion of the Sacramento River lying below the junction of its first principal tributary, the American. It is now applied to the Lower Sacramento Valley as a whole, and having this force it has been very frequently used in the latest botanical literature of California. The above title indicates the limits of the region under consideration. This paper has reference to the islands of the Lower Sacramento and to the overflowed lands bounding the river channel as far as the American. The principal islands are Brannan, Andrus, Tyler, Grand and Ryer. Grand Island, the largest, is some twelve miles long and three to five miles wide. Towards the mouth of the American the marsh strip on the eastern side of the river becomes quite narrow; on the western side the tule lands northward from Cache Slough are more extensive and extend untraversed by any water course to and beyond Putah Creek, a stream from the Coast Range vanishing in the marshes a little below the mouth of the American.

Along the new and old river channels the deposition of sediment has built up natural levees. The river banks are, therefore, highest, and back of them lie the brackish marshes, reaching to the edges of the plains. These natural levees form, also, a rim to the islands, and slope back to the cen-

tral portions, which are always below the level of the tide-water. Excepting where artificial levees have been added to the natural ones, the winter freshets inundate this entire area and the waters do not recede until late in spring or summer. The herbaceous vegetation is, therefore, late æstival and autumnal. It succeeds the dry season, as that of the plains adjacent precedes it.

The herbaceous plants on the plains are chiefly annual, and the rapidity with which they attain their full size, perfect their seeds, and pass away is the wonder of the botanical traveler. The wide plain is covered with showy Lupines, Clovers, Calandrinias, Platystemons, Bærias, Gilias, Nemophilas and Allocaryas. The shallow streams and pools are edged with handsome Eunani and curious Bolelias. The tide of plant life reaches its maximum from April 5 to 20. In one, two, or three weeks more the brilliant colors have faded from the landscape and the vernal aspect is succeeded by the dullness and aridity of summer. For months there is nothing to be seen but the grass-whitened plain, only later relieved by tufts of Grindelia and broad areas of the exclusive Hemizonias.

As the traveler passes late in the year from the sun-scorched plains to the riparian region, the change in the physiognomy of the country is decided and impressive. Even in September and October the river country is as fresh and green as the landscape in April on the plains of the Sacramento and in the lower foothills of the Sierra. The prevailing freshness of foliage is emphasized by the strength and richness of autumnal inflorescence. The abundantly floriferous blue spikes of *Verbena hastata*, the masses of yellow and blue adorning the bush-like forms of *Euthamia occidentalis* and *Aster Douglasii*, the light gray herbage of *Stachys albens* and *Gnaphalium Californicum*, are mere instances of decided colors surrounded and at times almost buried by the tender foliage of other herbaceous plants. Nor is the verdant landscape effect aided by aborescent evergreens, for there are few shrubs or trees that are not deciduous.

The two regions which are here contrasted lie in closest proximity, but the phenomena of a sudden and general herbaceous plant development occur in either region at exactly opposite seasons. The height of the herbaceous growth of the plains region is in March and April as that of the river region is in September and October. The aspect of the landscape in either region, however, is at such times decidedly vernal, belied only in the riparian area by the character of the plants in flower.

On account of the water-soaked condition of the soil, the richness of the alluvial land, and the heat of the unclouded summer sun, plant life in this region is endowed with all the requisites for the most robust growth. Certainly this is the most striking feature to one who comes here in September or October from the plains of the Sacramento or the foothills of the Coast Range. Herbaceous plants form dense masses through which it is difficult to force a way. Annuals are commonly from four to six feet in height. Certain species that grow in drier regions six to twelve inches high in favored situations and are looked upon as thrifty individuals, here double their common stature, twice or even three times over. A good instance is *Boisduvalia densiflora*, var. *imbricata*. As it flourishes here in the Lower Sacramento the upper virgate branches alone exceed two and one-half feet. Herbaceous perennials are even more luxuriant in their growth. Such attain in one short season a height of sixteen or eighteen feet. Excellent evidence of this sort of vigor is furnished by *Helianthus Californicus* and *Urtica holosericea*. Other plants of the plains and foothills whose height is set down in feet or inches may here be measured in yards.

The distribution of the larger wooded growth is only a less striking feature than the luxuriance of the herbaceous plants. Throughout all this region, the rivers, cross-channels, and sloughs are edged by a fringe of trees. This growth is supported by the natural levees which bound the water-courses and form a rim to the islands. The boat

of the explorer passes on through the labyrinth of channels, ascending sloughs and rounding bends, and the shining reaches of water are ever bounded by the thin wall of foliage. One may force his way through the thicket of brambles and underbrush beneath these river trees, and then there is another expanse—not of water, but of the masses of waving tule [*Scirpus lacustris*, var. *occidentalis*, Wats.] which chokes the marsh lands.

The trees and shrubs are of those species characteristic of such situations. The major part of the growth is made up of various species of willow [*Salix nigra*, Marsh, *S. lasian-dra*, Benth., and *S. longifolia*, Muhl.]. Fine specimens of the Plane Tree [*Platanus racemosa*, Nutt.] are not uncommon. The Cottonwood [*Populus Fremonti*, Wats.] is frequent; while the Button Bush [*Cephalanthus occidentalis*, L.], the Oregon Ash [*Fraxinus Oregana*, Nutt.], the California Walnut [*Juglans Californica*, Wats.], and the Alder [*Alnus rhombifolia*, Nutt.], though not abundant, are to be met with throughout this entire region. The Wild Grape [*Vitis Californica*, Benth.] was noticed in several places. The undergrowth is largely a tangle of California Wild Rose [*Rosa Californica*, C. & S.] and Blackberry [*Rubus vitifolius*, C. & S.], with various herbaceous and suffrutescent plants. The Box-Elder [*Acer Californicum*, Greene] and Poison Ivy [*Rhus diversiloba*, T. & G.] were noticed near Walnut Grove, as also fine individuals of the Live Oak [*Quercus Wislizeni*, DC.] on the highest river banks. The River Dogwood [*Cornus pubescens*, Nutt.] is fairly frequent. The leaves of the sterile shoots are very different from the normal form, being round-ovate and abruptly short acuminate.

In the cultivated areas the native vegetation has mostly been driven out and instead appears a wilderness of foreign weeds hardly remarkable in any respect save in their size. *Erigeron Canadensis* grows from five to eight feet high, as does *Oenothera biennis*. *Portulaca oleracea*, which in moist situations in the Coast Range spreads over the ground cover-

ing an area six to twelve inches in diameter, here takes on a huge aspect, its great fleshy stems being three and four feet in length. Other introduced plants are: *Trifolium repens*, Rivinus; *Medicago sativa*, Moris.; *Melilotus alba*, Lam.; *M. Indica*, Allioni; *Malva parviflora*, L.; *Nasturtium Armerica*, Fries; *Rumex crispus*, L.; *Polygonum aviculare*, L.; *Amarantus albus*, L.; *A. retroflexus*, L.; *A. hypochondriacus*, L.; *Chenopodium anthelminticum*, L.; *C. ambrosioides*, L.; *C. rubrum*, L.; *C. album*, L.; *Raphanus sativus*, L.; *Daucus Carota*, L.; *Anthemis Cotula*, DC.; *Xanthium spinosum*, L.; *X. Candense*, Mill.; *Centaurea Melitensis*, L.; *Carduus lanceolatus*, L.; *Latuca scariola*, L.; *Cichorium Intybus*, L.; *Sonchus oleraceus*, L.; *S. asper*, Vill.; *Convolvulus arvensis*, L.; *Marrubium vulgare*, L.; *Plantago lanceolata*, L.; *P. major*, L.; and *Panicum Crus-Galli*, L.

In many places outside the levees, beyond the bounds of cultivation, and on small islands, the indigenous growth is very rank, and the characteristic riparian plants may be found in abundance with hardly an admixture of the numerous foreigners. From such situations I have the more interesting plants of the region, including a number of additions to our flora. *Hypericum mutilum*, L., *Eclipta alba*, Hassk., *Bidens frondosa*, L., and *Lippia lanceolata*, Michx., collected Sept. 16, 17, 1891, and *Amarantus hypochondriacus*, L., and *Lippia cuneifolia*, Steud., gathered October 4, 5, 1893, were all new to California and, with one exception, to the Pacific Coast.

The following notes were made upon some of the more characteristic indigenous herbaceous plants of the region:

Lathyrus Jepsonii, Greene. Everywhere along the tide channels.

Psoralea macrostachya, DC. "Leather Root."

Glycyrrhiza glutinosa, Nutt. In the drier places. Andrus Island; Main Prairie.

Euphorbia serphyllifolia, Pers. Very abundant. Andrus Island.

Hibiscus Californicus, Kellogg. Near Rio Vista.

Hypericum mutilum, L. Possibly introduced. Sept. 16, 1891.

Polygonum Muhlenbergii, Wats. Cache Slough. June 20, 1893.

Polygonum acre, HBK.

Polygonum nodosum, Pers.

Atriplex coronata, Wats. Andrus Island; Tyler Island, near head of Georgiana Slough.

Atriplex spicata, Wats. New Town Landing.

Atriplex hastata, L., var. *oppositifolia*, Moq. Knott's Landing.

Epilobium paniculatum, Nutt.

Epilobium Californicum, Hausskn. Quite abundant.

Boisduvalia densiflora (Lindl.), Wats. Five feet high.

Boisduvalia densiflora (Lindl.), Wats., var. *imbricata*, Greene. Six and seven feet high.

Isnardia palustris, L.

Jussiaea diffusa, Forsk., var. *Californica* (Wats.), Greene, ined. Ryer Island. Terrestrial as well as aquatic.

Ammannia coccinea, Rottb. Grand Island.

Nasturtium dictyotum, Greene. Grand Island. Sept. 17, 1891.

Hydrocotyle prolifera, Kellogg. Near Rio Vista.

Sium heterophyllum, Greene. Tyler Island.

Solidago Californica, Nutt.

Euthamia occidentalis, Nutt.

Aster exilis, Ell. New Town Landing and Andrus Island.

Aster Douglasii, Lindl. Provisionally referred here. Of bushy habit; the lower leaves narrowly lanceolate, nine inches long, falcate, remotely serrate, the entire margin scabrous serrulate.

Gnaphalium palustre, Nutt. Knott's Landing.

Baccharis Douglasii, DC.

Pluchea camphorata, DC.

Eclipta alba, Hassk. Grand Island. Sept. 17, 1891.

Helianthus Californicus, DC.

Bidens frondosa, L. Very common; first collected on Grand Island in 1891.

Bidens laevis (L.), B. S. P. Always within reach of tide-water.

Ambrosia psilostachya, DC. Often four feet high.

Artemisia vulgaris, L., var. *Californica*, Bess. Ten to twelve feet in height.

Apocynum cannabinum, DC. Haas Slough.

Heliotropium Curassivicum, L. Andrus Island.

Solanum Douglasii, Dunal.

Stachys albens, Gray.

Stachys ajugoides, Benth.

Pogogyne Douglasii, DC. Near Haas Slough.

Lycopus sinuatus, Ell. Tyler Island, near Miller's Ferry.

Verbena hastata, L. Wilkes expedition, 1841; Grand Island, by the writer, 1891.

Lippia cuneifolia, Steud. Growing on the outer face of the levee banks, matting the ground thoroughly and rooting very freely near the surface. Better adapted for protection to the banks against the action of the waters than *Medicago sativa*, which is frequently used for that purpose.

Lippia lanceolata, Michx. Abundantly stoloniferous—the roots not lignescent. On the river bottoms.

Urtica holoserica, Nutt.

Sagittaria variabilis, Engelm.

Alisma Plantago aquatica, L.

Cyperus diandrus, var. *castaneus*, Torr.

Cyperus erythrorhizos, Muhl.

Cyperus stenolepis, Torr.

The indigenous herbaceous species are not numerous, yet the list, although incomplete, is suggestive as it stands, and indicates a relationship with the riparian flora of the Lower Mississippi and its tributaries. The plants that first come to mind as noteworthy in this respect are *Isnardia palustris*, *Pluchea camphorata*, *Eclipta alba*, *Lippia lanceolata*, *Cyperus diandrus*, var. *castaneus*, *C. erythrorhizos*, and *C. stenolepis*. Fully fifty per cent. of the species in the entire list are common, although not peculiar, to this region and to that of the Middle and Lower Mississippi.

Species that were plainly occasional were not recorded. *Eriogonum vimineum*, Dougl., and *Hemizonia Parryi*, Greene, were found on one of the islands. In very dry season such plants are quite abundant, and there is, as a consequence, a marked change in the character of the flora. The seeds of all occasional species are brought down by the river currents from the higher lands, and only at uncertain intervals find congenial conditions. Rushes, sedges, and grasses form a very extensive part of the vegetation, some one species alone, as noticed above, giving character to the landscape.

The following parasitic phanerogams were observed: *Cuscuta subinclusa*, Dur. & Hilg., on *Medicago sativa*, Moris.; *Phoradendron villosum*, Nutt., on *Æsculus Californica*, Nutt. and *Aphyllon comosum*, Gray, on roots of *Quercus lobata*, Née, banks of Haas Slough, May, 1884.

CORRECTIONS IN NOMENCLATURE.—IV.

By EDWARD L. GREENE.

Very humble apology is here proffered to our friend the Editor of *Garden and Forest*, for our having read as if it had been editorial, a recent article on nomenclature of the Silver-Bell Trees. Not until some time after our note on page 236 of the present volume was in print, was it pointed out to us that the article upon *Mohria* had Dr. N. L. Britton's signature.

And now, with Dr. Britton's permission, we shall state formally that, since our CARLOMOHRIA has five days priority over his *Mohrodendron*, the shrubs are to be called, respectively, **Carlomohria Carolina** (= *Halesia Carolina*, L.), **C. diptera** (= *Halesia diptera*, L.), and **C. parviflora** (= *Halesia parviflora*, Michx.).

Maintaining the ground we took, that *Mohria* at best is but a homonym of *Morea*, we offer the following instead of Swartz's *Mohria*:

COLINA.

C. Caffrorum (= *Polypodium Caffrorum*, L., = *Mohria thurifraga*, Swartz). The name commemorates the French Professor Colin.

Delphinium Blochmanæ. *D. ornatum*, Greene, Flora Franciscana, 304. There is an older and European *D. ornatum*, and our plant may well take the name of the lady who last spring rediscovered it, confirming its specific rank.

Tradescantia pinetorum. *T. tuberosa*, Greene. Bot. Gaz. vi. 185, not Roxb. Corom. ii. 5, t. 108.

Eunanus Congdoni. *Mimulus Congdoni*, Rob. Proc. Am. Acad. xxvi. 175.

NEW CALIFORNIAN UREDINEÆ.

By P. DIETEL.

By the kindness of Mr. Holway I have received numerous Uredineæ from California, which in part are new or have not been sufficiently distinguished hitherto from similar species. The specimens have been collected by Mr. W. C. Blasdale, Berkeley, Prof. A. J. McClatchie, Pasadena, and Mr. E. W. D. Holway, Decorah (Iowa). Some of these new species have already been described in *Hedwigia* (1893, pp. 29, 30), and in the *Botanical Gazette* (1893, No. 7). In the following we give descriptions of a further series of them.

Uredo coleosporioides, D. & H. Sori on the stems and under surfaces of the leaves, orange-red. Spores ovoid to oblong, echinulate, with colorless membranes, 22—30 x 15—25 μ .

On *Castilleia foliolosa*. Berkeley, Cal., June, 1893, leg. Blasdale. In its general appearance this species resembles the uredoform of a *Coleosporium*, but the spores are not formed, as is the case in this genus, in chains.

Uredo Castilleiæ, D. & H. Sori dark brown, almost con-

cealed by the pubescence of the host plant, principally hypophyllous. Spores broadly oval or spherical, chestnut brown, finely echinulate, 24—30 μ in diam.

On *Castilleia foliolosa*. Berkeley, Cal., June, 1893, leg. Blasdale.

Uredo sphacelicola, D. & H. Spots yellowish or absent. Sori amphigenous on the leaves, roundish, ca. 1 mm. in diameter, pulverulent, at first covered by the ruptured epidermis, pulvous. Spores globose or nearly so, brown, densely echinulate, measuring 32—40 μ in diam.

On *Sphacele calycina*. Mt. Tamalpais, Cal., May, 1893, leg. Blasdale.

Uromyces Chlorogali, D. & H. Amphigenous. *Æcidia* isolated, minute, opening by an oblong fissure of the pseudoperidium; peridial cells loosely coherent; *æcidiospores* globose or broadly ovate, finely verrucose, with a colorless membrane, 31—40 μ in diam.—Teleutospore layers irregularly scattered, first covered by the epidermis; soon naked, roundish or irregular, dark brown. Teleutospores globose, ovate or irregular, thin walled, not thickened at the apex, smooth, brown, 30—40 x 25—35 μ . Pedicels ca. 30 μ , deciduous.

On *Chlorogalum pomeridianum*. Berkeley, Cal., May, 1893, leg. Blasdale.

Puccinia Blasdalei, D. & H. *Æcidia* loosely arranged into roundish groups. Peridia opening with longitudinal fissures. *Æcidiospores* orange-yellow, finely verrucose, ovoid or polygonal, 24—31 x 18—14.—Uredospore pustules oblong, sometimes confluent, surrounded by the epidermis; uredospores broadly ovate or subglobose, membranes echinulate, nearly colorless, with orange-red protoplasmatic contents, 27—32 x 22—30 μ .—Teleutospores: sori black, confluent, covered by the epidermis; spores oblong or clavate, very irregular, mostly truncate or pointed above, rounded or attenuated below, slightly constricted at the septum, brown, apical thickening moderate; 36—60 x 18—27 μ . Pedicels

about half the length of the spores. Amongst the bicellular spores occur unicellular ones (mesospores). The teleutospores are enveloped by dark chestnut-brown paraphyses.

On the leaves and stalks of *Allium serratum*. Near Antioch, Cal., May, 1893, leg. Blasdale.—The uredosporic stage seems to develop only to a small extent.

Puccinia procera, D. & H. Uredosori amphigenous; principally epiphyllous, oblong or linear, enveloped by the ruptured epidermis, ochraceous. Uredospores ovoid to spherical, finely echinulate, brownish, $32-45 \times 10-38 \mu$. Teleutosori hypophyllous, linear, disposed into parallel lines, covered by the unbroken epidermis, blackish, surrounded by a dense row of brown paraphyses. Teleutospores very different in form and size, oblong to linear, slightly constricted at septum, usually narrowed below, lower cell often stalk-like elongated, vertex mostly truncate and little thickened, smooth, clear brown, $45-100 \times 18-23 \mu$. Pedicels short, brownish.

On *Elymus condensatus*. Pasadena, Cal., Aug., 1893, leg. McClatchie.—From *Puccinia Rubigo-vera* (DC.), Wint., which is said to occur on *Elymus condensatus*; *P. procera* differs by the dimensions of the teleutospores as well as of the uredospores.

Puccinia Cryptanthes, D. & H. Sori scattered on the stems and the lower side of the leaves, oblong, minute, (0, 1—3 mm.), sometimes confluent. Uredospores broadly oval or globose, $24-28 \times 20-24 \mu$, rich brown echinulate. Teleutospore layers black, pulvinate. Spores irregular, mostly oblong, commonly rounded at the base, upper cell pointed or truncate, often obliquely, sometimes rounded, central constriction little, apical thickening $5-10 \mu$, smooth, brown, $34-50 \times 19-30 \mu$. Pedicels not firm, surpassing somewhat the length of the spores. Single-celled teleutospores rather numerous.

On *Cryptanthe Torreyana*. Camp Badger, Cal., July, 1892, leg. Holway.

Puccinia Eulobi, D. & H. Uredospores: sori scattered,

erumpent, oval, 1—2 mm., brown. Spores ovoid or spherical, 24—32 x 18—24 μ , brownish, very minutely echinulate.—Teleutospores: sori long, covered by the lead colored epidermis, afterwards naked, pulvinate, black. Spores oval or fusiform, base rounded, apex conical or rounded, sometimes pointed, somewhat constricted in the middle, 43—66 x 18—24 μ . Epispore smooth, yellowish-brown to chestnut brown, 6—13 μ thick at the apex. Pedicels firm, brownish, about twice the length of the spores.

On all green parts of *Eulobus Californicus*. Pasadena, Cal., leg. McClatchie (No. 295).

Puccinia conferta, D. & H. Hypophyllous producing yellow patches on the leaves of the nourishing plant. Sori minute. 0.3—0.5 mm. in diameter, pulvinate, black, densely crowded into large groups or covering nearly the whole leaf blade. Teleutospores smooth, chestnut brown, clavate, constricted in the middle, apex conical or rounded, much thickened, lower cell mostly attenuated, cuneiform, 47—75 x 24—30 μ . Pedicels firm, about as long as the spores.

On *Artemisia* sp. Kings River Cañon, Cal., July, 1892, leg. Holway. Very distinct from *P. Tanaceti*, DC., occurring on numerous species of *Artemisia*.

Puccinia Lagophyllæ, D. & H. Spots yellowish or none. Sori of the uredo stage amphigenous, scattered, minute, brown. Uredospores ovoid or subglobose, brown, finely echinulate, with a thick epispore, 27—31 x 25—29 μ . Teleutospore layers black, circular or oblong, 1—2 mm. in diam., often circinating and confluent. Teleutospores ovoid or elliptical, rounded on both ends or attenuated below, slightly constricted at the septum, smooth, chestnut brown, lower cell usually lighter, apex thickened 6—9 μ , 38—55 x 22—32 μ . Pedicels colorless, deciduous, longer than the spores.

On *Lagophylla congesta*. Berkeley, Cal., in the University Bot. Garden, July, 1893, leg. Blasdale.—We are not able to indentify this with any species described on Compositæ.

Puccinia Baccharidis, D. & H. Amphigenous. Uredo-

sori numerous, scattered, minute, ochraceous, pulverulent. Uredospores ovoid or elliptical with a pale brownish, echinulate membrane perforated by numerous germ-pores, which are distributed over the whole surface, 34—44 x 21—31 μ . Teleutosori minute, pulvinate, pale. Teleutospores clavate or oblong, rounded at the little thickened apex, attenuated or rounded below, constricted at the septum, pale brownish, smooth, 56—74 x 23—32 μ . Pedicels firm, mostly longer than the spores, inflated, often very considerably. The teleutospores germinate directly after their maturation without any period of rest.

On *Baccharis viminea*. Pasadena, Cal., Aug., 1893, leg. McClatchie (No. 359).—This fungus has most resemblance to another Californian species on *Baccharis pilularis*, viz.: *Puccinia evadens*, Hark. In the "Provisional Host-Index of the Fungi of the United States" of Farlow and Seymour *Puccinia evadens* is also noted as occurring on *Baccharis viminea*. But there can be no doubt as regards the specific difference of the forms. The teleutospores of *P. evadens*, have a broad cap-like apical thickening of ca. 8 μ , whereas in *P. Baccharidis* the thickened part of the apex is minute and only 3—4 μ thick. Another difference consists in the shape of the spore stalks, which in *P. evadens* are not inflated. I have not been able to examine whether the uredo stage exhibits any difference.

Puccinia mellifera, D. & H. *Æcidia hypophyllous* on yellow or brown spots, isolated or composed into little groups, cinnamon colored, dusty. Pseudoperidia elongated, deeply slit, very perishable; peridial cells cylindrical, somewhat rough or nearly smooth, easily separable from one another. *Æcidiospores* ovoid or subglobose, finely verrucose, brownish, with numerous germ-pores, 29—40 x 24—29 μ . Teleutospore layers mostly epiphyllous, roundish, ca. 1 mm. in diameter, naked, black-brown. Teleutospores elliptical, rounded on both ends, slightly constricted in the middle, little thickened, if at all, at the apex, smooth, chestnut brown, 40—50 x 28—35 μ . Pedicels of moderate strength, measuring up to 80 μ .

On *Salvia mellifera*. Pasadena, Cal., leg. McClatchie (No. 297). The same fungus has been sent by Dr. Harkness to the late Dr. G. Winter apparently on the same host plant. It has been confounded hitherto with *Puccinia nigrescens*, Pk., a species with smaller teleutospores, which are verrucose and not smooth, as principally described.

ON CERTAIN LEAF-HAIR STRUCTURES.

By WALTER C. BLASDALE.

The structures which I shall consider in this paper occur in great abundance on the fronds or leaves of certain ferns of the genera *Gymnogramme*, *Notholaena*, and *Cheilanthes* and on at least five species of the genus *Primula*. Though normally occurring on the lower surface only, they may appear on the upper, and in all cases are distributed quite uniformly; that is, without reference to the sori veinlets or other organs.

They may be designated as simple capitate hairs, and the secretions to which they give rise, and which distinguish them from all similar structures, consist of certain mealy products that vary both in color and consistency. Some are crystalline, some are waxy or even oily, while others are merely granular. In color these secretions present various shades of yellow, red or orange but may be pure white.

According to Hooker's *Synopsis Filicum*, there are in the genus *Gymnogramme* seven species that bear these glands; and, chiefly on this account, they have been set apart as the *Ceropteris* division, though certain botanists have considered the group a distinct genus in itself. The species are as follows:

G. triangularis, Kaulf. A widely distributed species appearing on the Western Coast of America and reported to range from Vancouver Island to Peru.

G. trifoliata, Desv. A native of Cuba, Brazil and Peru. The fertile fronds bear an abundance of white or yellow powder.

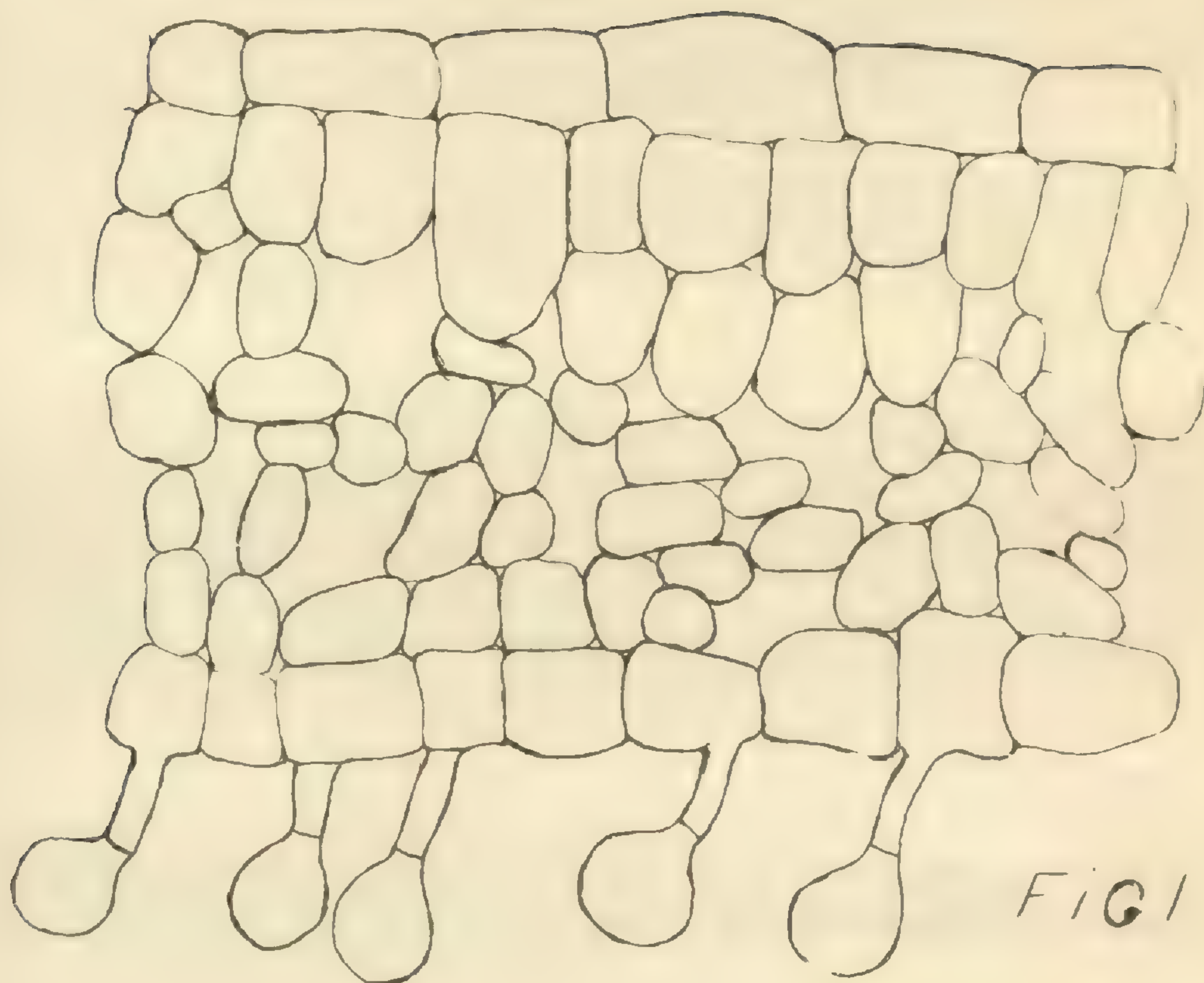


FIG 1



A



B

FIG 2

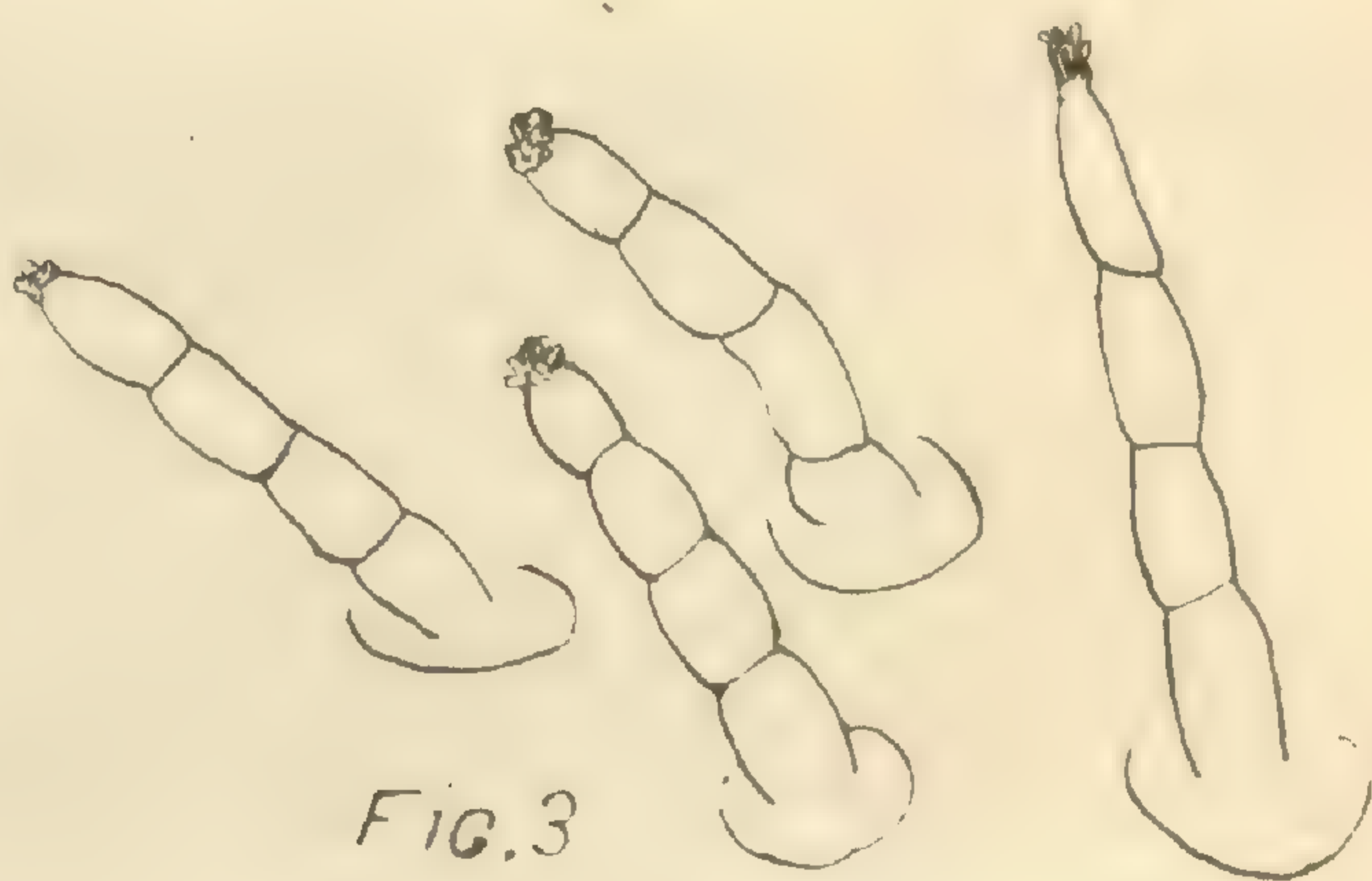


FIG. 3

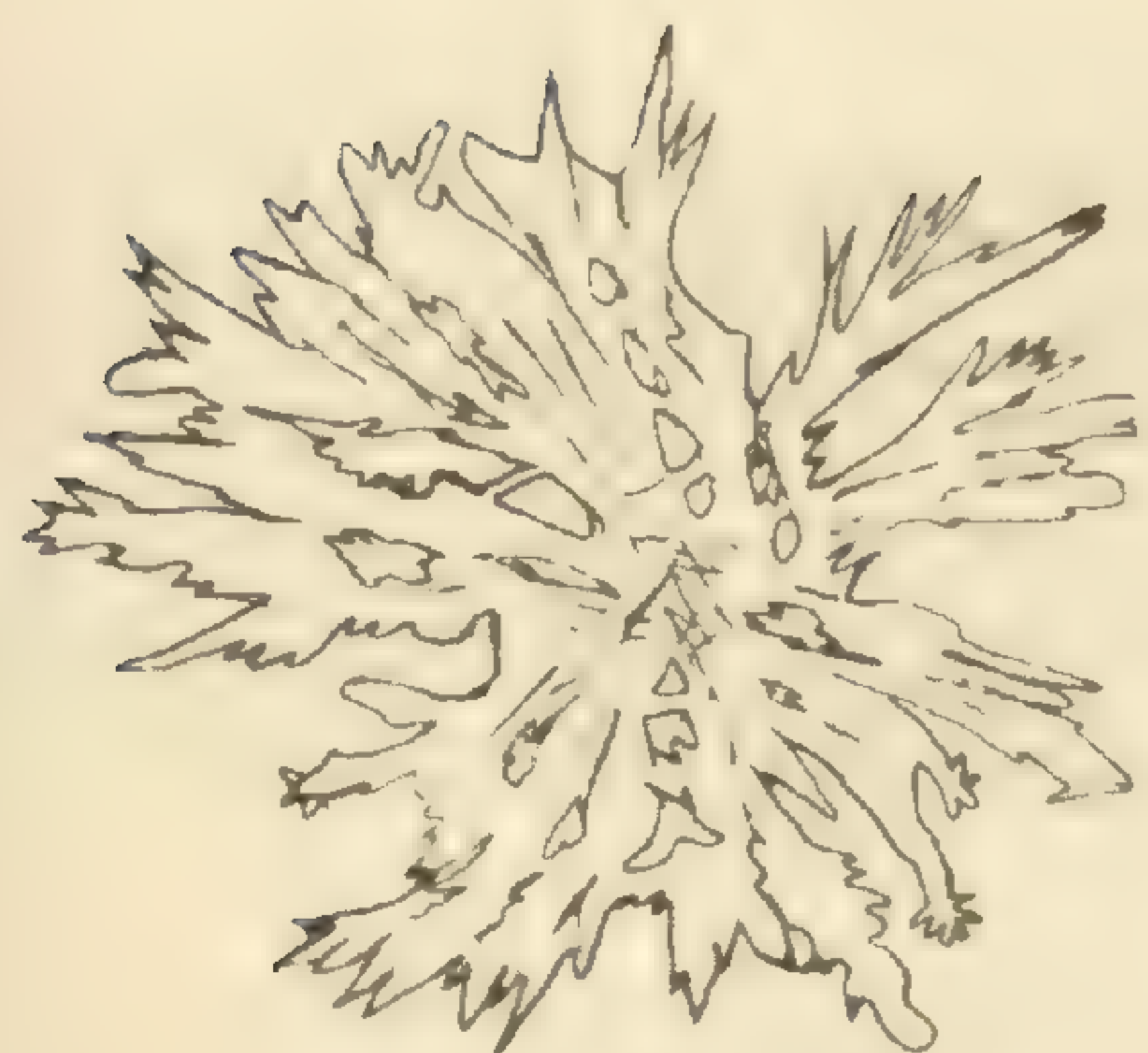


FIG. 4



FIG. 5

G. tartarea, Desv. Inhabits Tropical America and bears a dense coating of pure white powder.

G. calomelanus, Kaulf. A native of the West Indies but also occurring at Rio Janerio, Peru and the Islands off the Western Coast of Africa. Its indument is white.

G. pulchella, Linden. A native of Venezuela. The indument is pure white.

G. sulphurea, Desv. Found in the West Indies, and bearing a bright yellow powder.

G. argentea, Nutt. Inhabits the Mascaran Isles and Natal. Its indument is white or tinged with red.

Of these species the only one to which I have had access in the living state is *G. triangularis*, and having devoted considerable study to the chemical constitution of its indument, I can give a better account of it than of any of the plants under discussion. The general appearance of the hairs found on this species may be gathered from the accompanying sketch. They are two-celled capitate hairs, which in the drawing appear to be entirely bare, since the enveloping indument was necessarily dissolved off in the process of preparation for the microscope. As seen on the frond during the earlier stages of its growth, they present the appearance of spherical masses of fine acicular crystals. Later they produce such a mass of enveloping material as to form a complete crust or covering through which the growing sporangia force their way. In size they may be compared with the spores of the fern itself, though they are rather smaller than these.

The indument itself varies in color from pure white to a deep rich yellow, and in this particular seems to be governed both by the age of the frond and by the locality in which it is produced. It appears to consist of two distinct chemical compounds. The first, to which I have ventured to give the name *ceroptene*, is a light yellow crystalline body having the formula $C_{15} H_{16} O_4$ and melting at $135^{\circ} C$. It forms beautiful triclinic crystals that have a decidedly resinous lustre

and dissolve readily in alcohol, ether, chloroform, benzene and a variety of other solvents. Its alcoholic solution has a bitter rooty taste. Its chemical constitution is still unsettled, but I have determined many interesting facts regarding it. It is certainly a derivative of the benzene series; it is not an acid, an alcohol nor an ester, and cannot be a terpene or resin as has been stated by De Bary. The other compound consists of a white amorphous body that is soluble in petroleum spirit but not in ether. It forms but a small proportion of the indument as found on the mature ferns, and I am inclined to believe that it is the varying proportion of these two compounds that produces the variation in the color of the indument.

It is but proper at this point to make mention of an article written by the German Botanist Klotzsch that appeared in the *Monatsbericht der Berlin Akademie für Dec., 1851*. He therein states that the substances found on the fronds of certain species of *Gymnogramme* and on the leaves of *Primula auricula* is a Pseudo-Stearoptene, that is, a compound related to cumarin, the geranium camphor, etc. He relates that while making a revision of the former genus he found it necessary to remove the indument in order to get a good view of the sporangia. This he did by means of alcohol, and during the evaporation of this liquid he observed a shooting out (*anschiessen*) of needle crystals. These crystals melted at 50°, had an aromatic taste and odor, and were soluble in hot water.

I think there can be but little doubt that the compound he obtained was perfectly distinct from that prepared by myself. In all probability this was due to the fact that he worked with other species of the genus, for he makes no statement as to what particular species yielded the needle crystals. Aside from this fact I believe he gives insufficient reason for classing his compound with the stearoptenes.

As to the other species of *Gymnogramme* I can say but little. De Bary in *Comparative Anatomy of Phanerogams and Ferns* gives a figure of the glands found on *G. tartarea*.

He states that the secretion appears on the whole surface of the apical cell in the form of rods or radiating needle-shaped crystals. These are for the most part readily soluble in alcohol, and the finely granular layer that remains after treatment with this solvent readily dissolves in ether.

In the genus *Notholæna* we have also a group of species characterized by the presence of these glands and called the *Circinalis* division. The species are as follows:

N. trichomanoides, R. Br. A native of Jamaica and Cuba. It bears a white powder and ferruginous woolly-hairs.

N. affinis, Hook. A native of Guatemala and Mexico. It bears a sulphur colored meal.

N. sulphurea, J. Sm. Ranges from California and New Mexico along the Andes for some distance. Its indument is white or yellow.

N. flavens, Moore. Inhabits Central America and bears a dense bright yellow indument.

N. Hookeri, Eaton. Found on the Andes from Mexico to Peru. It bears a very light yellow powder.

N. Chilensis, Hook. A native of Juan Fernandez. The indument is white.

N. dealbata, Kunze. Inhabits Missouri. The dense coating of fine powder is pure white in color.

N. Fendleri, Kunze. A native of New Mexico. Its indument is white.

N. Lemmoni, Eaton. Found in Mexico and is sparingly coated with a white powder.

Of these species I have only examined *N. Hookeri* and *N. Lemmoni*. In the former species the glands consist of two-celled stout thick hairs whose apical cell is but slightly more developed than the lower one.

The indument is crystalline, lemon yellow in color, and is readily soluble in alcohol and ether. I could discover no difference between it and the indument of *G. triangularis*.

The hairs of *N. Lemmoni* bear a very close resemblance to

those found on the above mentioned species. They are, however, far less abundant.

In the genus *Cheilanthes* the *Aleuripopteris* division is distinguished by the presence of these glands. According to Hooker it consists of the following species:

C. rufa, Desv. A native of Hindostan. The fronds are coated with a white powder.

C. Welwitschii, Hook. A native of Angola at elevations of 2400—3800 ft. It is covered with a bright yellow meal.

C. argentea, Kunze. Found in Siberia, Japan, China and the Malayan Peninsula. Bears a white waxy powder.

C. farinosa, Kaulf. A native of Africa, Arabia and the Himalayas. Bears a dense coat of pure white powder.

C. aurantiaca, Moore. From Mexico. Is densely coated with a bright orange meal.

The last species, which is the only one of this group that I have examined, presents a hair-structure that differs considerably from those heretofore mentioned. These glands are found in abundance on the lower surface of the frond, though sparingly observed upon the upper, but are so covered by the broad deltoid scales as to be rendered inconspicuous. They consist of four or five short cells arranged in a single row, the uppermost one being slightly smaller than the others. The indument is of a decidedly waxy nature and shows no signs of crystallization. It dissolves readily in alcohol or ether, and such a solution leaves on evaporation a yellow mobile oil. It must differ in composition from any of the compounds thus far discussed.

In the genus *Primula* we find good examples of this kind of hair-structure, and in this genus also we find revealed the relation existing between them and similar secretory organs. A large number of species bear these glands though for the most part in comparative paucity and I think a careful study of the pubescence of all the forms would show all gradations between these peculiar structures and the typical resin secreting gland of which we find so good a type in *P. Sinensis*.

Probably the best example of the mealy Primulas is *P. farinosa*. Its glands are short two-celled and much resemble those from *Notholæna Hookeri*. The secretion consists of short rod-like bodies that are readily soluble in alcohol and ether. These solutions leave on evaporation light yellow sharply-pointed crystals that aggregate into characteristic stellate masses. They certainly differ from the ceroptene crystals, which assume bluntly-terminated prismatic or tabular forms and whose aggregates approach in some measure the fern-leaved type. This contrast may be seen by comparison of fig. 4 with fig. 5.

The probable function of these glands is a matter that might give rise to considerable speculation. In examining the various forms which they assume one cannot but be impressed with the idea that they are a specific organ of the plant formed for some definite purpose. It does not seem reasonable to suppose that these secretions are mere waste products necessarily produced in the complicated processes of cellular growth.

The only plausible function which I can assign to them is that of forming a protection for both the young spores and for the epidermis itself against excessive moisture and heat.

The position and chemical nature of the indument is such as to render it impossible for water to reach the lower leaf surface or the spores that are surrounded by this farinose material. Another fact to be considered is that nearly all those species of *Notholæna*, *Gymnogramme* and *Cheilanthes* that do not bear these glands are provided with a thick growth of hairs or scales, whose function is almost universally admitted to be that of protection. Furthermore, in looking over the habitats of these groups of plants it is seen that a large proportion are natives of the arid regions, that is of countries in which protective devices against the fierce heat of the sun during a portion of the year, and against a superabundance of moisture during the remainder, are by no means uncommon.

EXPLANATION OF PLATE.

- Fig. 1. Section of part of a frond of *Gymnogramme triangularis*.
 Fig. 2. From De Bary. Showing (A) a dusty hair from *Gymnogramme tartarea* and (B) a similar hair after treatment with cold alcohol.
 Fig. 3. Hairs on the upper surface of a frond of *Cheilanthes aurantiaca*.
 Fig. 4. A crystal aggregate obtained from the indument of *Primula farinosa*.
 Fig. 5. Crystals and crystal aggregates of ceroptene from the indument of *Gymnogramme triangularis*.

NOVITATES OCCIDENTALES.—VI.

By EDWARD L. GREENE.

Lotus confinis. Perennial; stems tufted, decumbent, barely a foot long; herbage velvety-pubescent: leaflets 5 to 7, obovate, acutish, 6 or 8 lines long; internodes about equalling the leaves; peduncles twice as long, bearing an unifoliate-bracted umbel of 3 to 7 large flowers: calyx-teeth subulate from a broad base, half as long as the campanulate tube: corolla 9 or 10 lines long, of a rich red-purple; petals not very unequal: legume unknown.

Near *L. grandiflorus* and *leucophæus*; distinguished from the latter by the relatively much shorter and broader calyx-teeth, and the larger corolla, the petals of which are always deep red, even in the bud. Species obtained by Mr. R. D. Alderson in the mountains of San Diego Co., Calif., near the United States and Mexican boundary, 1893.

Lotus trispermus. Near *L. humistratus*, rather smaller, decidedly less conspicuously villous: calyx-lobes subulate rather than linear, hardly longer than the tube: pods linear-oblong, 3-seeded: seeds obscurely quadrangular, thick in the middle, thin and acute at the edges but not at the ends.

Common on hills bordering the Mohave Desert, Calif., thence eastward and southeastward in Arizona. Species long confused with *L. humistratus* but clearly distinct by good character of the calyx and seed. Good specimens sent from near Lancaster, Calif., by Dr. Anstruther Davidson, have

enabled me to diagnose the species; this correspondent having suggested that the plant does not answer to the description of *L. humistratus*.

Helianthemum Aldersonii. Somewhat woody at base, the tufted and more or less tortuous stems a yard high more or less, leafy below, almost naked at the paniced summit, both stem and leaves of a vivid green and only sparsely stellate-puberulent: leaves linear-lanceolate, $1\frac{1}{2}$ inches long with closely revolute narrow margin, and acute narrow midvein beneath: panicle 6 or 8 inches long; pedicels and calyces rather densely pubescent: larger sepals 3 or 4 lines long, abruptly pointed: petals $\frac{1}{2}$ inch long: stamens about 25.

Mountains of the southern borders of San Diego Co., Calif., among rocks in hard and sterile granitic soil. Collected by Mr. R. D. Alderson, June, 1893.

Polygonum fusiforme. Perennial, the very stout geniculate stems decumbent or assurgent, 3 to 6 feet long, dark red, the internodes $2\frac{1}{2}$ to 4 inches long and fusiform: leaves narrowly lanceolate, acuminate, 3 to 5 inches long, glabrous, minutely punctate; ochreae very thin, delicately striate, sparsely strigose-pubescent along the lines and ciliate at summit: peduncles terminal, short, stoutish; bearing 5 or more paniculately disposed short spikes, these slender and few-flowered: calyx pinkish, not punctate, only $\frac{3}{4}$ line long, 4-parted, compressed, the two outer lobes only half as broad as the two inner and cucullate, or at least strongly ventricose at summit: stamens 4 or 5, small, included: styles 2; achenes much flattened, broadly ovate, tapering abruptly to a stout beak-like apiculation, very dark brown, smooth and shining.

Grown in the University Botanic Garden at Berkeley, and in dry ground, from a living plant sent from the moist banks of the Colorado, near The Needles, by Norman C. Wilson. The species a very interesting one by reason of the strong contrast between the size of the stems and the insignificant minute flowers. The excessively large internodes thickened somewhat abruptly above the point of leaf-insertion, then tapering gradually to the next node above, are a most strik-

ing feature of the plant. Probably in its native soil the plant attains greater dimensions than I have assigned it.

*Uropappus*¹ *leucocarpus*. Plant of the size and habit of *U. Lindleyi*, but achenes almost white, slenderly attenuate at summit, the narrow part vacant (not filled by the seed): whitish palea and slender awn each about $2\frac{1}{2}$ lines long.

Not rare in middle California; likely to be confused with *U. Lindleyi*, which has a very different achene and pappus, the achene being dark brown with no attenuate vacant upper part, and firm pappus-bristle of only a third the length of the brownish palea.

¹ See page 136 preceding.

MISCELLANEOUS NOTES AND NEWS.

AT the present date there is ready for distribution to such as are desirous of making exchanges of seeds, the first annual Seed-List of the University Botanic Garden at Berkeley. The seeds thus offered to other botanic gardens are, in the main, native Californian species. Not a few of them are of rare species or new; and a considerable number of them have not before been in cultivation. Mr. J. Burt Davy, who has been in charge of the seed department of the Garden, is the author of the List.

PLANT collecting in various parts of California and near its borders has been pursued with unusual vigor during the past season, by a number of our collectors. Some of the results of this work appear in this issue of ERYTHEA, and more may be looked for in future numbers. Mr. Walter C. Blasdale, of the College of Chemistry, University of California, has diligently gathered parasitic fungi in the Bay region, and Messrs. Michener and Bioletti have pursued critical studies in the phanerogamic flora of the same general district, collecting a number of rarities in Sonoma County and elsewhere. Some fine bundles of subalpine plants of the Sierra Nevada in Placer Co.

were brought in at the end of the summer vacation by Mr. A. M. Carpenter, of the Cooper Medical College, while from lower altitudes in the same county the University Herbarium has been enriched by good things obtained by Mrs. M. M. Hardy. Mr. Milo S. Baker, an undergraduate, was employed by the Department of Botany to collect extensively in Modoc Co. during June and July; and the result of his labors is a large invoice containing many varieties and some novelties from that vast and little explored part of the State which lies to eastward and north-eastward of Mt. Shasta.

From the city of Los Angeles Dr. Anstruther Davidson has made fruitful excursions into the adjacent hilly and mountainous districts; and Mrs. Blochman from Santa Maria has added her usual quota of plants new to the counties of Santa Barbara and San Luis Obispo. Very early in the year Mr. Norman C. Wilson explored some of the deep cañons of northwestern Arizona, in the interests of the University Herbarium and Botanic Garden, and at a later date crossed the Mohave Desert, in both regions obtaining many valuable contributions of living plants, of seeds, and of dried specimens. Mr. Wilson has been about the first to gather the early spring flora of the deep cañons back of Peach Springs, and his large parcels are now undergoing critical inspection at the University Herbarium. From the southern borders of the State, in San Diego Co., Mr. R. D. Alderson has sent us upwards of 300 numbers of herbarium sheets, embracing several new plants, besides many seldom collected. Mrs R. M. Austin, of Modoc Co., who has long been known as having added greatly to the knowledge of the flora of northern California, has this year gone beyond our boundaries into southeastern Oregon, and has brought an admirable collection of specimens, in duplicate, from a district not before explored by any botanist. Her collection has been secured for the Herbarium of our University.—E. L. G.

ERRATA.

- Page 13, line 10 from top, for parsley read parsnip.
 " 20, " 7 " " " Borthoud read Berthoud.
 " 21, " 6 " bottom, for proposes read professes.
 " 67, " 2 " " " M. borcalis read M. borealis.
 " 75, " 14 " top, for Whittrock read Wittrock.
 " 88, " 10 " " " 406 read 407.
 " 115, " 15 " " " R. Bn. read R. Br.
 " " " 2 " bottom, for purpuasceus read purpurasceus.
 " 144, " 8 " " " Phus read Rhus.
 " 172, running head, for Vegetation of Mount Hamilton read Vegetation of Mount Diablo.
 " 180, line 2 from bottom, for Dural read Dunal.
 " 245, " 1 " top, for At last read At least.
 " 258, " 2 " bottom, for character read characters.

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