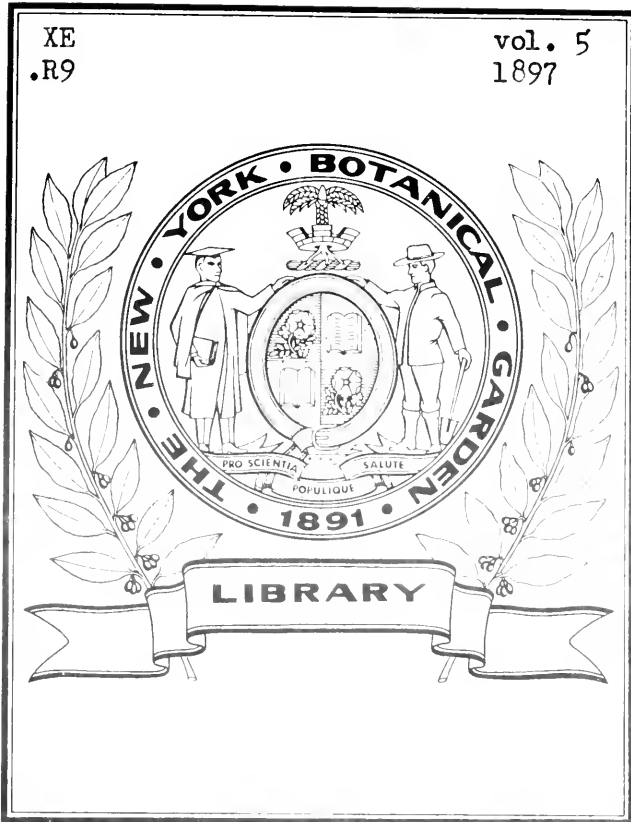


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A JOURNAL OF BOTANY, WEST AMER-
ICAN AND GENERAL

EDITED BY

WILLIS LINN JEPSON

INSTRUCTOR IN BOTANY, UNIVERSITY OF CALIFORNIA

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ERYTHEA

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ERYTHEA

A MONTHLY journal of Botany, West American and general, devoted to every department of botanical investigation and criticism.

While the articles on the general and special morphology and classification of Pacific Coast plants impart to the journal a West-American character, papers on physiological botany, geographical distribution and general topics will constantly be given place. Not the least interesting feature of the issues are the short articles, newsnotes, open letters and comments on current literature.

It is proposed in the early ensuing numbers to publish engravings of a considerable number of Californian plants which have, heretofore, been inadequately studied, imperfectly described and poorly or not at all illustrated. Another feature of interest will be historical papers on Californian Botany and Botanists.

The subscription price is \$1.50 per year in advance; to Great Britain and the continent of Europe, 7 shillings. Single copies, 25 cents. No discount to dealers.

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A NEW WEST AMERICAN PEUCEDANUM.

By WILLIS L. JEPSON.

Peucedanum erosum. Acaulescent, glabrous; peduncle stoutish, $1\frac{1}{2}$ -2 feet high; leaves, exclusive of the petiole, about 6 or 7 inches long, pinnately dissected into linear or oblong segments 3-4 or 5 lines long; involucre none; bractlets of the involucre oblong-linear, 2- $3\frac{1}{2}$ lines long, 3-dentate (sometimes 4-dentate); rays very unequal, $1\frac{3}{4}$ - $4\frac{1}{2}$ inches long; pedicels 1- $1\frac{1}{2}$ lines long; flowers unknown; fruit large, elliptic-oblong, 6 lines long, the wing equaling or exceeding the body in breadth, the margin all around erose or denticulate; oil tubes none on the face or back; ribs distinct, filiform.

Described from abundant fruiting material collected by Miss Alice Eastwood, at Exeter, Tulare County, on the east side of the San Joaquin Valley, May 26, 1895. This new species is plainly most nearly related to *P. caruifolium*, but has longer and much more unequal rays, distinct ribs, and broader wings, which are not entire.

NOTES ON THE POLLINATION OF SOME CALIFORNIAN MOUNTAIN-FLOWERS.—III.

BY ALICE J. MERRITT.

(Continued from Vol. IV, p. 147.)

LUPINUS CONFERTUS, Kell. This lupine covers many acres in Bear-Valley. It flowers very abundantly, and each dense spike must have an existence of two or three months. Its heavy fragrance advertises it from afar. The flowers are mainly violet with suggestions of crimson, as they grow older, and are from five to six lines long. The structure of lupines with reference to pollination is perhaps too familiar to botanists to need detailed description here. In this species, as in all the others that I know, the pollen of the five longer stamens is discharged into the keel in the bud, and is

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ready, when the banner erects itself, to be forced out of the small opening at the end of the keel by the piston-like filaments of the other stamens. The style is a little longer than the filaments and is easily extruded by pressure on the keel. I have not determined at what period the minute stigma becomes receptive, nor whether it is fertile to its own pollen. In spite of the underlying circle of bristles some of its own pollen must fall on the stigma after an insect visit, but the stigma is sure to be first brought into contact with any pollen the guest may bring from other flowers. The flowers provide no honey. This species, for obvious reasons, is visited more than lupines usually are by bees collecting pollen. A large bumblebee, *Bombus Nevadense*, Cress., is often seen on the plants, and this bee works very rapidly. I have seen it visit thirty-five flowers in one minute. It has but to clutch a keel with a leg, and the pollen is pumped up on the under side of its body, soon to be deftly stowed away in the baskets. Hive-bees work less rapidly, pausing with their entire weight on each keel, as if about to collect honey.

LUPINUS BREWERI, Gray. The flower-clusters of these typically alpine plants are only about two inches long and the flowers four or five lines long, but both the individual flowers and the flower clusters are of unusually long duration. The flowers are slightly fragrant. They were under my daily observation for two months, but only three times did I see them visited by insects, twice by a hive bee and once by *Bombus Californicus*.

POTENTILLA WHEELERI, Wats. These plants are scattered over acres in the vicinity of the lake. The stigmas are mature when the flowers first open early in the day. Deliscence does not begin until about noon of the first day, and at first the pollen can not fall on the stigmas; later the stamens rise somewhat, and there may be some self-pollination, as there must be when the flowers close toward evening. When the flowers open the second day, they are practically staminate, the stigmas having withered, and the center of the flower is occupied by the dusty upturned anthers, whose pollen is available for the cross-pollination of flowers in the pistillate stage. Honey is fairly abundant, and the flowers are visited from early morning by a considerable number of guests. As is usual in this type of open flowers

the beetles and small flies often alight on the petals and so fail to recompense their host, but a frequent guest, *Anthophora urbana*, always alights in the center and makes a complete circuit of the flowers in search of honey. I have seen small butterflies work at the flowers in the same systematic way.

POTENTILLA GRACILIS, Dougl. This larger and more showy species resembles the above in its method of pollination, but varies from it in some interesting particulars. The flowers open in the morning with mature stigmas, but the flowers of the previous day rarely retain their petals the second day, so there are few, if any, conspicuous flowers to furnish pollen during these early hours. In fact, the newly opened flowers seem to provide little honey at this stage, and insect visits are few until near noon, when the four circles of anthers begin dehiscing. Guests now become numerous, large and small flies, hive-bees, *Osmia Californicus*, *Ammophila*, *Melissodes*, etc., many of them of the most desirable sort. The flowers close rather early in the afternoon and whenever the weather is cloudy.

POTENTILLA ANSERINA, L., has solitary and therefore less conspicuous flowers than the other two species, but the flowers retain their petals much longer. The anthers begin dehiscence soon after the flower opens, and from the first assume a nearly erect position, so that self-pollination is possible. I was not able to observe this species so carefully as the others, but I think its flowers secrete less honey and have fewer guests. I have seen bees on them.

HORKELIA BOLANDERI, Gray, var. *Purryi*, Wats., was very abundant throughout the summer. The introrse anthers and the stigmas seem to me to mature simultaneously, but not to come into contact. Honey is secreted by a ring of tissue below the stamens, and the bases of the filaments, together with the calyx, may exclude it to some extent from small beetles and flies. The flowers are thronged with guests of various sorts. Sand-wasps are specially numerous, and there are large flies and many kinds of bees. The insects in making the circuit of the honey-secreting ring must effect close- as well as cross-pollination.

EPILOBIUM ANGUSTIFOLIUM, L., grows in very showy masses along streams, and is much frequented by hive bees. *Bombus Californicus* also visits it. I find that my notes on the floral structure do not differ from Müller's, except that I do not see that the style lengthens after the flower expands. In fact, the style always seems unduly long. During the dehiscence of the anthers it protrudes awkwardly without the corolla, and after it erects itself the stigma lobes are so high as to often miss contact with the bees. I observed many visits of hive bees, and only one bee in five, on the average, touched a stigma.

GENOTHERA BIENNIS, L. In the valley these flowers open about 6 P. M., and are nearly closed at 9 A. M. The stigmas are from one to three lines beyond the anthers, but I have frequently seen them wind-pollinated, a slight breeze being sufficient to land the pendant masses of webby pollen against the stigmas. At 7:30 P. M. I found pollen on nearly all the stigmas, although I had seen no night moths flying. The odor of the flowers is very faint, but they are large, three or three and one-half inches in diameter, and pale enough to be conspicuous at night.

GENOTHERA CALIFORNICA, Wats. The plants in Bear Valley are low, almost acaulescent, but grow in masses. The flowers vary considerably in time of opening and closing, but they are always in full flower by 5 P. M. and remain expanded through the night, when they are very fragrant and conspicuous. I have seen hive bees collecting pollen from them at 5 P. M. They are likely to strike stigmas first, since the stigmas slightly exceed the anthers. Honey is not abundant in the evening. I did not observe them during the night, but in the morning the honey is sometimes an inch deep in the tube, the pollen is gone from the anthers, the stigmas are visibly pollinated, and one usually finds pollen grains at the slight angle in the calyx tube.

SARCODES SANGUINEA, Torr. The essential organs of these flowers were past maturity when I reached the valley, but there was still some honey in the flowers, and I saw them visited by humming-birds, bees, and thrips.

NEW WEST AMERICAN FUNGI.—III.

BY J. B. ELLIS and B. M. EVERHART.

Asteridium bicolor, E. & E. On leaves of *Arctostaphylos bicolor*, Cedros Island, Lower California. A. W. Anthony.

Maculicolous, hypophyllous. Spots orbicular, about 2 mm. diam., brown, nearly black above. Perithecia innate-erumpent, flattened, and subumbilicate-collapsed above. Asci oblong-obovate, short-stipitate, $22-26 \times 18-22 \mu$, with abundant filiform paraphyses. Sporidia oblong-fusoid, fasciculate, yellowish, becoming brown, 3-4-septate, scarcely constricted, $18-20 \times 6-7 \mu$.

Homostigia Rhoinum, E. & E. On dead leaves of *Rhus integrifolia*, San Diego, Cal., March, 1895. K. Brandegee (No. 15).

Stromata epiphyllous, spheroid, gregarious, $\frac{1}{4}-\frac{1}{3}$ mm. diam., prominent but closely covered by the blackened epidermis, which is ruptured at the apex. Ascigerous cells 2-5 in a stroma, spheroid, white inside, $80-120 \mu$ diam. Asci oblong-clavate, short-stipitate, $60-70 \times 12-14 \mu$. Paraphyses filiform, abundant, often curved above. Sporidia biseriata, oblong-fusoid, 4-septate, constricted at the middle, hyaline, subobtuse, $15-18 \times 3\frac{1}{2}-4\frac{1}{2} \mu$.

Associated with *Didymosporium Rhoinum*, E. & E., on the same leaves.

Didymosporium Rhoinum, E. & E. On leaves of *Rhus integrifolia*, San Diego, Cal., March, 1895. K. Brandegee (No. 15, in part).

Acervuli epiphyllous, subcutaneous, globose, $\frac{1}{4}-\frac{1}{3}$ mm. diam., black, slightly raising the epidermis and blackening it with the ejected, oblong-fusoid, uniseptate, $12-14 \times 3\frac{1}{2}-4 \mu$ spores.

Cercospora Hyptidis, E. & E. On *Hyptis*, Playa Maria, Lower California. A. W. Anthony.

Forming indefinite, tobacco-brown patches on the under side of the leaf. Hyphæ fasciculate, simple, brown, sparingly septate, $75-100 \times 3\frac{1}{2}-4 \mu$. Conidia fusoid-cylindrical, straight, $30-40 \times 3-4 \mu$, brown, uniseptate. But for the brown conidia and hyphæ this would be *Ramularia*.

Cercospora Eriogoni, E. & E. On leaves of *Eriogonum molle*, Lower California. A. W. Anthony.

Hypophyllous, in small, sooty-black, scattered patches scattered irregularly, leaves marked above with dark brown subindefinite spots. Hyphæ subdecumbent, sending up erect branches more or less divided above, subhyaline at first, becoming dark brown and multiseptate. Conidia cylindrical, nearly straight, dark brown, multiseptate, $35-55 \times 4 \mu$. Approaches *Helminthosporium*.

Puccinia Serjaniae, E. & E. On *Serjania*, Pescadero, Lower California, September, 1893. A. W. Anthony.

III. Sori in small (2-3 mm.) orbicular groups, depressed-hemispherical, nearly black, naked, hypophyllous; marginal sori immature, smaller, and paler, giving the appearance of a pallid margin. Teleutospores elliptical, brown, scarcely constricted, epispore thick, smooth, not much thickened at the apex, $25-40 \times 15-20 \mu$. Mesospores (spores without septa) much more numerous, and mostly smaller, elliptical, $22-30 \times 15-20 \mu$, all on slender pedicels, $50-60 \mu$ long, attenuated below. The leaves are marked above, opposite the clusters of sori, with round pallid spots darker in the center.

Puccinia transformans, E. & E. On *Tecoma Stans*, San Felipe, Lower California, September, 1893. K. Brandegee (No. 9).

III. Causing swellings 1 cm. long and 2-3 mm. thick on the petioles, and transforming the young leaves into an oblong-cylindrical, amorphous mass, 1 cm. (or more) long by 2-3 mm. thick. The teleutospores form a thin, cinnamon-colored layer on the surface of these deformations without any distinct, definite sori. They are of an oblong-elliptical shape, pale brown, slightly constricted, rounded at the ends, with the epispore scarcely thickened at the apex, and muricately roughened, more distinctly so when dry, $22-35 \times 13-16 \mu$, with or without a small papilla at the apex. Pedicels very short, almost none, and soon disappearing.

P. ornata, Hark., on the same host, has hypophyllous, pulvinate sori, has teleutospores $50-70 \times 30-40 \mu$ on long pedicels with verticillate processes above, and must be very different from this.

Aecidium Gossypii, E. & E. On leaves of cotton (*Gossy-*

pium), San José del Cabo, Lower California, September, 1893. K. Brandegee (No. 8).

Spots deep, dark brown, becoming reddish towards the margin, and surrounded by a pallid border. *Æcidia* hypophyllous, erumpent, small (200μ), soon open, margin thin, erose-dentate, erect. *Æcidiospores* globose or angular, smooth or nearly so, $15-20\mu$ diam.

Æcidium Desmum, B. & C., on the same host, has no spots.

NOTE ON HERBARIUM-TECHNIQUE.

AN excellent adhesive substance for firmly fastening the terete stems of grasses and other plants to herbarium sheets, is the "White Muslin Isinglass Plaster," manufactured by Bauer & Black of Chicago. It is cleanly, white, and so adhesive as to be immovable without tearing the surface of the sheet to which it is attached. The mounted grass-collection of the University of California suffered much from the "springing" of the ends and bent portions of stems of grasses, owing to the very small glued surface which these terete parts present to the paper, until this plaster was adopted. It is also used in the herbarium of the California Academy of Sciences.

BOTANICAL EXPLORATION IN CALIFORNIA IN 1896.

IT is highly desirable, at this time more than ever perhaps, that the botanical exploration of California should be advanced in the most systematic manner possible, and it has seemed to the writer worth the while to make a record of what has been done during the past year. Had a fairly complete record of exploration been made during the first two decades of California's history as an American commonwealth, it would not only be of historical interest, but of value to those who are now engaged on the systematic botany of western America.

It is intended to include here only notes of somewhat extended expeditions or accounts of prolonged collecting in a single locality.

In the latter part of May Prof. W. A. Setchell and Mr. W. L.

Jepson went into the field for seven weeks with a collecting and camping outfit, after the fashion long in vogue on the Pacific Coast. The route followed is here given: From Berkeley to San José and the upper Santa Clara Valley southward and eastward to Pacheco Pass, then directly westward across the Coast Range to the ocean at Soquel and Santa Cruz, then northward and eastward traversing the Coast Range region once more from the Santa Cruz Mountains to the Livermore Pass, by way of Mission San José; at the Livermore Pass passing into and across the San Joaquin Valley to Oakdale and southward to La Grange on the Tuolumne River, at that point entering the Sierra foothills. From Coulterville the Hazel Green route into the Yosemite region of the High Sierras was followed. A very large and important collection of algæ and flowering plants was made, the Coast Range collection of the latter proving very rich in rare species and forms of morphological interest. The examination of the alkaline flats near Hollister developed various facts bearing on the relation of the vegetation of that region to the dry season flora of the Sacramento Valley. A short time was devoted to the Lower San Joaquin on the return trip to Stockton.

From April 24 to May 31 Mr. J. Burt Davy, under the direction of the Department of Agriculture of the University, devoted himself to field studies of the alkaline vegetation of the Upper San Joaquin Valley. During this time he collected 1,029 numbers from the plains and bluffs skirting the foothills near Bakersfield, the alkali patches bordering the Kern Delta, and Tulare Lake near Delano, the Kern Delta, the sandy plains at foot of the Tejon and Tehachapai Ranges, San Emigdio Cañon, Tehachapai Valley, Dry Lake, Antelope Valley, and the Tejon Pass. On a second trip from October 12 to 27 Dry Lake, Antelope Valley, and Bakersfield were revisited. In the middle of March Mr. Davy made a small but interesting collection of plants at Duncan's Mills, Cazadero, and Fort Ross, visiting the old historic ground whence the seeds of some of Fischer & Meyer's plants came.

Miss Alice Eastwood, curator of the Herbarium of the California Academy of Sciences, accompanied Mrs. Ida Blochman on a trip along the Cuyaman or Santa Maria River, which forms the boundary between San Luis Obispo and Santa Barbara Counties, and

crossed the hill country to the Carisa plain. The region between Santa Maria and Point Sal also received attention.

Mr. J. B. Lambert, who has for several years past been a resident naturalist in the Yosemite region of the Sierras, was found dead in his cabin on the Merced River, early last spring. Mr. Lambert was scarcely known personally to Californian botanists, but he had sent some interesting bundles of plants of his region to our University in the last five years. *Senecio Lamberti*, Greene, was named in his honor.

Mr. A. J. McClatchie made a wagon collecting trip from Pasadena to San Diego during the summer. Smith Mountain, San Diego County, was visited and a number of characteristic High Sierra plants were collected there.

Numerous minor and local collections have been made by these and other botanists during the year, some of which have been currently reported in ERYTHEA.—W. L. J.

BIOGRAPHICAL NOTICES.

DR. HENRY TRIMEN, until quite recently Director of the Royal Botanic Gardens of Ceylon, died at Peradeniya, Ceylon, on October 16, in his fifty-third year.

Up to the time of his death, Dr. Trimen had been diligently at work upon his "Handbook of the Flora of Ceylon," of which three parts have been published, bringing the work down to the Balanophoraceæ, and which he had nearly completed. He was joint author with Dr. W. T. Thiselton-Dyer, of the "Flora of Middlesex," published in 1896, generally considered the most complete work of its kind, and an excellent model for a county flora. His name is especially well known as associated with that of Professor Bentley in the preparation of their important book, "Medicinal Plants," published in 1880. From 1870 to 1879 Trimen edited the *Journal of Botany*, of which Mr. James Britten now has charge.

THE death is announced of Auguste Trécul, at an advanced age. Trécul was a member of the French Academy, and was principally celebrated as a plant anatomist, though he also gave some attention

to systematic work, classifying the Artocarpaceæ. In the early part of his career he collected in Texas, the Rocky Mountains, and Mexico, on behalf of the French Government.

SHORT ARTICLES.

SPHAGNA BOREALI-AMERICANA EXSICCATA.—Curaverunt D. C. Eaton et E. Faxon. Distribuit G. F. Eaton. During the last years of his life Professor D. C. Eaton, long a devoted student of the mosses, turned his attention particularly to the American species of the genus *Sphagnum*. Only those who were associated with him, can realize the untiring energy, with which he collected, sectioned, and mounted his specimens, or searched through the descriptions and published sets, to identify the forms of the swamps and bogs of New England, New York, and New Jersey. He found a most earnest helper in Mr. Edwin Faxon, of Jamaica Plain, Mass., and enlisted the services of as many as he could, to collect in other parts of the United States, with the purpose of distributing all the available species of North America. His death occurred before the task was completed, but so carefully had the work been done and so finished in each separate case, that it has been possible for his son, Mr. George F. Eaton, to carry out to a considerable extent the wishes of his father.

The distribution contains 172 numbers, each including at least one ample bunch of plants. Thirty-nine species, each with a full complement of varieties and forms, are represented. They are contained in neat and convenient envelopes, with plain, well-printed labels. The set is one which will certainly remain for a long time one of the most valuable aids to the student of this most difficult genus. New England furnishes the largest quota of forms, New Jersey follows, and the southern Atlantic states come next. The Pacific Coast is represented by three numbers, two from the islands of Alaska, and one from Washington.

W. A. S.

THE RANGE OF *SALIX NIGRA*.—In a letter of the late M. S. Bebb, addressed to Miss Alice Eastwood, are found some interesting

comments on the range of *Salix nigra*. A brief extract is here given, in order that the attention of collectors may be drawn to this tree:—

“Do you remember anything about *S. nigra* as it occurs at Visalia? Is it widespread over the adjacent country or local? I have several different collections of this species from that locality, and infer that it is either common—abounding in individuals—or else a few trees are conspicuous and attract attention.

“Then, too, do you remember anything about the San Bernardino County localities? What I want to get at is this: I had only a few months ago a *string* of single collections of *S. nigra* from Texas to the Sacramento Valley. Your observations settle the question of its *frequency* in the latter region, and now I find in your Academy Herbarium material, specimens collected by Dr. Thurber more than forty years ago at El Paso with this interesting note: ‘Common all along the Rio Grande, 40° to 50°, cut for firewood.’ If I can get a few more reports like that instead of my *string* of possibly rare finds, I will be able to publish *S. nigra* as growing in reasonable abundance all along the line.

“It seems very interesting and remarkable that a species, the range of which westward is so effectually debarred by the great plateau, should steal around the mountains at the south and then occur plentifully on the Pacific Coast almost, if not quite, as far north as it does in the Mississippi Valley.

“Yours sincerely, M. S. BEBB.

“Rockford, Ill., Sept. 28, 1895.”

MISCELLANEOUS NOTES AND NEWS.

THE fifth fascicle of the *Phycotheca Boreali-Americana*, issued by Messrs. Collins, Ho'den, and Setchell, has just appeared. The following numbers are from the coast of California: 221, *Ulva fasciata*; 229, *Codium mucronatum* var. *Californicum*; 232, *Petrospongium Berkeleyi*; 238, *Gymnogongrus linearis*; 239, *G. Griffithsia*; 241, *Rhodomela Laria*; 246, *Polysiphonia villum*; 248, *Ceramium codicola*; and 249, *Halosaccion Hydrophora*.

MR. GEORGE HANSEN has published (August 1, 1896), in pamphlet form, "Additions to the List of Specimens Collected in Amador, Calaveras, and Alpine Counties." Two new oaks are named but not described, numbers of the distributed set being cited as type specimens. The first list, published some two years since, was entitled "Flora of the Sequoia Gigantea Region," and was accompanied by a descriptive account of the author's botanizings in the Sierra foothills and the High Sierras.

THE New England Botanical Club is one of the recent botanical organizations of the eastern United States. It was "established for the promotion of social intercourse and the dissemination of local and general information" among gentlemen interested in the flora of New England. The club, which has already a very considerable membership, held its first annual meeting in December last, at the St. Botolph's Club, in Boston. The officers for 1897 are: President, N. T. Kidder; vice-president, J. R. Churchill; recording secretary and treasurer, E. F. Williams; corresponding secretary, E. L. Rand; phanerogamic curator, Walter Deane; cryptogamic curator, Roland Thaxter; councilors, G. G. Kennedy and B. L. Robinson. The herbarium is growing very rapidly and numbers at present 5,000 sheets.

NUMBERS 111 and 112 of the *Kew Bulletin*, dated March and April, 1896, have reached Berkeley. So long a time elapsed between the receipt of the February number and the joint numbers for March and April that we feared the publication of the *Bulletin* had ceased. Such a contingency would be very regrettable. We appreciate highly the valuable information published from time to time, especially that relating to new cultural industries, and commercial and agricultural botany in general. The cessation of the *Bulletin* would cause a gap which could scarcely be filled from any other source, and we often feel a desire, that the Director of Kew might see his way to extend, rather than curtail, it. The last number received contains an interesting article on the vegetation of the botanically little-known island of Formosa, from the pen of Mr. Augustine Henry, who is so well known on account of his persevering investigation of the Chinese flora.

THE cause of eczema resulting from handling bulbs of the Roman Hyacinth, *Hyacinthus orientalis*, and its varieties, has been investigated at the Jodrell Laboratory of the Royal Gardens, Kew. After several experiments, Dr. D. Morris concludes that it is directly due to puncture by the raphides of oxalate of lime which occur in many of the cells. It has often been observed that snails, though feeding freely on other bulbous plants, leave Roman Hyacinths which are growing alongside, untouched. It is said that the raphides injure the delicate feeding organs of the snails.

J. B. D.

A NEW botanical text-book by Prof. W. A. Setchell is now in press and will shortly be published by MacMillan & Co., New York. The volume, which is entitled "Laboratory Practice for Beginners in Botany," will be noticed in full in a subsequent issue.

IN the last *Pittonia*, under the title of "New and Noteworthy Species, XVII," forty-five new species of West-American plants are proposed by Professor Greene. These are chiefly of the genera *Ranunculus*, *Delphinium*, *Arnica*, *Crepis*, *Allocarya* and *Oreocarya*. The other papers are: "Studies in the Cruciferae," "Remarks on Acaulescent Violets" and "Studies in the Compositae, IV." In the latter paper two new genera are named and diagnosed: *Oreastrum* (to include two subalpine species of *Aster*, *A. alpigenus*, Gray, and *A. Andersonii*, Gray, and *Oreastrum elatum*, described as new) and *Leucelene*.

AT the meeting of the Chamisso Botanical Club of the University of California, held January 18, Mr. W. J. V. Osterhout read a paper on "Recent Investigations on the Sexuality of the Ascomycetes."

IN the "Proceedings of the California Academy of Sciences" (Ser. 2, Vol. VI, 422-29) Miss Alice Eastwood describes seven new species of Californian plants. These, with the locality whence the type material came, are as follows: *Sedum Blochmanæ* (near Point Sal; this, from the account of the roundish bunch of "corms," we should judge to be a remarkable addition to the list of Californian species of the genus); *Anemone Californica* (Lot's Lake, Plumas Co.); *Hosackia rosea* (Fort Bragg); *Lupinus rostratus*

(Estrella); *Heuchera cæspitosa* (San Emigdio Cañon); *Brodiea Purdyi* (northern Sierras); *Cynoglossum viride* (southern Sierras).

IN the December number of the *London Journal of Botany* there is an illustration of *Sisyrinchium Californicum* which has become spontaneous in Ireland, near Wexford. The plant was introduced into cultivation in England in 1796; the first herbarium specimens were collected at Bodega by Menzies in 1792.

ERYTHEA

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EDITED BY

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NOTES ON THE POLLINATION OF SOME CALIFORNIAN MOUNTAIN FLOWERS.—IV.

BY ALICE J. MERRITT.

DODECATELON ALPINUM, Greene. There were scattered plants in flower in wet meadows all summer. The flowers in their provision for pollination resemble our common *D. Clevelandii*, but the clusters have fewer flowers, and the flowers, while somewhat smaller, are more deeply colored, the petals being rose colored, the filaments purple, and zones between, crimson and yellow. The fragrance is similar. The anthers, as is usual in pendent flowers of this type, are closely connivent, but at a slight disturbance of the anthers the flowers are enveloped in a small cloud of dust, so fine and buoyant are the pollen grains. The styles, although somewhat variable in the mountain species, usually exceed the anthers by about two lines. In the older flowers the styles turn upward so that some of the pollen falling from the now shrinking anthers must light on the stigmas. The flowers provide no honey, and I have seen hillsides white with *D. Clevelandii*, yet unvisited for hours; but the scattered mountain flowers are more successful. *Bombus Californicus* and hive bees visit them rather frequently for pollen. They of course strike the stigmas first.

GENTIANA AMARELLA, L. var. ACUTA, Engelm., was found in wet meadows. The plants do not grow in masses, but individual plants are from one to two feet high and are much branched and many flowered. The flowers vary from pale blue to deep violet. They are about one-half an inch long and have a faint perfume. In their provision for pollination they seem to differ somewhat from the type as described by Müller. The anthers remain so decidedly extrorse during dehiscence that self-pollination seems impossible, although stigmas and anthers are mature at the same time and the stigmas are sometimes the lower. Usually the stigmas are above the anthers and on entering, guests would effect cross-pollination. Honey is not plentiful and I saw only a hive bee, *Bombus Californicus*, and a *Melissodes* visit them in a casual way. Thrips are abundant and must generally effect close-pollination.

ERYTHEA, Vol. V, No. 2 [26 February, 1897].

GENTIANA SCEPTRUM, Griseb., was abundant in a very wet meadow. The flowers are from one and one-half to two inches long and are mainly a deep blue. The anthers are from three to five lines below the stigma; they are about two lines long and shed their coarse abundant pollen extrorsely. The folds of the corolla remain unexpanded so that the large bilaminate stigma, mature from the first, nearly fills the contracted throat, and is nearly sure to be struck by any entering guest. But as the folds of the corolla can be forced open to admit a cylinder five lines in diameter, a large insect could enter bodily down to the contracted portion of the tube, *i. e.*, within less than half an inch from the base. The widened filaments form a close cylinder, without which abundant honey is secreted by five glands at the base of the corolla; the folds of the corolla extend to this cylinder of filaments so that there are five slender tubes leading to the honey, specially adapted, one would think, to the long tongues of the Lepidoptera. I made several pilgrimages to this meadow when the weather was favorable for insect visitors, but did not succeed in seeing any other than small flies and one small bee evidently after pollen. The elaborate structure of the flower would of course lead one to expect other guests. Of a large number of flowers collected at 3 P. M.—the flowers close soon after—about ninety per cent had their stigmas visibly pollinated.

GILIA VIRGATA, Steud., is very abundant in the pine woods in July and August. The tube of the flower is but a line long; the funnel-form throat, about two lines long, is white, with yellow spots and has an oblique entrance, the corolla being more deeply incised below. The stamens decline toward the lower petals of this decidedly irregular corolla, and the anthers open widely and curve upward. The bees commonly cling to the entire group of anthers as they search for honey. The stigmas, which are small for *Gilias*, mature late and also lie in the way of the entering guest. Honey is very plentiful and the plants are thronged with bees and butterflies, particularly with *Anthophoras* and hive bees.

GILIA DENSIFOLIA, Benth., grows in showy masses, but is not so common in Bear Valley as *G. virgata*. It is done flowering by August. The flowers are deep blue with distinct white lines. The

stigmas mature later than the anthers and the style is usually longer than the stamens, but it varies in length, and self-pollination is sometimes possible. The flowers I collected in Bear Valley were from six to nine lines long, and the honey, sometimes two lines deep in the tube, seemed to be accessible to large bees. In July I found this species and *G. virgata* flowering in close proximity, and bees were visiting both species without discriminating, the small bees for pollen, the larger apparently for honey. I found no hybrids, however. Earlier in the season I had decided that the honey of *G. densifolia*, growing in the San Fernando Valley, was too deep for bees, the flowers being visited only by *Rhaphiomidas Acton*, Coq.

GILIA TENUIFLORA, Benth., is very abundant in the mountains in June and July. I have seen the plants three feet high and the flowers one and one-fourth inches long, but the plants under my daily observation in Bear Valley were much smaller. The flowers are very brightly colored, and conspicuous, but they provide very little, if any, honey, and I have never seen them visited except casually by a fly or a bee after pollen. The flowers, like many other *Gilias*, are open only from 8 or 9 A. M. to 3 or 4 P. M., and have the usual *Gilia* habit of maturing exserted stigmas later than the widely-opened anthers. I think the flowers of this species are mainly pollinated by the anthers striking the stigmas as the corollas fall off.

GILIA MICRANTHA, Steud. In this locality the flowers of this species are an inch or more long and are usually white with a yellow throat. They are distinctly heterostyled. The hundreds of plants I noted divided themselves about equally into two groups, those with stigmas quite beyond the anthers and those with stigmas in the throat below the anthers. But the anthers were always in the same position, just above the throat. The anthers are small, and, like the anthers of other *Gilias*, become little pollen-covered balls because of widely opened cells. I have never seen the flowers visited, but they provide considerable honey and remain open at night, closing only in bad weather. The *Gilia* in the vicinity of Los Angeles, which is commonly called *micrantha*, has its stigmas always considerably beyond the anthers, provides little, if any, honey, and closes about 4 P. M.

PHACELIA MOHAVENSIS, Gray, *P. CIRCINATA*, Jacq., and *P. DAVIDSONI*, Gray. The first species I found abundant at Green Valley; the other two were common in Bear Valley: *P. Mohavensis* is generally inconspicuous; *P. circinata*, with its dull white, almost cylindrical corolla, escapes obscurity only because of its long white filaments; *P. Davidsoni* has numerous rather large violet flowers, less highly colored than I have seen them at Wilson's Peak. *P. Mohavensis* belongs to the group of Phacelias that has the circle of corolla appendages closely fitting together in the tube so as to form a sort of false bottom a line or so above the real base where lie five large drops of honey excluded from all but slender tongues. This species, like others of the group, is much frequented by bees. *P. circinata* has the appendages less compactly arranged but provides considerable honey and receives a fair amount of attention from the bees. *P. Davidsoni*, like some other Phacelias and Nemophilas, has the appendages at the base arranged in pairs, each pair inclosing a drop of honey. But the amount of honey is small and I have seen the flowers only casually visited by small bees. They remain open at night. In all three species the anthers dehisce extrorsely but curve upward so that visitors are sure to carry away some pollen. The first two species have filaments exerted and the style lengthens later and brings the stigmas to occupy about the position held by the dehiscent anthers. The essential organs of *P. Davidsoni* are not exerted and mature at about the same time, but I could not see that the anthers ever come into contact with the stigmas.

SOME MOUNTAIN SPECIES OF MIMULUS. *M. luteus* was of course common in cienegas and *M. pilosus*, Wats., along streams; there were several acres abounding in *M. moschatus*, Dougl.; and at Bluff Lake, which I twice visited, there was a great abundance of *M. primuloides*, Benth. I also noted two or three plants of *M. Palmeri*, Gray. None of these species secrete much honey. *M. moschatus* provides a little more than the others, but not so much even as *M. glutinosus*, and much less than *M. cardinalis*. But they all, with an exception, to be noted later, depend on their guests for pollination, the stigmas being quite above the anthers. The two lips of the stigmas of all this group have the well-known habit of closing on irritation, the edges of the lower lip being particularly sensitive. Some of the

species have the stigmas so placed as to be certain of contact with an entering insect. The stigma in *M. pilosus* occupies nearly all of the narrow throat. The throat of *M. moschatus* is much narrowed by two ridges, and the stigma lies below this narrowed entrance. The palate of *M. luteus* does not quite close the throat, and small flies, beetles, etc., sometimes enter without striking the stigma, but the dense hairiness of the lower lip makes this occurrence rare, and a large bee is almost sure to effect cross-pollination. *M. primuloides* has a more open throat, and it is only in the opening bud that entrance to the honey is fully guarded by the stigma; I found a considerable number of stigmas of this species insensible to irritation, and inferred that they had been pollinated in the bud. *M. Palmeri*, like *M. cardinalis*, holds its essential organs a considerable distance above the open throat, but I do not know whether this red flower can, like its very showy relative, depend on humming-bird visits. I saw none of these species frequently visited. *M. luteus*, which I have never seen visited by insects in lower altitudes, and rarely in the mountains, entertains *Bombus Californicus* and sometimes smaller insects. I found thrips in *M. moschatus*, and found flowers with stigmas visibly pollinated before the dehiscence of their own anthers. I saw *M. primuloides* only casually visited by bees. This species has, late in the season, many small flowers only three or four lines long, with styles extremely variable in length. Sometimes the styles are so short as to bring the stigmas below the anthers, one stigma lobe being very small in these cases, and so self-pollination is insured. I found but one similar instance in the other species, this being a small late flower of *M. moschatus*.

PENTSTEMON PALMERI, Gray. *P. barbatus*, var. *labrosus*, Gray, and *P. Bridgesii*, Gray. These Pentstemons all have abundant honey secreted by the bases of the two upper perfect stamens. The filaments of these stamens curve inward to meet each other and the other two anther-bearing filaments, then all four filaments sweep over so as to lie against the upper wall of the flower. The sterile filament crosses the tube above the junction of the others and lies for the rest of its length against the lower wall; all of which mechanism has the effect of excluding short-tongued guests from the honey. The anthers do not dehisce simultaneously, and the process

is long continued. Not until dehiscence is nearly ended does the style lengthen. It, too, lies against the upper side, but by the curving of its tip the stigma is brought down to guard the entrance to the flower, not, however, in such a position as to receive pollen falling from the anthers. *P. Palmeri* is in flower, often in dense masses, from June to August. It is fragrant and very attractive: in color it varies from pale lavender to blue with prominent honey guides, and guests are very numerous. There is a constriction in the tube where the four filaments meet about two lines above the base, and the sterile filament crosses just above the constriction. The throat and limb are wide enough to admit the largest bees. The anthers lie against the upper wall and present a large pollen-covered area through their widely opened cells. The heavy beard on the sterile filament lying against the lower wall tends to make insects keep to the upper part of the flower; still there is one frequent guest, *Osmia deusa*, Cress., that seems to succeed in getting honey without striking the anthers. Hive bees and *Anthophoras* usually strike the anthers, particularly when they turn around in the flower on leaving. A common and most useful guest is a great *Xylocopa*. The bees are even less likely to miss the stigma; and as it is lower than the anthers it will usually be struck first. *P. barbatus*, var. *labrosus*, was abundant about my cabin, and any time from early dawn till dark I was likely to hear the whir of the wings of its humming-bird guests. The flowers are types for this kind of pollination. They are vivid scarlet, are nearly two inches long and tubular. The anthers are exerted beyond the tube, but are sheltered by the upper lip; by being pendent they thoroughly guard entrance to the honey, as does the stigma in the older flowers. The stigma is sufficiently beyond the anthers to avoid self-pollination. The anthers are small and almost woody. They discharge pollen slowly through their narrow slits; still, hive bees and *Anthophoras* sometimes consider it worth while to collect pollen from them. They are of course only useful to those flowers that have stigmas mature before the pollen is quite gone. At Wilson's Peak I had found these *Pentstemons* punctured by some marauders after honey. *P. Bridgesii* is another successful plant in this region. A neighboring hillside was scarlet with these flowers in August, and one could always be sure of find-

ing a half dozen or more humming-birds among them." Although this species is somewhat later than the other scarlet one, their seasons overlap, and the humming-birds often pass from one to the other, but I found no hybrids. The two species are generally similar in their provision for pollination. The flowers of *P. Bridgesii* are more declined and have a somewhat shorter but a wider tube, so that the hive bee sometimes essays to get the honey. The bee, after much fussing, wriggles into the tube as far as possible, but even then, as one can see through the tissue of the corolla, the tongue does not reach quite to the bottom. The pollen is discharged so slowly through the short curved slit at the apex of the anthers that it does not tempt the bees, so that this flower comes near to excluding all but the most desirable guests.

CASTILLEIA AFFINIS, H. & A. Considerable areas of moist land are scarlet with this plant and become resorts for humming-birds. The plant needs no provision for self-pollination. The protruding capitate stigma is sure to be struck by the visiting bird, while the anthers just below in the galea deposit a fresh supply of pollen on its bill. Honey is abundant and pollination is usually effected before the flowers attain their full length, so that the older flowers, like the bracts, merely contribute to the general showiness. Thrips are frequently present, and may effect some close-pollination.

CORDYLANTHUS NEVINII, Gray, flourishes on sunny hillsides among the pines. It flowers in August, and, notwithstanding a slenderness characteristic of the habitat and season, the plant is fairly conspicuous because of the white tips of the finely dissected leaves and bracts and the prominent lower lip of the corolla. This lip is three or four lines broad, and the flower is one-half inch or more long, but as the corolla tube is less than a line long, the abundant honey is accessible to a considerable range of guests. Like *Castilleia* the flower has a long period for pollination, the essential organs being mature before the flower attains its full growth. The stigmas are exerted but are not so conspicuous as *Castilleia*. *Bombus Californicus* frequently visits the flowers, and I have also taken *Anthophora urbana* and an *Ammophila* on them.

VERONICA AMERICANA, Schweinitz, abounds along streams and has flower clusters that last from June to September at least. The

flowers are small and short-lived, but intensely blue. There is little honey, but small insects visit the flowers occasionally. I could not get near enough to make sure, but I think that the insects must strike the stigma first because of the declined style, and it is probable that they cling to the two anthers after the usual manner of *Veronica* guests, and so effect cross-pollination. I have found no provision for self-pollination.

NOTES ON WEST AMERICAN CONIFERÆ.—VII.

By J. G. LEMMON.

PSEUDOTSUGA MUCRONATA, SUDWORTH.

At last the botanical name which our noble Douglas Spruce should bear, seems to be settled. When my Report of the Botanist to the California State Board of Forestry¹ was written, in 1890, it had been decided, that the specific name of *Douglasii* given by Lindley in 1833, should give place under the rule of priority to that of *taxifolia*, which was published by Lambert in 1803. It appears that Lambert, in his "Pinus," published a meager description under the name of *Pinus taxifolia*, the "Yew-leaved Fir." Notwithstanding that Lindley, in 1833, had named the tree as *Abies Douglasii*, the "Douglas Fir," Lambert, four years later (1837) in the second edition of his "Pinus," enlarged the description and changed the name to *Pinus Douglasii*, because, as he expresses it, the name he had first applied "was by no means a happy one, and the more especially as the Silver Fir has been called *Pinus taxifolia*." Unaware, perhaps, or unmindful of its preoccupation, Dr. Britton, in 1889, restored the name of *taxifolia*, and I therefore called the species *Pseudotsuga taxifolia* Britton, both in the Forestry-Report cited and in my Handbook of West American Cone Bearers,² the generic portion of the name having been given by Carrière in 1867.

But this name was not irrefragable. In 1895 Mr. Geo. B. Sudworth, dendrologist to the Division of Forestry of the U. S. Department of Agriculture, noticed that the little-known description of this species published by C. S. Rafinesque, in the *Atlantic Journal*,

¹See p. 139, Pis. 10 and 11.

²Ed. III, 56, Pl. 9, 1895.

under the name of *Abies mucronata*, antedated Lambert's last name, *Pinus Douglasii*, by five years, and Lindley's better one, *Abies Douglasii*, by one year. Mr. Sudworth, therefore, in determining the CONIFERÆ of Mr. Holzinger's collection, renamed the species *Pseudotsuga mucronata*.

Through the kindness of Professor Greene I have been provided with a copy of the original description by Rafinesque, in the *Atlantic Journal*, 1832, p. 120.

“THE DOUGLASS FIR.

“5. *ABIES MUCRONATA*, R. (Fifth Fir, L. C.), bark scaly, branches virgate, leaves scattered, very narrow, rigid, and oblique, sulcate above, pale beneath. Cones ovate acute, scales rounded nervose-mucronate.

“Rises 150 feet, leaves sub-balsamic, one inch long, $\frac{1}{20}$ th wide, cones very large, two and a half inches long.

“Var. *palustris*. Grows in swamps, only thirty feet high and with spreading branches.”

“It is interesting,” Professor Greene remarks, “to see that Rafinesque, even, seems to have known the swamp *Pseudotsuga*, and to have given it a name as a variety.” Only a few persons have reported any knowledge of this variety. It is said to be found in the vicinity of the lower Columbia River, and that its wood is soft and brittle, greatly unlike the tough timber of the typical Douglas Spruce.

Rafinesque's description of this Feather-coned Spruce, though meager and disjointed, is mainly correct, the principal exception being in the application of the very term “nervose-mucronate,” upon which he bases his name. This term does not apply to the rounded cone-scales but to the long, acerose midrib of the bi-lobed cone-bracts protruding from between the scales; a character which Lambert seized upon in 1837, when he gave to this tree the English name of “Trident-bracted Fir.”

Somewhat extended descriptions, with plates, of this interesting species are given in the *Forestry Report* and the *Handbook* already cited, and further particulars will be found in the first of this series of articles, in *ERYTHEA*, i, 48-52, 1893. In the paper last cited I described two marked forms, *suberosa* and *elongata*, as new varieties

of *Pseudotsuga taxifolia* Britton. These, as well as Rafinesque's variety *palustris* alluded to above, must now be referred to the new binomial *Pseudotsuga mucronata*.

The synonymy of the species and its varieties is as follows:—

PSEUDOTSUGA MUCRONATA Sudworth, in *Holzinger. Contrib. U. S. Nat. Herb.*, iii., No. IV, 266, Nov. 23, 1895.

Pinus taxifolia Lamb., *Gen. Pin.*, Ed. I, 27, t. 33, 1803. Not *Pinus taxifolia* Salisb., *Prod. Stirp.*, 399, 1796, a synonym of *Abies balsamea* Mill.

Abies taxifolia Loisel., *Nouv. Duham.*, v., 292, 1812.

Abies mucronata Raf., in *Atl. Journ.*, 1832, 120.

Abies Douglasii Lindl., in *Penny Cyclop.*, i, 32, 1833; Nutt., *Sylva*, iii, 129, t. 115; Newberry, *Pacif. R. Rep.*, vi, 54, t. 8.

Pinus Douglasii Lamb., *Gen. Pin.*, Ed. II, iii, t. 90, 1837.

Picea Douglasii Link, in *Linnaea*, xv, 524, 1841.

Tsuga Douglasii Carr., *Trait. Conif.*, Ed. I, 192, 1855.

Pseudotsuga Douglasii Carr., *op. cit.* Ed. II, 256, 1867.

Pseudotsuga taxifolia Britton, in *Trans. N. Y. Acad.*, viii, 741, 1889.

Var. **suberosa** Lemmon, nom. nov.

Ps. taxifolia var. *suberosa* Lemmon, *ERYTHEA*, i, 48, 1893.

Var. **elongata** Lemmon, nom. nov.

Ps. taxifolia var. *elongata* Lemmon, *ERYTHEA*, i, 49, 1893.

Var. **palustris** Lemmon, nom. nov.

Abies mucronata var. *palustris* Raf., in *Atl. Journ.*, 1832, 120.

Engelmann names a variety *pendula*, of *Ps. Douglasii*, in the *Calif. State Survey Botany*, ii, 483; this, however, is no more than a pendulous form such as we find in many coniferous species. At least seven other forms of this species are met with under cultivation; they are known to gardeners by the names *brevifolia*, *elcgans*, *glauca*, *revoluta*, *Stairii*, *taxifolia*, and *variegata*.

Engelmann's variety *macrocarpa* of *P. Douglasii* is *P. macrocarpa*, a valid species.

The name changes recorded above are partly due to the fact, that all the cone-bearing trees known to the ancients were at one time called Pines or Firs. Early in the eighteenth century Tournefort distinguished, and described technically, three genera of Coniferae;

Pinus, the true Pines, in 1735; *Abies*, the Silver Firs, in 1737; *Larix*, the Larches, in 1763. Link separated the Spruces or Pitch Trees from true *Abies* in 1827, under the generic name *Picea*. More recently, in 1855, Carrière split up Link's *Abies* into Firs and Hemlock Spruces, naming the latter as a genus, *Tsuga*; in 1867 he distinguished as distinct from *Tsuga* the genus *Pseudotsuga*, or False Hemlock Spruces. In 1890 I still further restricted the generic name *Tsuga* by describing the Alpine Western Spruce under that of *Hesperopeuce*.

THE NEW SERIES OF PROCEEDINGS OF THE CALIFORNIA ACADEMY OF SCIENCES.

IMPORTANT changes have recently been made by the California Academy of Sciences in its publications. The great increase in scientific research that has recently taken place in California has brought the question of means of publication prominently before the minds of local scientific workers. Any method of scientific publication that would deserve the approval of scientific men must, in view of the already enormous and rapidly-increasing volume of periodical scientific literature, regard most carefully the convenience of the users of this literature. Further, it is the desire and the effort to give such form and character to the publications of the Academy as shall make them become the chief depository of the results of all researches in pure science that relate to nature in California and on the Pacific Coast of the United States. With these considerations, and others of local importance in view, the administration of the Academy has adopted the following plan with reference to its publications, which, it believes, furnishes the best solution practicable to the publication question. Beginning with the next volume, the first of the Third Series, the Proceedings will be issued in several wholly independent divisions, or parts, each division to be devoted to a single branch of science, or to a group of closely-related sciences. There will be begun at once three divisions, viz., for Geology, for Botany, for Zoology, and from time to time such others as may be demanded, and as the finances of the Academy will permit. Papers will be issued separately, and will

be distributed immediately. Each title-page will bear date of issue and the number in the volume of the division to which the paper belongs. The divisions will be formed into volumes, chiefly according to convenience, and with but incidental inference to time, each volume containing generally about four hundred or five hundred pages. Much attention will be given to illustrations.

The Editorial Committee on Botany consists of Prof. W. R. Dudley, of Stanford University, and Prof. W. A. Setchell, of the University of California. In this division one paper, "Morphological Studies on Naias and Zannichellia," by Prof. D. H. Campbell, is already in press. The following are in preparation: "Report on a Collection of Plants made in the Southern Sierras of California, in 1895-1896," by W. R. Dudley. "The Principal Modifications of the Meristematic Regions in the Laminariaceæ," by W. A. Setchell. "I.—Revision of the North American Species of the Genus *Allium*. II.—Report on a Collection of Plants from the Boundary between San Luis Obispo and Santa Barbara Counties," by Alice Eastwood. "Phycological Memoirs. I.—Some Pacific Coast Ectocarpaceæ. II.—Enceliaceæ of the Pacific Coast," by De Alton Saunders. "Studies upon the Origin of the Caryokinetic Spindle," W. J. V. Osterhout. "A Revision of the Genus *Eriogonum*," by Susie G. Stokes.

SHORT ARTICLES.

MR. BAKER'S REVISION OF BRODIAEA.—Mr. J. G. Baker, Keeper of the Herbarium of the Royal Gardens, Kew, well known as a special student of the petaloid monocotyledons, is publishing a revision¹ of the genus *Brodiaea* in accordance with the conception of it which Bentham and Hooker outlined in their *Genera Plantarum*. *Triteleia*, *Calliprora*, *Hesperoscordum*, *Hookera*, *Dichelostemma*, and *Seubertia* are therein included in *Brodiaea*, and all of the Millas, except the single Mexican species, upon which that genus was founded. Three parts of his paper have appeared, and, although

¹ "The Genus *Brodiaea* and Its Allies," by J. G. Baker, F. R. S., F. L. S., etc. *Gardeners' Chronicle*, Ser. III, xx, 213, Aug. 22; 238, Aug. 29; and 459, Oct. 17, 1896.

not yet completed, it seems advisable to record the changes in nomenclature which have so far been made.

Mr. Baker says: "There is a considerable number of fine American bulbous Liliaceæ, nearly allied to one another, many of which have been introduced into European gardens, which have been classified so differently by recent authors, that their nomenclature is in a state of great confusion. . . . In 1886, Mr. James Britten, in the *Journal of Botany*, pointed out that *Hookera* of Salisbury is an earlier name than *Brodiaea* of Smith. According to Kuntze, Salisbury's name was published in March, 1808, and Smith's paper was read in April, 1808. Kuntze, in his *Revisio Generum*, enumerates under *Hookera* all the species described under *Brodiaea* and *Milla* by Dr. Watson and myself, with the exception of *M. uviflora*. In 1886, in the *Bulletin of the California Academy*, Dr. Greene published a valuable paper, in which all the North American species are carefully described, and several new ones added."

The following North American species are enumerated by Mr. Baker. The references to figures are to those supplied in illustration of Mr. Baker's article.

B. GRANDIFLORA, Smith. *Hookera coronaria*, Salish. (*Op. cit.* 213, fig. 36.)

B. CALIFORNICA, Lindl. *Hookera californica*, Greene. (*Op. cit.* 215, fig. 37.)

B. MINOR, S. Wats. *Hookera minor*, Greene.

B. TERRESTRIS, Kell. *Hookera terrestris*, Britten, and of Greene.

B. STELLARIS, S. Wats. *Hookera stellaris*, Greene.

B. LEPTANDRA, Baker. (*Op. cit.* 213, fig. 38.) *Hookera leptandra*, Greene.

B. ROSEA, Baker. (*Op. cit.* 214, fig. 39.) *Hookera rosea*, Greene.

B. FILIFOLIA, S. Wats. *Hookera filifolia*, Greene.

B. ORCUTII, Baker, l. c., fig. 40. *Hookera Orcuttii*, Greene.

B. MULTIFLORA, Benth. *B. parviflora*, Torr. & Gray.

B. CONGESTA, Smith. *Dichelostemma congesta*, Kunth. (*Op. cit.* 213, fig. 41.)

B. PULCHELLA, Greene. *Hookera pulchella*, Salish.

B. CAPITATA, Benth. *Milla capitata*, Baker. *Dichelostemma capitata*, Wood.

- B. CAPITATA var. PAUCIFLORA, Torr.
 B. CAPITATA var. ALBA, Baker. (*Op. cit.* 238, fig. 44.)
 B. INSULARIS, Greene.
 B. DOUGLASHII, S. Wats. *Triteleia grandiflora*, Lindl. and of Greene. *Milla grandiflora*, Baker.
 B. HOWELLII, S. Wats. *Triteleia Howellii*, Greene.
 B. HOWELLII var. LILACINA, Hort.
 B. PALMERI, S. Wats.
 B. LAXA, S. Wats. *Triteleia laxa*, Lindl. *Milla laxiflora*, Baker. (*Op. cit.* 241, fig. 46.)
 B. CANDIDA, Baker. (*Op. cit.* 239.) *Triteleia candida*, Greene.
 B. PEDUNCULARIS, S. Wats. *Triteleia peduncularis*, Lindl. *Milla peduncularis*, Baker. (*Op. cit.* 243, fig. 47.)
 B. BRIDGESII, S. Wats. *Triteleia Bridgesii*, Greene.
 B. HENDERSONII, S. Wats.
 B. LEMMONÆ, S. Wats. *Triteleia Lemmonæ*, Greene.
 B. CROCEA, S. Wats. *Milla crocea*, Baker. *Scubertia crocea*, Wood. *Triteleia crocea*, Greene.
 B. GRACILIS, S. Wats. *Triteleia gracilis*, Greene.
 B. IXIOIDES, S. Wats. *Ornithogalum ixiioides*, Ait. *Calliprora lutea*, Lindl.
 B. LUGENS, Baker. (*Op. cit.* 459.) *Triteleia lugens*, Greene.
 B. SCABRA, Baker, l. c. *Calliprora scabra*, Greene.
 B. HYACINTHINA, Baker, l. c. *Hesperoscordum hyacinthinum*, Lindl. *H. Lewisii*, Hook.
 B. HYACINTHINA var. β LACTEA, S. Wats. *Hesperoscordum lacteum*, Lindl.
 B. LILACINA, Baker, l. c. *Triteleia lilacina*, Greene.
 Professor Greene's CALLIPRORA SCABRA var. (?) ANALINA, is described, but not named under Brodiaea.—J. B. D.

VELEZIA RIGIDA, L.—This species, which has not been recorded from America, was collected on sandy bluffs overlooking the Tuolumne River at the village of La Grange, early in July, 1896, and adds another plant to the list of aliens, which have come to us from the Mediterranean region. It is not unlikely, it seems to me, that

the species will soon be reported from other mining towns in the Sierra foot-hills, particularly as it is adapted for ready dispersion. It is of diffuse or nearly prostrate habit, glandular-pubescent throughout, with rather slender, rigid stems, breaking up into joints after fruiting. The flowers are small and red. The gamophyllous calyx is narrowly cylindrical (suggestive of *Frankenia*), fifteen-nerved, six lines long, and bracteate; the calyx teeth are acute and cuspidate; stamens five.

The material in the writer's possession was recently determined by Dr. B. L. Robinson, who had in hand at the time the preparation of the manuscript of the Caryophyllaceæ for the Synoptical Flora.—W. L. J.

OPEN LETTERS.

The Genus *Avena* on the Pacific Coast.

U. S. DEPARTMENT OF AGRICULTURE, Division of Botany,)
Washington, D. C., December 2, 1896. }

YOUR letter of November 23, and also the package of *Avenas*, which you have kindly forwarded, have been received.

The specimens were all correctly named except one, labeled *Avena fatua*, which proves to be *A. barbata*. This species is distinguished from *A. fatua* by the long, thin, and slender points of the glumes, especially of the floral glumes, and by the softer pubescence on the floral glume. I have examined specimens of *A. barbata* from Fresno, San José, and San Bernardino, California, and Suavies Island, Oregon. Bastard oat, *Avena fatua glabrescens* Coss. (*A. hybrida* Petermann), not represented in your collection, has been usually referred to *A. fatua*. It has the habit and glumes of this species, but its floral glume is naked except for a few short hairs at the base, and sometimes a thin pubescence along the margin. I have examined specimens of this variety from San Bernardino and San José, California; Croy, Oregon; and Pullman, Washington. *A. fatua* appears to be most abundant and widely distributed. It is the only one, so far as I know, that is found east of the Rocky Mountains. Very truly yours,
LYSTER H. DEWEY, Assistant.

San Clemente Island.

I WALKED the length of the island and was in a few of its great cañons. At first the eye perceived only the grasses and stones of a great level; but suddenly the cañons drop down to the sea, and they are very narrow as well as steep, so that one can distinguish many of the trees from above. *Lyonothamnus floribundus* was in bloom, and there were groves upon groves of trees. It seems strange that it has not been reported before. It is not included in Mr. Brandegee's list, which, I believe, covers all previous lists. *Antirrhinum speciosum* marked everywhere the beginnings of the cañons by its brilliant flowers.

At the head of one cañon there were several groves of *Quercus tomentella* situated where the trees could not fail to get the heavy winter winds. On Santa Catalina the groves of this oak are in deep and sheltered cañons. These trees on San Clemente show the effects of their exposed situation, being twisted and round-topped, of medium size and somewhat crabbed. On Santa Catalina they are comparatively tall, over fifty feet in height, straight of limb, and majestic.

MRS. BLANCHE TRASK.

MISCELLANEOUS NOTES AND NEWS.

THE number of street-trees in Paris is stated to be 122,877, of which 26,000, in round numbers, are *Platanus*, 17,000 *Aesculus Hippocastanum*, 15,000 *Ulmus*, 9,000 *Ailanthus*, 6,000 *Acer Pseudoplatanus*, 4,000 *Acer spp.*, 4,000 *Robinia*, 2,000 *Tilia*, and 1,000 *Paulownia*. Among the remainder are species of *Populus*, *Fraxinus*, *Catalpa*, *Quercus*, *Morus*, and *Sophora*.

ISSUES Nos. 11, 12, and 14 of Mr. C. G. Lloyd's series of "Photogravures of American Fungi" illustrate *Lepiota Morgani* Peck, *Sparassis Herbestii* Peck, and *Lenzites betulina* Linn, and are most admirable productions. *Lepiota procera* Scop. is shown in issue No. 13, but is not quite so meritorious as the first mentioned.

THE following new books have been received from MacMillan & Co., New York: "The Horticulturist's Rule Book," by L. H. Bailey, 75 cents; "The Spraying of Plants," by E. G. Lodeman, with a preface by B. T. Galloway, \$1.00.

ERYTHEA

A JOURNAL OF BOTANY, WEST AMERICAN
AND GENERAL.

EDITED BY

WILLIS LINN JEPSON,

Instructor in Botany, University of California.

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It is proposed in the early ensuing numbers to publish engravings of a considerable number of Californian plants which have, heretofore, been inadequately studied, imperfectly described and poorly or not at all illustrated. Another feature of interest will be historical papers on Californian Botany and Botanists.

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A NEW CALIFORNIAN RUST.

BY E. W. D. HOLWAY.

Puccinia cretica. Spots none; sori powdery, scattered over both sides of the leaves, cinnamon-brown, surrounded by the ruptured epidermis; teleutospores smooth, elliptical, slightly constricted at the septum, with the cells mostly rounded and of nearly equal size, sometimes irregular and angular, not thickened at the apex; epispore thin, $28 - 40 \times 16 - 24\mu$, mostly $32 - 36 \times 20\mu$; pedicel hyaline, about the length of the spore, but fragile and usually broken off close to it, often on the corner, or even the side of the lower cell.

On *Cressa cretica*, San Pedro, A. J. McClatchie; Newark, Alameda County, May, 1895, J. Burt Davy. No uredo-spores were found.

I am indebted to Dr. Lagerheim for making comparison with his *Puccinia Cressæ*, which is different. *Æcidium Cressæ* DC. occurs on the same plants.

THE EXPLORATIONS OF HARTWEG IN AMERICA.¹

BY WILLIS L. JEPSON.

THE name of Hartweg is one of the most familiar in the history of botanical exploration in South America, Mexico, and western America during the first half of this century. Karl Theodore Hartweg, for such is his full name, was born June 18, 1812, at Carlsruhe, in western Germany, which is situated on an elevated table-land of the Hardtwald, and is noted for its public squares, parks, and botanic garden. Veitch tells us that Hartweg was descended from a long line of gardeners, and that he received the benefits of an excellent education—better by far than is enjoyed by an ordinary gardener. He was, for a time, in his early youth, employed at the Jardin des Plantes, in Paris; later we find him in England, without employment.

¹ Read before the Chamisso Botanical Club, May, 1893.

In the year 1836 he was sent to Mexico by the London Horticultural Society, to collect living plants and seeds, and to make herbarium specimens. He was directed by the Society to devote his attention almost entirely to the elevated regions of Mexico, that is, to the *tierra fria*, or upper limits of the *tierra templada*, in order to secure such plants as might be expected to do well in England in the open air, or with slight protection. The Society, at this time and afterwards, was largely interested in the introduction, cultivation, and propagation of hardy or half-hardy trees, shrubs, and herbaceous plants from little-known regions; and through their agency thousands of rare, useful, and ornamental plants were brought into the gardens of England and the continent.

Hartweg was described by the Society's officers as a "steady, well-informed, and zealous young man," a statement of his abilities succinct enough, and far from being couched in extravagant terms; but that even such a modest recommendation might serve to foreshadow a very considerable amount of endurance, enthusiasm, and judgment, he abundantly proved during seven years of exploration in Mexico and the tropics of America.

He landed at Vera Cruz in December, 1836, and journeyed from Mt. Orizaba, near the coast, to the table-lands between San Luis Potosi and Zacatecas, and to the Sierra Madre of Durango. He afterwards proceeded southwards to Morella, the capital of Mechoacan, and glowingly described the beautiful vegetation of the broken country; its oaks adorned with epiphytes, and its showy fuchsias and rigidellas. Thence he returned to the City of Mexico by way of the plateau of Real del Monte. He next visited Guatemala. It was on this long journey that he took up his headquarters for a time at Oajaca, in southern Mexico, and made excursions in various directions—one to the north coast across the Cordillera, completing a circuit of six hundred miles; another to the south coast, on which occasion he rediscovered the Hand-tree, *Cheiranthodendron pentadactylum*, the individual which he found measuring sixty feet in height; and yet another to the wooded districts of Chinantla; after which he resumed his course, skirting the shores of the Pacific for one hundred and thirty leagues. After studying for some time the tropical vegetation of Guatemala and ascending the Volcano de

Agua, the explorer passed on to the region of the equatorial Andes, visiting the neighborhood of Callao and Lima, Peru, and returning northward by way of the Gulf of Guayaquil, Ecuador, and the city of Quito to the peak of Chimborazo and the plains of Bogota. The traveler spent over two years in this interesting region, one month of which was consumed by an illness contracted through sudden change of climate. He floated down the Magdalena River and returned to England in 1843.

The travels of Hartweg resulted in the most extensive collection, made by a single individual, that came from Mexico and tropical America in the first half of the century. During these years he had sent to England hundreds of living plants, thousands of packets of seeds, and a large quantity of herbarium specimens. Through his efforts the rarest plants of Mexico were living in the hothouses of the Society. He discovered many new pines, and made, in particular, several choice collections of orchids. "Upon leaving the scanty undergrowth of the Savannahs near Vera Cruz," he writes in his journal, "I entered a forest of oaks, and there a change took place as if brought on by magic; Orchidaceæ, for which I had been on the lookout since I left Vera Cruz, and of the finding of which I had given up all hope, considering the elevation I had attained, appeared here in the greatest abundance; the oaks actually seemed to groan beneath their weight; *Maxillaria densa* and *tenuifolia* forming festoons and hanging gracefully over the branches they were growing on, seemed to strive with the larger species of *Tillandsia* for their existence."

The personal record of his travels, which was published in the "Proceedings and the Journal of the Society,"¹ contains an account of the characteristic vegetation wherever he journeyed, comments on rare and strange plants, and the native uses of many of these, in company with an occasional spirited bit of description.

The success of Hartweg induced the Society to send him to California, and the botanical explorer arrived again at Vera Cruz, this

¹ See "Transactions of the London Horticultural Society," n. s. ii, p. 377; n. s. iii, 115; and *Journal of the London Horticultural Society*, i, 169, 180; ii, 121, 191; iii, 217, where will be found Hartweg's "Journal of a Mission to California in Search of Plants."

time in November, 1845, whence he proceeded directly across Mexico to Mazatlan, on the shores of the Pacific. Passage to California was not, however, easily obtainable. The officers of the war ships of the United States bound for Monterey looked upon him as a political spy, for both England and the United States were eagerly watching the first opportunity to seize the fair lands of Alta California. It was not, therefore, until the 12th of May of the following year that he gained passage from Mazatlan for Monterey, where he arrived on the 7th of June, 1846. The verdant fields and pine-covered hills of that region proved an agreeable change from the arid country on the Mexican west coast. Among the first plants that he collected were *Ceanothus thyrsiflorus*, *Adenostoma fasciculatum*, *Ribes malvaceum*, *Diplacus glutinosus*, *Garrya elliptica*, and *Gaultheria Shallon*. He also records and sends home to the Society, without an exclamation or word of surprise, the measurements of a redwood¹ (*Sequoia sempervirens*), in the Santa Cruz region, 270 feet high and 55 feet in circumference 6 feet from the ground. Hartweg had, however, by this time journeyed in lands filled with a strange vegetation. He had measured a specimen of *Taxodium distichum* 98 feet in circumference 6 feet from the ground, which grew within a few leagues of Oajaca. This measurement, of course, included the longitudinal board-like excrescences, or knees, which descend the main stem, and at the base project 6 or 8 feet from the trunk proper.

This period, as has been intimated, was in California a season of great political disturbance, and Hartweg, who was above all things a cautious traveler, did not venture far from "the quiet little town of Monterey." He seems to have been, nevertheless, a man of great physical strength and endurance, and with the exception of attacks from fever in the lowlands of the tropics or elsewhere, he incurred few serious misfortunes, and it was his surpassing good luck while in Mexico to fall in with "pronunciados" who were invariably poor marksmen. In any event he made short excursions about the town—one to Santa Cruz, returning in time to see the United States naval forces land and raise the American flag without opposition over the old Spanish capital; another to Carmel Bay, and another to

¹ Doubtless one of the "Santa Cruz Big Trees."

the Mission of Carmel. In such manner his time was occupied during the summer.

About the end of August he departed for Yerba Buena¹ by sea. From there he crossed to Sausalito, and was the guest of General Vallejo, at San Rafael. He traveled as far north as Sonoma and San Miguel.² "The face of the country," to quote again from his journal, "is perfectly level towards the bay. Several species of oaks [*Quercus lobata*, *Q. Douglasii* and *Q. Kelloggii*]³ thrive well in the fine black vegetable mould, and are disposed into large irregular clumps, giving the country the appearance of an immense park, enlivened by numerous herds of elks and antelopes." After a visit to Bodega, the traveler returned once more to Monterey.

(*To be concluded.*)

REVIEWS AND CRITICISMS.

Contribution toward a Monograph of the Laboulbeniaceae. By ROLAND THAXTER. *Memoirs of the American Academy of Arts and Sciences*, Vol. XII, No. III.

No worthier or more epoch-making botanical work has ever appeared in America than this superb volume, which opens up for the botanist an almost entirely new chapter. The minute plants, of which Professor Thaxter treats, present some of the most interesting morphological and phylogenetic problems of plant life.

The plants, with which the monograph deals, are extremely minute fungi, parasitic upon insects, mostly beetles, which for the most part live in damp situations. They are extremely small even for fungi, very few of them reaching the length of a millimeter, while the great majority are decidedly smaller than that. They are attached to the various portions of the outer surface of the insect, many species occurring only upon very limited and definite regions. They would be mistaken by the ordinary observer for bristles or hairs upon the body of the insect itself. The parasitism is slight, the

¹San Francisco.

²Rancho de San Miguel, just above the present town of Santa Rosa.

³The first collection of the Kellogg Oak.

plant penetrating only through the outer covering of the insect by a short process. Consequently they do not figure as insect-enemies, and have little or no economic interest.

The spores are borne in asci, are two-celled, and are invested at maturity by a gelatinous covering which helps them in adhering to the insects with which they come into contact. When the spores germinate they become attached by one end to the insect and grow out into a more or less complex plant body. Professor Thaxter distinguishes the receptacle or supporting part of the plant body thus produced, from the perithecia and from the appendages which bear the antheridia. The receptacle possesses at the proximal end a small blackened organ, the foot, which penetrates the body of the host and draws nourishment from it through the tip, where a small circular portion of the investing membrane is much thinner than elsewhere.

The perithecia are produced as lateral branches from the tissue derived from the activity of the proximate cell of the spore. Each perithecial branch is at first a single cell, which soon becomes two, through the formation of a horizontal septum. The lower cell forms the perithecial wall, while the upper cell forms the procarpic branch. The latter consists of three superposed cells, designated thus: a basal or carpogenic cell, a middle or trichophoric cell, and a terminal cell, which grows out into a trichogyne. The trichogyne may be simple and unicellular, or it may be divided into a number of cells, and even branched, after a very complicated fashion. Such trichogynes are receptive, however, only at the tips.

The antheridia are borne upon the appendage and are always produced from the cells arising from the distal cell of the spore. In a few aquatic species the spermatia are abjoined directly from lateral branches of the appendage, but in the majority of the species they are produced inside flask-shaped cells, from whose necks they issue singly.

Fertilization takes place through the copulation between a spermium and the trichogyne, after which the trichogyne withers and the carpogenic cell begins to divide by horizontal septa until three superposed cells are formed. The two lower cells take no farther part, but the upper one divides by oblique divisions into from two

to nine cells, each of which gives rise to an ascus, containing either four or eight spores, according to the species. The asci soon become free within the cavity of the perithecium, which is formed by the destruction of the other inside cells. The walls of the asci disappear and the resulting spore mass is discharged through the neck of the perithecium.

The cell structure of the members of this group has much in common with that of the Floridæ or Red Algae, and this resemblance between the members of the two groups is heightened by the possession by each of trichogynes and spermatia. The ascus represents a structure which marks a wide morphological and phylogenetic difference between the two groups, but the resemblances add a strong argument to those being brought forward for considering the Ascomycetes as derivatives from the same phylum with the Red Algae.

Professor Thaxter enumerates and describes 158 species, of which only 14 were known previous to his own papers upon the group. The genera have also been increased from 3 to 28. The hosts number 250, of which 241 are beetles. Species are described from all over the globe, but only a very few west American ones are known to the author.—W. A. S.

Analytic Keys to the Genera and Species of North American Mosses.

By CHARLES REID BARNES. Revised and Extended by FRED DE FOREST HEALD. Madison, January, 1897.

A LITTLE over ten years ago Professor Barnes published a set of keys to the genera of mosses included in Lesquereux and James' Manual. Four years later he published keys to the species of the Manual, including also the new species described since the publication of that work. Both of these sets of keys proved very useful to the students of mosses in this country, and the stock of available copies was soon exhausted. In the present volume, prepared by Professor Barnes and Mr. Heald, the keys have been revised and brought up to date, and the descriptions of all species published as North American, between the date of issue of the Manual (1884) and January, 1896, have been added.

Ninety-two pages are devoted to the keys and one hundred and

sixteen to the descriptions. The authors describe their work as being one of compilation and analysis for the most part, original matter being inserted only in the cases of the genera *Dicranum* and *Amblystegium*, in which the investigations of Barnes, True, and Cheney have been utilized. These keys and descriptions help greatly in providing a substitute for that which is urgently needed, viz., a manual of North American mosses which shall be both critical and complete.

This work is issued as No. 5 of volume 1 of the science series of the Bulletins of the University of Wisconsin.—W. A. S.

Index Desmidiacearum citationibus locupletissimus atque bibliographia.
Auctore C. F. O. NORDSTEDT. Berlin, 1896.

Professor Nordstedt has signalized the completion of thirty years' critical study of the desmids by presenting to the world the most complete bibliography and index to specific references which we possess of any group of plants. For accomplishing this he possessed especial advantages and fitness, and as a result he has brought together 1,200 titles, many of them being the small notices and references which so readily escape the general worker. The citations number about 24,000, and show the scope and completeness of the work done. The botanical world is certainly greatly indebted to Professor Nordstedt for his arduous labors in its behalf, and also to the two learned societies whose liberality permitted these results to be rendered accessible in permanent form.—W. A. S.

SHORT ARTICLES.

A CORRECTION IN NOMENCLATURE.—***Ribes montigenum***. *R. nubigenum* McClatchie, ERYTHEA, II, 80, not *R. nubigenum* Phil., Linnæa, XXVIII, 646. As the specific name previously given the multi-spinose *Ribes* described from specimens collected on the summit of Mt. San Antonio, proves to have been previously assigned to a Chilean plant, it becomes necessary to give it another name. I now propose to call it *Ribes montigenum*. Dr. Davidson reports it as occurring upon the summit of Mt. San Jacinto also.—A. J. McCLATCHIE.

CALIFORNIAN HERB LORE.—*Artemisia Californica* Less. This is a great cure-all for man or beast. A strong decoction is made, which is used to bathe wounds and swellings. It is said to be the herb with which Ramona, of Helen Hunt Jackson's tale, was treated.

Euphorbia Californica Benth. The Mexicans call this Golondrino, and consider it a cure for the bite of the rattlesnake.

Heliotropium Curassavicum L. This is held in great esteem by the Mexicans as a cure for wounds. The whole plant is dried and reduced to powder, which is blown into the wound. It is mucilaginous, I believe.

Gutierrezia Californica Torr. and Gray. This shares with *Adenostoma sparsifolium*, the Mexican name of Yerba de la Pasma, or Yerba Pasma. It is reputed to be good for everything, and especially valuable in chills and fevers, and to purify the blood. It is made into a tea.—MRS. I. HAGENBUCK, Dulzura, San Diego County, California.

CONCERNING AN EAST AMERICAN VIOLET.—*Viola subvestita*. *V. canina*, var. *puberula*, Wats., in "Gray's Manual," sixth edition, p. 81. This plant has seemed to me to be sufficiently distinct from all other forms of the *canina* group of violets; and the same opinion I find becoming prevalent. It has lately been printed—scarcely published—as such; but the specific name is in this instance the same as the Watsonian varietal name. This, however, is but the homonym of a Spanish species, *V. puberula*, Lanze, 1881.—EDW. L. GREENE.

THE SACRED THORN OF ARIZONA.—Inquiry was recently made concerning the shrub known as Sacred Thorn by the whites, and Crucifixo by the Mexicans, of Tempe, Maricopa County, Arizona. The following information has kindly been furnished by Prof. J. W. Toumey, botanist and entomologist to the Agricultural Experiment Station of the University of Arizona, at Tucson. Professor Toumey says: "The plant to which you refer under the name 'Sacred Thorn,' growing about Tempe, is *Holacantha Emoryi* Gray. At Tucson we find another Sacred Thorn, viz., *Koeberlinia spinosa* Zucc. The species of *Holacantha* grows to the size of a tree some twenty or more feet in height. *Koeberlinia spinosa* is a dark green, low-

growing shrub, in this locality never more than two to four feet in height. Both of these shrubs are known to the Mexicans under the name 'Corono de Cristo.' These two desert plants represent monotypic genera of the Simarubaceæ. Seeds of *Holacantha*, collected by Norman C. Wilson somewhere in northern Arizona, are now germinating in our conservatory, after being kept in the herbarium for four years.—JOSEPH BURTT DAVY.

THE SLEEPY GRASS OF NEW MEXICO.—A correspondent has recently written to me for information concerning a native grass of New Mexico which is said by the cattlemen to cause drowsiness to the horses which eat it. It is suggested that it may be a species of *Stipa*. Any information concerning it will be welcome.—JOSEPH BURTT DAVY.

VEGETABLE SOAPS.—The roots of *Yucca filamentosa*, imported from Mexico, are said, by the manufacturers thereof, to be used in the preparation of the "purely vegetable" "Yucca-root Soap." A factory for the manufacture of this article exists in San Francisco, and is doing a large business; but we have not been able to learn what proportion of the saponaceous principle of the root is used. It would seem probable that *Chlorogalum pomeridianum*, popularly known as "Indian Soap-root," which abounds on the hills around San Francisco Bay, and which is used for laundry-work by economical Mexican and Irish families, might take the place of the imported article. In some parts of California, especially towards the south, the root of *Chenopodium Californicum* is used for washing purposes. A superficial inspection of this latter substance would give the impression, that it contained far less saponaceous matter than the *Chlorogalum*, and this may be the case; but *Chenopodium Californicum* often grows in places where the *Chlorogalum* is not met with.—J. BURTT DAVY.

MISCELLANEOUS NOTES AND NEWS.

PART I of the "Catalogue of the African Plants collected by Dr. Friedrich Welwitsch in 1853-61," by W. P. Hiern, has recently been printed by the British Museum. It contains a portrait of Welwitsch, who was a remarkable character, and a sketch of his career, including an account of his travels. As is well known, he was the discoverer of that most peculiar gymnosperm, *Welwitschia*, which develops only two foliage leaves, these persisting during the entire life of the plant. It is said that when he discovered this vegetable wonder, his own sensations were "so overwhelming that he could do nothing but kneel down on the burning soil and gaze at it, half in fear lest a touch should prove it to be but a figment of the imagination."

THE "Opportunities for Research in Botany Offered by American Institutions," is the title of a paper in the February *Botanical Gazette*, which gives a general account of the facilities for graduate work in botany in seventeen American universities and colleges granting the doctor's degree upon the completion of three years' study. It would seem to the Pacific understanding that a résumé of the quantity and quality of the original papers contributed to botanical science would give one a far more reliable and just notion of what the facilities amounted to. The results attained, the use to which the facilities had been put, could not but prove far more convincing than statistics concerning the number of sheets in an herbarium, or the number of volumes in a library, all of which things really tell nothing of the positive or relative value of institutions. It is, however, extremely interesting to note the almost amazing number of mounted herbarium sheets which some of the very young institutions possess. It is likewise equally interesting to read that the oldest, the Gray Herbarium of Harvard University, has over 200,000 sheets. According to the figures furnished for publication in Bailey's "Botanical Collector's Handbook," the Gray Herbarium in 1881 was "thought to contain over 250,000 specimens."

THE city of Los Angeles has been offered an extensive tract of land, containing 3,300 acres, lying along the Los Angeles River, to

be used as a park or for some other similar purpose. This body of land is the property of Mr. G. J. Griffith. It is very diversified in its topography, being made up of hill, plain, and mountain country, and varying greatly in soil character, exposure, and altitude above sea level. It has been proposed to found here a great botanic garden, which shall illustrate, in so far as possible, the floras of all the countries bordering the Pacific Ocean. The conditions, climatic and otherwise, are extremely favorable to the carrying out of such a plan. A garden of this character would yield rich scientific results, would prove a great attraction to travelers visiting western America, and would be of distinct economic value to California in the great and growing commercial relations of the State with Trans-Pacific lands.

MR. J. B. LEIBERG, in No. 1 of Volume V, "Contributions from the United States National Herbarium," gives an account of a botanical survey of the Cœur d'Alene Mountains in 1895. The report is largely economic in its character. The principal topics treated relate to the climatology of the region, the forest resources, the composition of the forests, the destruction of the forests, and consideration of the system of timber protection. The author states that, without regard to sentiment in the matter of forest preservation, there is no question but that it would be of the highest advantage to that region to protect and adequately manage the Cœur d'Alene forests. The greatest wealth of the Cœur d'Alene is in its mines. To exploit the mineral treasures of these mountains will constantly require a large amount of timber and fuel. As illustrating the rapid rate of wasteful forest destruction, the following paragraph by Mr. Leiberg is of interest: "In 1884 I passed through the Cœur d'Alene into Montana. In spite of the many previous fires, there were miles upon miles of primeval forest. In this year (1895) along the same route there was not a single foot that the fire and ax had not run through, and the larger quantity had been uselessly and totally destroyed." The era of forest fires began with the early immigrants; with the discovery of ore deposits, forest fires raged in hundreds of localities, started for the purpose of clearing away the dense brush and timber which interfered with the work of prospectors seeking mineral-bearing lodes.

IN September, 1896, Prof. C. S. Sargent and Mr. John Muir measured a felled Coast Redwood, *Sequoia sempervirens*, in the forests near Scotia, Mendocino County, California, which was 340 feet in length and 230 feet to the first limb. The trunk diameter at 6 feet above the ground was extremely small—only 10 feet 5 inches. These figures grant to the Coast Redwood the honor of being the tallest tree on the American continent, since the tallest *Sequoia gigantea* is but 325 feet high.

THE *Gardeners' Chronicle* records the death of M. Jordan, an eminent French botanist, and adds, "He was not only a closet botanist, but cultivated the plants in which he was interested, and to each minor variation of a constant character he applied a specific name, so that he was a 'splitter' *par excellence*."

It is reported that Prof. Thos. C. Porter, who has held the chair of natural history in Lafayette College for more than thirty years, will retire at the end of the present collegiate year. His herbarium has become the property of the college.

VOLUME X of the "Silva of North America," by Charles Sprague Sargent, has been recently issued. This volume contains the trees of the Liliaceæ, Palmæ, Taxaceæ, and Conifere through the Cupressineæ and Taxodineæ, and is of exceptional interest to west American botanists. The Liliaceæ are represented only by the *Yuccas*. Of the eight arborescent species of *Yucca*, peculiar to North America, two are Californian, namely, *Yucca arborescens*, so familiar to travelers through the Mojave Desert, and *Yucca Mohavensis*. The last is found higher on the hills surrounding or belonging to the Mojave Desert and also in the vicinity of Monterey. It has heretofore been confused with *Yucca macrocarpe*, a Texas species, and *Yucca baccata*, belonging to the Colorado plateau. The plates of these *Yuccas* are among the most beautiful of any that have yet appeared in the "Silva." Only one palm, *Washingtonia filamentosa*, is distinctively Californian. This is the largest palm in the United States, and is found native in the San Bernardino and San Jacinto Mountains. It is well known in cultivation, being our most generally cultivated palm. Under Taxaceæ are *Tumion Californicum* and *Taxus brevifolia*, the former

better known as *Torreya Californica*. Four species of *Juniperus* are found within the State, *J. communis*, *J. Californica*, *J. Utahensis*, and *J. occidentalis*; and the same number of species of *Cupressus*, *C. macrocarpa*, *C. Goveniana*, *C. MacNabiana* and *C. Lawsoniana*. The last is probably better known as *Chamæcyparis Lawsoniana*. The species of *Cupressus* are difficult to distinguish from single sprays, and almost impossible to delineate so as to show the subtle differences that exist between them. The cones of *Cupressus macrocarpa*, illustrated in the volume, do not represent the form common in California, or they are not correctly drawn. In the plate the cone scales are rounded in at the edges and could not be made to fit together; they resemble somewhat an inverted saucer. As the cones are known to the writer of this note, the cone-scales turn up at the edges and fit exactly when placed together. *Thuja gigantea* and *Libocedrus decurrens* finish the list of Californian Cupressineæ. The Taxodineæ are represented by our two species of *Sequoia*, one of which appears under the name of *S. Wellingtonia* and the other (let us return thanks!) as *S. sempervirens*.

It seems particularly unfortunate that a strict adherence to the rules of priority and synonyms laid down in the Preface to the "Silva" should have compelled the author to replace a name so well known and appropriate as *Sequoia gigantea* by one so distasteful, so foreign to the country, and, in every way, so ill suited. It will be a long time, if ever, before our "Big Tree" will be called by any other name than *Sequoia gigantea*. The plate bears the old name, probably having been engraved before the description was written. The displacement of *Torreya* by *Tumion* is another case in point.

The painstaking research and wonderful faculty of picking up information about the trees in regard to their economic value, properties, and so forth, are as noticeable in this volume as in all its predecessors.—A. E.

WITH the January number the *Botanical Gazette* added to its staff of associate editors a number of Old World botanists, including Casimir De Candolle, J. B. De Toni, A. Engler, Leon Guignard, Jinzo Matsumura, Fritz Noll, H. Marshall Ward, Eugen. Warming and Veit Wittrock.

MR. C. F. MILLSAUGH, Curator of the Department of Botany of the Field Columbian Museum, published in December, 1896, a "Second Contribution to the Coastal and Plain Flora of Yucatan." A number of new species are described and illustrated, one of these, *Cracca Greenmanii*, being dedicated to Mr. J. M. Greenman, who has made several important contributions to Mexican and West Indian botany.

WE have just received Vol. 1, No. 1, of the "Proceedings of the Southern California Academy of Sciences," published in July, 1896. In addition to minutes of the Academy's meetings, and various official matters, this number contains a "Catalogue of the Plants of Los Angeles County" (including the islands of San Clemente and Catalina), by A. Davidson. The first list of the flora of Los Angeles County was issued in October, 1892; and since that time many additions have been recorded, and a number of new species described. It is usual, in a census of the plants of a region, to segregate the species and varieties,—a practise not followed in this catalogue, which gives the number of species and varieties as 934, and the number of pteridophytes as 27. A new hybrid, *Audibertia stachyoides* \times *polystachya*, is described, accompanied by figures of the flowers of the hybrid and of the parents. One nomen nudum, *Buda gracilis*, appears. This slip is, however, of little consequence, since, whether custom or priority determine, Buda would in neither case be taken up. The List, we have no doubt, will be of much practical use to the botanists of Los Angeles County, in their study of the local flora; and we trust that in the Academy's herbarium a full set of the plants, on which the List is based, are to be found.

WE are in receipt of Fascicle I of "A Flora of Northwest America," by Thomas Howell, which we expect to notice at greater length in the April number.

ANOTHER volume of the Garden Craft series, entitled "The Forcing Book," has made its appearance. This is a manual of the cultivation of vegetables in glass houses, by Prof. L. H. Bailey, the editor of the series. \$1.00. Macmillan & Co., New York.

THE sixth fascicle of the *Phycotheca Boreali-Americana*, Nos. 251 to 300, has just been issued by Messrs. Collins, Holden, and Setchell. The Californian species are represented as follows: 278, *Colpomenia sinuosa* (Roth) Derb. et Sol.; 279, *Desmarestia latifrons* Kuetz.; 281, *Chordaria abietina* Rupr.; and *Melobesia amplexifrons* Haro. A notable feature of this fascicle is the number of rare species from Florida which are distributed.

INFORMATION has recently come to us of the death, on February 28, of Dr. L. N. Johnson, who is familiar to American botanists as our foremost worker on the Demids.

ANOTHER volume from the pen of Prof. L. H. Bailey is at hand. "The Survival of the Unlike" is a collection of evolution essays, which were originally addressed to horticultural societies, and in the preparation of which the author had in mind their final collation and publication in book form. The first two parts are concerned with the general theory of evolution as suggested by a study of cultivated plants; the third part is devoted to essays tracing the evolution of particular types of plants. The titles of some of these essays are as follows: "Whence Came the Cultivated Strawberry?" "The Battle of the Plums," "The Evolution of the American Grapes," "The Amelioration of the Garden-Tomato." The whole volume will be found a most readable one. \$2.00. Macmillan & Co., New York.

ERYTHEA

A JOURNAL OF BOTANY, WEST AMERICAN
AND GENERAL.

EDITED BY

WILLIS LINN JEPSON,

Instructor in Botany, University of California.

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It is proposed in the early ensuing numbers to publish engravings of a considerable number of Californian plants which have, heretofore, been inadequately studied, imperfectly described and poorly or not at all illustrated. Another feature of interest will be historical papers on Californian Botany and Botanists.

The subscription price is \$1.50 per year in advance; to Great Britain and the continent of Europe, 7 shillings. Single copies, 25 cents. No discount to dealers.

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NEW SPECIES OF KANSAS FUNGI.—II.

By J. B. ELLIS and ELAM BARTHOLOMEW.

THE following 17 species of new fungi were all found by the junior author in Rooks County, Kansas.

Puccinia substriata. On leaves and sheaths of *Paspalum setaceum*, Aug. 20, 1896 (No. 2237).

II & III. Amphigenous. Uredospores globose or obovate, 19–23x22–30 μ ferruginous, very faintly echinulate in minute ($\frac{1}{4}$ –1 mm.) punctiform or elliptical sori, covered by the irregularly ruptured epidermis. Teleutospores, obovate or clavate, rusty brown, distinctly constricted, upper cell mostly broader and very slightly roughened, only moderately thickened at the apex, which is regularly rounded or sometimes flattened, without any distinct papilla, very faintly striate 27–52x19–23 μ , on stout, short (15–20 μ), slightly colored pedicels. Sori mostly oblong and about 1 mm. long, covered by the epidermis, which finally splits either along the top of the sorus or oftener along one side, leaving it covered as if by a cap or lid.

Differs from *Puccinia Puspali* Tracy and Earle in the shape of the sori, the slightly echinulate uredospores and the thick, short pedicels of the teleutospores.

Puccinia cryptandri. On leaves of *Sporobolus cryptandrus*, Sept. 16, 1896 (No. 2264).

Epiphyllous. Uredosori linear 1 mm.–1 cm. long, narrow, bordered by the longitudinally cleft epidermis, light-brown. Uredospores globose 20–24 μ diam., or elliptical, 25–30x20–23 μ , yellowish-brown faintly aculeate. Teleutospores in sori like those of the uredospores, but mostly shorter, oblong-elliptical, yellow-brown, constricted at the septum, 35–45x20–23 μ . Epispore smooth, scarcely or only slightly thickened at the apex. Pedicels as long or longer than the spores.

II very abundant wherever the host occurs, from July to October.

III very rare.

Differs from *Puccinia sporoboli* Arth. principally in its longer and darker colored uredosori. In that species they are a bright orange.

ERYTHEA, Vol. V, No. 4 [30 April, 1897].

Cytispora Macluræ. On dead limbs of *Maclura aurantiaca*, Dec. 10, 1895 (No. 1999).

Stromata subcuticular, irregularly scattered, or here and there subconfluent, 1-1½ mm. diam., convex, sunk in the unaltered substance of the bark, 4-8-celled, the cells often assuming the form of perithecia with separate, black and shining, smooth-tipped erumpent ostiola, or with the ostiola united and opening through a single central pore. Sporules allantoid-hyaline, only slightly curved, 5-6x1½µ.

This is evidently the spermogonial stage of *Valsa Macluræ* C. & E.

Cytispora Amorphæ. On dead *Amorpha fruticosa*, Feb. 26, 1896 (No. 2049).

Stromata abundant, about ¼ mm. diam., black, multicellular, deep seated in the inner bark, extending to the wood but not changing its color. Epidermis perforated by the prominent stout ostiolum. Perithecia few (3-6) in a group. Sporules subacute, hyaline, slightly curved, 4-6x1-1½µ.

Spermogonial stage of *Valsa Amorphæ* E. & E. (No. 2048).

Cytispora sambucina. On dead branches of *Sambucus Canadensis*, April 10, 1896 (No. 2111).

Stromata convex, 1-1½ mm. diam, slaty-black inside, multilocular, raising the bark into pustules, opening by a single pore. Sporules oblong-allantoid 6-7x1¼µ.

Cytispora leucosticta. On dead branches of *Pyrus Malus*, April 21, 1896 (No. 2123).

Stromata abundantly scattered over the host ⅓-⅔ mm. diam., seated on the surface of the inner bark, not changing its color or that of the wood. Pustules soon erumpent, presenting a crater-like pruinose disc pierced by a single pore.

Perithecia black, subcircinate, 8-12 in a stroma. Sporules hyaline, curved, suballantoid 7-10x1½µ.

Differs from *Cytispora leucostoma* (Pers.) in the form of its stroma and its larger sporules.

Sphæropsis Ailanthi. On dead shoots of *Ailanthus glandulosa*, April 17, 1896 (No. 2118).

Perithecia thickly scattered, globose, ½ mm. diam., buried in the inner bark and raising the epidermis into pustules which are soon

ruptured at the apex. Sporules elliptical, or broadly elliptical, brown, $16-24 \times 7-10 \mu$.

S. sociata Lev. on the same host has the perithecia cespitose.

Sphæropsis Populi. On dead branches of *Populus monilifera*, July 17, 1896 (No. 2191).

Gregarious, perithecia buried in the bark, $200-260 \mu$ diam., raising the bark into flattish pustules which are barely pierced by the minute osteola, but not ruptured. Sporules oblong, obtuse, $15-22 \times 7-9 \mu$.

Sphæropsis ulmea. On dead shoots of *Ulmus Americana* Feb. 20, 1897 (No. 2364).

Perithecia abundant and evenly scattered, minute, $200-300 \mu$ in diam., subcuticular, raising the epidermis into minute pustules but for the most part not rupturing it. Sporules oblong-elliptical, brown, $15-21 \times 8-10 \mu$.

S. ulmicola E. & E., has the perithecia exactly like this but in that the sporules are $20-30 \times 12-15 \mu$. *S. ulmi*, Sacc. & Roum., has sporules $60-70 \times 14 \mu$, and *S. ulmi*, Karst., has them $10 \times 4 \mu$.

Diplodia celtidigena. On fallen limbs of *Celtis occidentalis*.

In ERYTHEA, IV, No. 5, p. 82, this was erroneously named *D. inquinans*, and the host given as *Negundo aceroides* by an oversight. Differs from *D. Celtidis* Roum. and *D. argentina* Speg., in its much smaller sporules.

Diplodia rhizogena. On exposed roots of *Fraxinus viridis*, March 27, 1896 (No. 2086).

Perithecia globose, $\frac{1}{3}$ mm. diam., suberumpent, in short series, 2-3 mm. long, through longitudinal cracks in the bark. Sporules oblong or oblong-elliptical, deep-brown, scarcely constricted, $20-22 \times 8-10 \mu$.

Differs from *D. inquinans* West, in its seriate less distinctly erumpent perithecia and rather smaller spores. Resembles *D. seriata* De Not, in the seriate perithecia, but that species has the sporules $17-18 \times 7-9 \mu$, and is on a different host.

Diplodia Ceanothi. On dead *Ceanothus ovatus*, April 22, 1896 (No. 2130).

Perithecia scattered, covered, small, 200μ diam., raising and slightly rupturing the epidermis. Sporules oblong-elliptical, constricted, obtuse, deep-brown, $15 \times 7-8 \mu$.

Diplodina Pruni. On fire-killed *Prunus demissa*, April 17, 1896 (No. 2120).

Perithecia subcuticular, scattered or subseriate, globose, smooth, black, about $\frac{1}{2}$ mm. in diam., raising the epidermis into pustules, which are soon ruptured. Sporules elliptical or ovate, yellowish-hyaline, obtuse, 1-septate, and constricted, $10-14 \times 4-6 \mu$.

Stagonospora Populi. On decorticated limbs of *Populus monilifera*, May 6, 1896 (No. 2131).

Perithecia scattered, erumpent, globose, $200-350 \mu$ in diam., smooth, black, with a small papilliform ostiolum. Sporules abundant, hyaline, cylindrical, straight or curved, obtuse $3-4$ -guttulate, $20-30 \times 5-6 \mu$.

Macrosporium negundinicolum. On living leaves of *Negundo aceroides*, Sept. 17, 1896 (No. 2270).

Hypophyllous. On subindefinite dirty white spots thickly scattered over the leaf. Nearly pure white and very noticeable when viewed from above. Hyphæ erect, simple, sparingly septate $35-45 \times 5 \mu$, smoky hyaline to brown, occasionally cæspitose but mostly solitary, not abundant. Conidia clavate, stipitate, $3-7$ septate, now and then with one or two of the cells divided by a longitudinal septum, light-brown, $25-50 \times 10-12 \mu$.

Monilia fungicola. On the peridium of a large fresh specimen of *Lycoperdon giganteum*, completely covering the whole plant. Sept. 21, 1896 (No. 2295).

Forms a thick, ashen-gray, felt-like coating composed of interwoven hyaline hyphæ, sending up fertile, simple branches bearing chains of 4 or more subelliptical hyaline conidia $20-30 \times 15-23 \mu$.

Botrytis papyrigena. On old pasteboard in cellar, May 11, 1896 (No. 2135).

Pulvinate-tufted or sphaeriæform, black, tufts varying in size from punctiform to 1 mm. in diam. Hyphæ irregularly branched, slender, bearing the minute (3μ) subglobose conidia clustered at their extremities.

Differs from *B. fuliginosa* C. & E. in its pulvinate-tufted mode of growth and in its shorter hyphæ.

Torula occulta. On the inside of an old decaying elm post below the surface of the ground, May 11, 1896 (No. 2132).

Effused, black, forming a loose tomentose layer on the surface of the wood, extending for several cm. Fertile hyphæ very short, bearing chains of 5-7 or more conidia, varying from globose 7-8 μ , to oblong or oblong-elliptical 12-20x7-8 μ , slightly narrowed in the middle or biconical, 20-24x8-10 μ , and of a lighter brown. The longer conidia are mostly 3-septate but not constricted, and all except the biconical ones are nearly opaque. The chains of conidia are more or less branched and often are composed entirely of the smaller globose conidia, but mostly these smaller ones are between the longer conidia.

T. pulvinata Speg. has the chains of conidia shorter and the oblong ones are wanting.

THE FOLLOWING CORRECTIONS concerning species recently published are here inserted: *Cenangella thujina*, Ell. & Barth., which was published in ERYTHEA, IV, No. 1, Jan., 1896, p. 3, proves to be a synonym of *Patellea hysteroioides* E. & E. As the species belongs to the Patellariaceæ rather than the Dermateaceæ, the former name becomes obsolete. *Puccinia Serjanix*, described in the January number of the ERYTHEA (V, 6) is not specifically distinct from *P. Archavaletæ*, Speg., and *Puccinia transformans* (lc. V, 6) is antedated about three months by *P. elegans* Schrtr., in Hedwigia, October, 1896.

THE EXPLORATIONS OF HARTWEG IN AMERICA.

By WILLIS L. JEPSON.

(Concluded from page 35.)

ON account of the political disturbances, a contemplated trip to San Diego was abandoned, and it was determined instead to visit the Sacramento Valley. It was not, however, until the next spring, March 8, 1847, that a favorable opportunity offered. This journey was made by water. The explorer touched at San Francisco, Corte Madera (Marin County), botanizing at various landing-places, and, passing through the upper bays into the Sacramento River, arrived at "Fort Sacramento." Thence he proceeded by land, and made his headquarters at the junction of the Yuba and Feather Rivers.

The country was teeming with flowers; eschscholtzias, platystemons, delphiniums, violas, nemophilas, gilies and linanthuses formed brilliantly-colored patches covering the extensive prairies. But the display was not to last long. This was April, and Hartweg soon began to realize with what rapidity the vegetation ran its course under "the cloudless sky" of Alta California.

From his headquarters he made various expeditions, one northwards seventy miles, to the Upper Sacramento Valley, which should have taken him to the neighborhood of the 40th parallel, about opposite what is now Tehama. There can be no doubt, it seems to us, however, that he went at least as far northward as the present town of Chico, and, it may be, not further. From this point he made an excursion into the Sierra foot-hills, on which occasion *Ceanothus prostratus* was collected for the first time. Later he ascended the isolated group of mountains rising up out of the plains between the Feather and Sacramento Rivers, now known as the Marysville Buttes, from which he could see the great tule basins flooded with water. He also visited the Sierra foot-hills on different occasions, following the right bank of the Yuba on one excursion, and visiting Bear Valley, in the High Sierras, on the headwaters of the Yuba. It was very early in the season for collecting at that altitude, but he obtained *Ranunculus alismæafolius*, *Pæonia Brownii*, *Hesperochiron Californicus*, *Pentstemon Menziesii*, and other characteristic plants of the High Sierras. A second visit to the Upper Sacramento Valley to collect seeds completed his work in that direction, and he left this region after three months' botanizing during a most favorable season. A number of botanical collectors had been on the coast before him, but none except General Fremont and members of the Wilkes party had penetrated the interior, and none had collected in the High Sierras unless we except Fremont.

Hartweg next went southward and traveled through the Salinas Valley to the missions of La Soledad and San Antonio. From San Antonio he writes: "A range of mountains¹ extends along the coast, attaining a great elevation, which, although apparently barren as seen from the mission, I was assured on the western flanks toward the sea is covered by large pines. Descending the western

¹ The Santa Lucia Mountains.

flank of this great mountain range, I found at last the long-wished-for *Abies bracteata*.² This remarkable fir attains the height of 50 feet; one-third [of the stem] is clear of branches, and the remainder forming an elongated pyramid, of which the upper part, for three feet, is productive of cones. Having cut down some trees, I found to my regret that the cones were but half grown and had been frost-bitten. . . . I was thus precluded all hope of introducing this remarkable fir into Europe." Hartweg journeyed as far south as the missions of San Luis Obispo and Santa Inez, and returned to Monterey. After one more visit to the "continuation of the San Antonio Range," he sailed for Europe with his collections, in 1848.

An enumeration of his plants from California, Mexico, Central and South America, and a systematic description of the new forms, was undertaken by George Bentham, and appeared in the volume so well known to West American botanists as "Plantæ Hartwegianæ." In this work, eighty-one species from his Californian collection were described as new, some of these being published also in De Candolle's Prodrômus. His collection, in addition, furnished material for various contributions by Bentham and by Lindley to the "Proceedings" and the "Journal" of the London Horticultural Society and the "Botanical Register." Various numbers of the collection were at a later date published as new by Dr. Gray and Dr. Watson, and even within a year a new species has been founded with a reference to a number of Hartweg as part of the type.

It is said that the Society was not altogether satisfied with the result of his work in California, and blamed him especially for not securing seeds of *Abies venusta*. So far as one may judge from his journal, the character and extent of the country he traversed, and the fruits of his collecting, he was altogether conscientious and faithful. However this may be, he left the service of the London Horticultural Society, and afterwards became director of the Grand Ducal gardens at Swetzingen, in his native province of Baden. He remained in this position until his death, which occurred on the 3d of February, 1871.

Below is given a list of the Californian plants first collected by Hartweg. Indeterminable scraps of a few were apparently in

² *Abies venusta*, Sargent.

earlier collections. Tracing his route on local maps by the aid of our present knowledge of the geographical distribution of the plants he collected and by aid of the landmarks described in his journal, we are enabled, through a comparison of the numbers of his journal, with those of his California collection in the *Plantæ Hartwegianæ*, to give for the first time the exact station of a number of his new plants, and a somewhat more definite locality for some others. It is very desirable in many instances that a full series of specimens of Hartweg's plants should be collected from the original station or region. Even at this late period there are few cases in which this has been done.

Ranunculus canus, Benth. The discovery of this species is thus told by Hartweg: "On April 13, I left [the junction of the Yuba and Feather Rivers] with Mr. L. for his farm, seventy miles higher up in the valley. . . . Crossing Feather River, which here is eighty yards broad, and of considerable depth, our course lay five and twenty miles along that river, through a beautiful wood of evergreen and deciduous oaks. . . . Leaving Feather River we struck across a prairie for twenty miles; here immense fields of *Eschscholtzia crocea*, *E. californica* and *Ranunculus*, No. 239, presented themselves, each species growing by itself." The *Ranunculus* mentioned here is the *R. canus* of Bentham, which has never been recollected. One is inclined, therefore, to venture the thought that the collector may have made a mistake concerning the locality or the abundance of the species. That Hartweg labeled his plants with the greatest care has, however, been abundantly proved by all subsequent explorations in the State.

Ranunculus Californicus, Benth. In woods about Monterey.

Delphinium patens, Benth. Plains near the junction of the Yuba and Feather Rivers.

Thysanocarpus radians, Benth. With the preceding.

Viola lobata, Benth. Foot-hills of the Sierra, Butte County.

Linum Californicum, Benth. Marysville Buttes.

Polygala cucullata, Benth. In woods about Monterey.

Sidalcea Hartwegi, Benth. Fields of Butte County.

Hypericum concinnum, Benth. "Sacramento Valley," probably collected in the Sierra foot-hills, on the excursion to Bear Valley.

Limnanthes alba, Hartweg. Butte County.

Limnanthes rosea, Hartweg. Upper Sacramento Valley, near junction of the Yuba and Feather Rivers.

Ceanothus prostratus, Benth. Sierra foot-hills, higher altitudes, *Pinus ponderosa* belt; about opposite Chico.

Rhamnus tomentella, Benth. In the Sierra foot-hills, probably on the excursion along the Yuba.

Hosackia brachycarpa, Benth. In the Sierras, Yuba River region.

Prunus subcordata, Benth. Sierra foot-hills, Butte County.

Chamaebatia foliolosa, Benth. Excursion to Bear Valley, in the *Pinus ponderosa* belt.

Philadelphus Californicus, Benth. With the preceding.

Sedum pumilum, Benth. Upper Sacramento Valley.

Saxifraga peltata, Torr. "Pine Creek," Sierra foot-hills, Butte County.

Heuchera pilosissima, F. & M., var. *Hartwegi*, Wats. Near Monterey.

Deweya Hartwegi, T. & G. Sierra foot-hills.

Peucedanum tomentosum, Benth. Butte County, in the dry bed of a creek; described as having an aromatic tap-root and valued by the Indians for its medicinal properties.

Cicuta Californica, Gray. Near Monterey.

Lonicera interrupta, Benth. Mountain defile leading to the mission of San Antonio.

Lessingia ramulosa, A. Gray. On level ground near Sonoma, also near San Rafael.

Monolopia bahiaefolia, Benth. Plains near the junction of the Yuba and Feather Rivers.

Lagophylla dichotoma, Benth. Fields of Butte County.

Arnica discoidea, Benth. In woods near Monterey.

Antennaria argentea, Benth. Sierras; excursion to Bear Valley.

Erax caulescens (Benth.), Gray. Valley of the upper Sacramento.

Scorzonella sylvatica, Benth. Sacramento Valley, near the junction of the Yuba and the Feather.

Erythraea floribunda, Benth. Sacramento Valley.

Frasera nitida, Benth. Sierras.

Cycladenia humilis, Benth. Sierras.

Asclepias eriocarpa, Benth. "Tularcitos," possibly Pelarcitos, near Monterey.

Gnaphocarpus cordifolius, Benth. Marysville Buttes.

Nemophila maculata, Benth. Sierra foot-hills, right bank of the Yuba.

Navarretia leucocephala, Benth. Plains near the Feather River.

Navarretia viscidula, Benth. Sierras (probably in the foot-hills).

Gilia filipes, Benth. Upper Sacramento Valley.

Gilia tenella, Benth. Plains near the junction of the Feather and the Yuba.

Phlox diffusa, Benth. Bear Valley, High Sierras.

Plagiobothrys canescens, Benth. Upper Sacramento Valley.

Hesperochiron Californicus (Benth.), Wats. Bear Valley, High Sierras.

Pentstemon azureus, Benth. Dry bed of creeks, Butte County.

Collinsia tinctoria, Hartw. Right bank of the Yuba, Sierra foot-hills.

- Antirrhinum cornutum*, Benth. Upper Sacramento Valley.
Mimulus bicolor, Benth. Foot-hills of the Sierra, near Bear River.
Orthocarpus lacerus Benth. Marysville Buttes.
Orthocarpus campestris, Benth. Upper Sacramento Valley. In the same locality as *Ranunculus canus*.
Orthocarpus linearilobus, Benth. Sierra foot-hills, excursion to Bear Valley.
Monardella candicans, Benth. Foot-hills of the Sierra, right bank of the Yuba.
Pogogyne zizyphoroides, Benth. Upper Sacramento Valley. Very rarely collected.
Calamintha mimuloides, Benth. Carmel River.
Stachyspynantha, Benth. Mountains near Carmel.
Chorizanthe stellulata, Benth. Upper Sacramento Valley, probably near Chico.
Chorizanthe diffusa, Benth. Near Monterey.
Eriogonum leucocladon, Benth. Carmel River.
Polygonum Californicum, Meisn. Sacramento Valley.
Asarum Hartwegi, Watson. Sierra foot-hills, near Bear River.
Salix lasiandra, Benth. Sacramento River.
Salix lasiolepis, Benth. Salinas and Carmel Rivers.
Myrica Hartwegi, Watson. River banks of the Sacramento.
Quercus chrysolepis, Liebm. Near Monterey.
Quercus Kelloggii, Newberry. First collected by Hartweg near Sonoma.
Fritillaria lanceolata, Pursh., var. *gracilis*, Wats. Corte Madera.
Fritillaria recurva, Benth. Foot-hills of the Sierra, Northern Butte. This may have been collected earlier by Fremont.
Erythronium Hartwegi, Watson. Sierra foot-hills, neighborhood of the 40th parallel.
Odontostomum Hartwegi, Torr. Upper Sacramento Valley, probably in the Sierra foot-hills.
Damasonium Californicum, Torr. Upper Sacramento Valley.
Smilax Californica, Gray. In the Chico region.

NOTES ON THE POLLINATION OF SOME CALIFORNIAN MOUNTAIN FLOWERS.—V.

BY ALICE J. MERRITT.

MONARDELLA LINOIDES, Gr., is a main dependence for honey-seeking insects in August. The odor and the white tips of the corolla invite attention, and Anthophoras, hive bees, *Bombus Californicus*, sand wasps, and butterflies, are ready to respond. Small

bees, like *Megachiles*, seem to come for pollen only. The anthers of the flowers are exerted and dehisce upward, and, as is usual in *Labiatae*, the stigmas mature later and slightly exceed the anthers.

AUDIBERTIA INCANA, var. *pilosa*, Gray, is a very conspicuous member of the mountain flora in August. The bright pink or magenta calyces and bracts and the blue or violet corollas make a striking combination of color that succeeds in attracting humming-birds as well as bees. Only the largest bees and humming-birds can get honey in a legitimate way, for the corolla tube is from six to nine lines long. *Xyllocopas* seem to be frequent guests, and both these bees and the birds must strike the anthers, which are exerted from three to six lines and dehisce downward. The stigmas occupy similar positions in older flowers. Smaller bees come occasionally for pollen, but they would not often visit flowers with mature stigmas. Hive-bees are often seen pilfering the honey through little punctures of the corolla-tube just above the calyx.

SCUTELLARIA ANGUSTIFOLIA, Pursh, grows in masses along streams and is very assiduously visited by *Anthophora urbana*. Honey is abundant when the flowers have not been recently visited, but the bees pay many visits to depleted flowers. Since the flowers are from nine lines to an inch long, the head of the bee must be thrust well down the throat of the flower, and the bee's back is dusted with pollen from the anthers which are included in the fold of the upper lip. The stigmas are similarly situated. Since the clusters have only from one to three flowers expanded at one time, much of the pollination is of one plant with another.

ERIOGONUM BAILEYI, Wats., carpets considerable areas in August and succeeds admirably in securing cross pollination. The nine filaments erect themselves, a few at a time, and hold the pink anthers with upward opening cells where the pollen is sure to adhere to visiting insects. The styles, which have been closely coiled during dehiscence, now rise and occupy their central position. After the pollination of the flowers the perianth persists, and by changing to rose color adds much to the attractiveness of the flower clusters. Honey is usually perceptible at the base of the perianth and the plants are humming with bees of many sorts. *Megachiles*, *Macro-*

teras and Anthophoras are particularly abundant; so are small beetles, *Bembex fasciata*, *Steniola duplicata*, and an *Ammophila* were also taken on the flowers.

HEBENARIA LEUCOSTACHYS, Watson, is not infrequent in this locality. The spikes are of long duration and the pure white flowers are very fragrant, especially at night. The stigmas are comparatively large and the discs very sticky, adhering readily to the point of a needle. It would seem that an insect large enough to get the honey—the slender spurs are from nine lines to an inch long—must come in contact with the discs. I had little opportunity to watch the flowers, and saw no guests, but a greater part of the older flowers lacked one or both pairs of pollen masses, and the plants have abundant fruit.

EPIPACTIS GIGANTEA, Dougl., I found abundant at Seven Oaks in July. I could find no honey; the disc was less glutinous than in the *Habenaria*, and I saw no guests. Self-pollination certainly sometimes occurs in this Orchid; for although the pollen masses lie above the stigma under a lid, as the flower becomes older the coarse, webby pollen pushes out from beneath the lid and is blown against the stigma.

SISYRINCHIUM BELLUM, Wats., occurs sparingly in some cienegas. I was much surprised to see bees visit these flowers for pollen on several occasions. In the vicinity of Los Angeles, where I have been accustomed for years to see these plants growing in masses, I had only once seen them visited by any insect.

IRIS LONGIPETALA, Herbert, was nearly out of flower when it came under my observation. Some bees were about the few remaining flowers, but I was unable to see whether they struck the stigmas. I do not succeed in germinating its seeds.

CALOCHORTUS NUTALLI, T. & G., was found frequently in the mountains. The flowers vary in color from white to purple. In form the corolla is sometimes rotate, again it is like a slender chalice. As in other *Mariposas* of this group the anthers of the nearly opened flowers stand in the center and dehisce very slowly, three at a time, then fall back against the petals. In this species the anthers

twist during dehiscence. The stigmas are exposed only a day or two before the petals fall. When the petals spread widely, these stigmas are by no means sure to be pollinated by an entering guest; those that come for pollen seek the center but would visit older flowers only by mistake, while those that come for honey need not be large, since the honey is excluded only by short, dense hairs. Nor is honey plentiful, although served so very attractively, and I do not find *Mariposas* generally much frequented by insects. I watched this species but once under conditions favorable to insect visits, and saw a few flowers visited by hive bees and anthophoras. These flowers happened to have narrow entrances, and the stigmas in the older flowers were probably touched by the bees. The flowers close two or three hours before sunset, and, as the corollas store the pollen falling from the anthers, insects that avail themselves of the shelter of the flowers at night would be likely to effect close pollination in the older flowers.

ALIAM PARRYI, Wats., is not rare and has large and very fragrant flowers, with abundant honey. The large anthers are slightly exserted and remain for several days entirely covered with coarse pollen; but the styles are so erratic as to length and position that it is difficult to draw any conclusions as to the method of pollination. The stigmas may be beyond, within, above, below or among the anthers. I observed the plants only during the day, and saw only bees visit them in a casual way.

REVIEWS AND CRITICISMS.

Laboratory Practice for Beginners in Botany. By WILLIAM ALBERT SETCHELL, Professor of Botany in the University of California. MacMillan & Co., New York.

The word "laboratory" always suggests extensive preparations. A vision of rows of compound microscopes and all kinds of apparatus arises before the eye. The author's plan, however, while requiring abundant material with which to work, demands only the simplest tools. A note-book, pencils, eraser, dissecting needles, a pair of forceps, a magnifying glass, and a sharp knife, scalpel or razor are all that are needed.

The aim of the book is to lead the student to look upon the plant as an individual with its own life to live, its children to produce and provide for, its enemies to protect itself against, and its friends to attract, welcome, and treat to its most precious stores. The student is not to learn from definitions or illustrations, as is the usual plan, but from seeing, describing and drawing the objects himself.

The plan is almost ideal and in the hands of a good teacher could neither fail to lead the student into habits of observation nor to provoke thought concerning the reasons for observed facts. It is not a book for a student learning by himself, and would be almost useless except in the hands of a competent, energetic and enthusiastic teacher.

The entire absence of illustrations, while a seeming defect, is a part of the plan, the object being to make the student more self-reliant and to compel the teacher to have on hand the actual materials for study. These have been wisely and carefully selected from plants that are generally obtained readily; most of them are plants common in cultivation. Some, however, such as *Darlingtonia*, *Sarracenia* and *Drosera* would generally be extremely difficult to obtain, and others would require the teacher to possess a garden or greenhouse, unless he should have access to that of some florist or gardener.

A book like this can have no local coloring. For a knowledge of the plants native to any section of the country, some other book must be used in connection with it, or if the teacher should happen to know the flora of the neighborhood, he can, perhaps, supply the lack from experience. The relationships of plants to each other are omitted altogether, belonging more properly to field study than to laboratory work.

The arrangement is scholarly and logical. Beginning with the seed, the history of the plant is traced through root, stem, and leaves to flower and fruit. The headings of the chapters give an excellent idea of the outline and contents: Seeds, Seedlings, Roots, Stems, Leaves, Phyllotaxy, Buds, Præfoliation, Protection, Storage, Climbing Plants, Epiphytes, Parasites, Saprophytes, Insectivorous Plants, Vegetative Reproduction, Seed Reproduction, A Typical or Pattern Flower, Fertilization, Imperfect, Incomplete, Irregular and Unsym-

metrical Flowers, Coalescence and Adnation, Wind and Insect Pollination, Self-pollination, Anthotaxy, Metamorphosis, Fruits, Fleshy Fruits, Dry Dehiscent Fruits, Dry Indehiscent Fruits, Seed Dispersal by Animals, by Wind, by Water, Spore Reproduction.

There are two appendices, one containing suggestions to students and the other to teachers. In the latter, the author states that the book was written perhaps more for the teacher than for the pupil. The truth of this is evident throughout the book. In fact, one questions the necessity of putting the book into the hands of the pupil; for with a really competent teacher and with a class not too large, each pupil would make his own book, illustrated with his own drawings, containing his own definitions and descriptions and full of original thoughts for the reasons of things. It is, however, doubtful to what extent and with what success this plan can be carried out, since neither teachers, students, nor conditions are ideal. The labor of constantly and carefully examining note-books with large classes becomes almost impossible where work presses and time is limited, as is the case in most of our grammar and high schools. The need of careful revision of note-books, too, is imperative; for only in that way can the teacher learn to what extent the student has assimilated what has been given him.

As a reaction against two extremes the book is notable. The old idea that botany consisted in learning the names of plants, and the new idea that it is to be learned only through a compound microscope, are absolutely ignored. Field work, too, receives very little attention, though it is in the field, certainly, where the plant is best studied as an individual. In fact, a laboratory manual, at its best, aims only to show how to work in the field and to provoke thought in regard to the phenomena of plant life.

The index is remarkable. Everything is indexed under every possible head, so that not to find what is sought seems utterly impossible.

The list of books given in the second appendix, under each subject, will be found especially helpful to teachers who have not the opportunities of consulting libraries to find out the best books for themselves; while to those who have such advantages, the list is suggestive, so that much time and effort are thereby saved in seeking for the best.—ALICE EASTWOOD.

THE REVIEW of Mr. Howell's Flora of Northwest America, which was promised for this issue is unavoidably delayed, until the May number.

ERYTHEA

A JOURNAL OF BOTANY, WEST AMERICAN
AND GENERAL,

EDITED BY

WILLIS LINN JEPSON,

Instructor in Botany, University of California.

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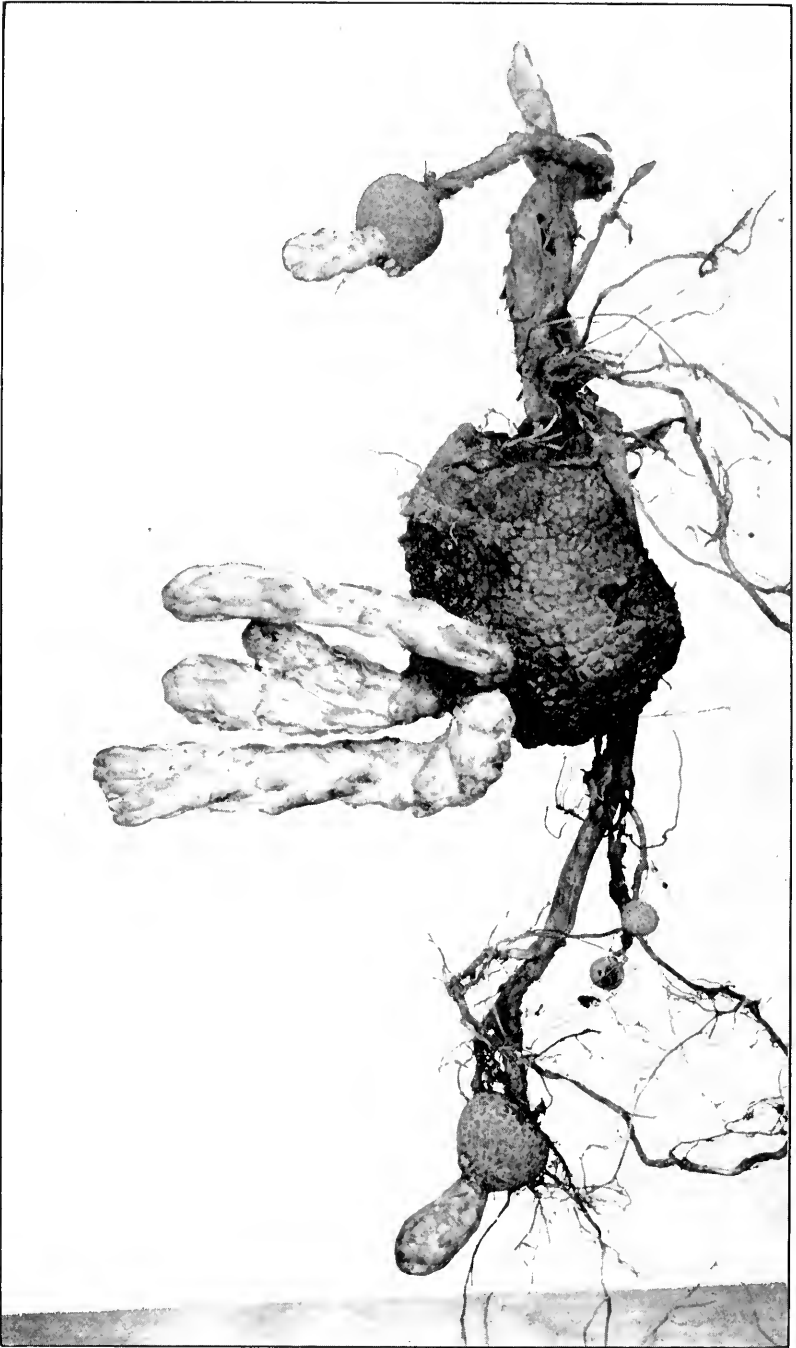
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TUBERS OF BOSCHNIAKIA STROBILACEA, Gray.

BOSCHNIAKIA STROBILACEA, GRAY.

By WILLIS L. JEPSON.

THE Genus *Boschniakia* is thought to contain four species. The type of the genus is *B. glabra*, C. A. Meyer, which is found in Siberia, Japan, and from the Aleutian Islands east to Slave Lake in British America. The second species to be published was *B. Hookeri*, Walp., which was obtained on the Northwest Coast by Menzies, and has not been collected since his day. The third in chronological order is *B. strobilacea*, of the Pacific Coast. The fourth is *B. himalaica*, Hook. and Thoms., of the Himalayan Region.

Boschniakia strobilacea was first collected by Dr. J. M. Bigelow, of Whipple's expedition of the Pacific Railroad Survey, on dry and rocky hills of the South Yuba River, California, in May, 1854, and received its technical description from Dr. Gray in the "Pacific Railroad Report," iv, 118 (1857). To this original description little was added in the "Botany of California," i, 585 (1876), but a much fuller account appeared in Gray's "Synoptical Flora," ii, 313, 455 (1878), and in the "Proceedings of the American Academy of Arts and Sciences," XXII, 312 (1887). In the place last cited Dr. Gray offers the opinion that *B. Hookeri* and *B. strobilacea* may be the same species. To the above literature is to be added a reference to a note by Mrs. T. S. Brandegee in *Zoe*, ii, 78 (1891), accompanied by a photographic reproduction of a "tuber" bearing young spikes which had not appeared above the surface of the ground.

The species is now known to have a wide distribution north and south on the Pacific Coast, although, considering the period of time that has elapsed since the days of Bigelow, it has been rarely collected and in few or single specimens. Brewer, of the California Geological Survey, made the second collection in the Santa Lucia Mountains (No. 470, 1861). The southernmost station is the San Bernardino Mountains, *Lemmon*, 1876; the northernmost, Mt. Finlayson, near Victoria, British Columbia, *Macoun*, 1885. Other localities from which I have seen specimens, are: Santa Cruz Mountains, *Anderson*; Redwood Cañon, Oakland hills, Contra Costa County, *Blasdale & Davy*, 1897; Mt. St. Helena, *Jepson*, 1893; Arcata, Hum-

boldt County, *Korbel*, 1896; Hyampum, Trinity County, *Blasdale*, August, 1896; Seattle, Washington, *Piper*, 1892.

Early in May, 1896, some exceptionally fine specimens of the tubers and flowering spikes were received through Prof. E. W. Hilgard at the Department of Botany of the University of California from Sonoma County. Mr. Adolph H. Weber, who sent the specimens, reported that they were taken from roots of the Madrone, *Arbutus Menziesii*. While these plants were evidently to be referred to *Boschniakia strobilacca*, the material differed in several notable particulars with the generic and specific diagnoses as given in the Botany of California and the Synoptical Flora, and exhibited some interesting variations. The descriptions in the above works were found by the writer to correspond, however, with the type specimen and the early material preserved in the Gray Herbarium on which the diagnoses were based, and it is to be noted that nearly all the material received from time to time at the Gray Herbarium has called for some change in, or necessitated an addition to, some feature of the generic or specific diagnosis.

The "tubers" or globose growths which form the attachment of the parasite to the root of the host are shown in Plate No. 1. They differ much in size. The earliest stage in Mr. Weber's material is $\frac{3}{8}$ of an inch in diameter, and this is the earliest known to us. The "tubers" bearing spikes vary in size from $1\frac{1}{4}$ to $3\frac{7}{8}$ inches in diameter. Internally the texture is quite fleshy, the outside being firmer and more or less tessellated. They produce one or more short caudices, which bear a single spike or are branched and bear two, three or even four spikes. The largest tuber, as shown in the illustration just cited, bears four spikes. Plate No. 2 shows a small secondary spike at the base of the large one.

The flowering shoots borne by the tubers vary also considerably in size. Two of Mr. Weber's plants measure respectively $8\frac{1}{2}$ and 9 inches in length and at the thickest portion the spike was $2\frac{1}{2}$ inches in diameter. One specimen of Mr. Blasdale's, the largest which the writer has seen, was fourteen inches in length. Usually, however, the plants are rather smaller and are frequently only three to four inches in length. But more interesting than mere variations in size are the differences in the floriferous portion of the

shoots. One of the Sonoma specimens was a remarkable illustration of the happiness of the specific name, the broad overlapping scales of the thick spike, and the outline of the spike itself, bearing a most remarkable resemblance to the narrow cones of one variety of the sugar pine, *Pinus Lambertiana*. On the other hand, the Mt. St. Helena specimens are example of variation in the other direction, the spike being rather short and very open—almost loose, not in the least suggestive of a pine fruit.

The bracts are mostly rhomboidal in outline, sometimes as broad as long, usually more or less erosulate, and are $\frac{1}{4}$ to $\frac{3}{4}$ of an inch in breadth above. Bracteoles are not ordinarily found but when present, occur on the lower portion of the spike, two to each flower. These bracteoles are narrowly linear structures 4 to 5 lines in length.

In a few very interesting cases they are somewhat longer, with the upper half of the structure distinctly expanded and laminate with erosulate margins. There are no other leaf organs known of this plant but the bracts and bracteoles and scales. The genus in the Synoptical Flora is characterized as "ebracteolate." The flowers of *Conopholis* are bibracteolate, as are, also, those of *Aphyllon comosum*, *A. tuberosum*, and related species.

The flowers themselves are either sessile or distinctly pediceled. The bracts at the period of full anthesis curl their apices inwards somewhat, the corollas thus having the appearance of being exerted a little beyond them. The tube of the corolla is slightly constricted just below the throat; the upper lip is described by Gray as entire in all the species of the genus but it is often rather deeply notched, most noticeably in Mr. Blasdale's *Hyampum* specimens, particularly in the upper flowers.

The most noteworthy variations, however, appear in the calyx. In the plants from Sonoma County there appears every variation from a calyx which is perfectly truncate to calyces with one, two, three, or four lanceolate acuminate or triangular acute teeth, which are equal or unequal and may be as long as the tube. The calyces without teeth occur in the lower part of the spike; when two teeth are present, they are either lateral or anterior. Calyces with three or four teeth are found mostly on the upper part of the spike and are disposed laterally and anteriorly. In no case is there a posterior

tooth. In regard to variation in the calyces the reader is also referred to Mr. Blasdale's note on his *Hyampum* specimens, in this journal, iv, 188.

The 4-valved capsules are large and contain numerous seeds, which are about one line long and are very peculiar, having a thick honeycombed coat and a minute kernel, $\frac{1}{2}$ millimeter long. The embryo occupies one end and is about $\frac{1}{4}$ of a millimeter long. It is of oval outline and shows no differentiation whatsoever into caulicle or cotyledons, even under high power of a compound microscope.

The host plant is usually some species of Manzanita. The host of Bigelow's plants was not reported; Brewer's specimens were taken from Manzanita, as also the Mt. St. Helena plants. The plants of Piper were on *Gaultheria Shallon*, and those of Mr. Weber were said to have been on Madrone. All the host plants, therefore, are of the Ericaceæ.

EXPLANATION OF PLATES.

Plate I. Tubers of *Boschniakia strobilacea*, Gray, on roots of *Arbutus Menziesii*. Three of the tubers bear young flowering shoots.

Plate II. Spike in full anthesis with a young lateral spike at base.

REVIEWS AND CRITICISMS.

A Flora of Northwest America. Containing brief descriptions of all the known indigenous and naturalized plants growing without cultivation north of California, west of Utah and south of British Columbia. By THOMAS HOWELL. Vol. I, Fascicle 1. Portland, Oregon, March 15, 1897. 50c.

This fascicle is the first part of a pioneer botany. The title "Flora of Northwest America," is not one to give a clear idea of the region included, nor is the sub-title altogether definite, since neither Oregon, Washington nor Idaho (which the Flora covers), is "west of Utah." A title which named these states might have been in a small degree cumbersome, but there are some things better than brevity. However, a title is no such great matter, perhaps, and, in any event, the users of this new flora will give it no less welcome on this account, for it is first-comer in all that extensive country.



SPIKE OF BOSCHNIAKIA STROBILACEA, GRAY.

From the prospectus we learn that Volume 1, containing the Phanerogamæ, will be issued in six parts or fascicles. Fascicle I, now before us, includes the orders from Ranunculaceæ to Celastraceæ, following the Bentham and Hooker sequence. That the work is, in large part, a compilation the author distinctly implies, as evidenced by the following sentence transcribed from the preface: "As the writing of descriptions of plants at this late date is, to a great extent, writing or copying what others have previously done, it is hardly right to claim originality for work done in that field; . . . and to save repetition . . . I wish to give full credit here to all authors any portion of whose works have been copied herein." The purist may carp at the above sentence, but to us it is one of those deliciously quaint and truthful expressions which ought to be sufficient to promote the gayety of botanists, for he must be dull who can not read its meaning and he unobservant who can not find application. However, this is a digression and we very much doubt if Mr. Howell meant to throw any lances.

Naturally, in a book of this kind, one turns first to get knowledge of the author's expression of genera and species. No new genera are proposed in this part, but the author follows the recent tendency towards the segregation of genera. Such revivals, then, as *Batrachium* (aquatic species taken from *Ranunculus*) and *Roripa* (the yellow-flowered species of *Nasturtium*) find place here as in the more recent American local floras. In the *Portulacaceæ* the generic treatment differs from that in any other flora; it is that outlined by the author in volume 1 of this journal, and displays the writer's field acquaintance with these plants.

As to species there is even a more decided tendency towards division. The author has "raised nearly all published varieties of the region . . . to specific rank;" these, with the entirely new specific proposals, enliven the pages with no small number of novelties. In addition all species proposed by other authors are accepted, so that not even one reduction appears in the fascicle. We can not but feel that this last observation of ours has some relation to another, viz., that there is in many cases scarcely any grouping of the species into small sections. For instance, in *Delphinium*, sixteen species appear in one section. We are rather inclined to

demur if it is Mr. Howell's idea that these species have each "one constant character." *Delphinium leucophæum*, it may be exemplified, is not distinguishable in any satisfactory way from *D. Columbianum*, and it is only a combination of characters which helps much in the end anyway. It might be said, in addition, that this failure to section the species will not make easy the work of determining—and local floras find sale because the residents of a region desire some means of finding out the names of the plants which grow about them.

It may be noted that for *Myosurus sessilis* "an alkaline flat" near Arlington, Oregon, is cited as "the only known locality." What seems to be the same occurs in alkaline spots near Vacaville, California. I have been privileged with a plant of the type material from the Gray Herbarium, and the Californian and Oregon plants are found to correspond.

It is evident from a perusal of the pages that Mr. Howell's work is cyclopedic rather than critical. What he has done has been to bring together in a usable form, in the light of his field knowledge (and no other botanist knows so well the plants of these states) all that has been published concerning the flora of the region. But it should, of course, be added that very many diagnoses are his in whole or in part, and that his personal observations color the completed product. Even so much is a task of no small magnitude. The author has not spoken of difficulties, but difficulties must have been many in a region in which library and herbarium facilities are meager. Mr. Howell, therefore, deserves no small meed of praise for the courage and resolution necessary in the face of such circumstances, and we trust that he may finish his volume within the limit of the period contemplated—that is, by the end of the present year.

—W. L. J.

Ueber den Flechtentribus der Rocellei. O. V. DARBISHIRE.
Berichte d. deutschen Botan. Gesell., 15, 1–15, Pl. 1, 1897.

The Rocellei form a small tribe of lichens recently removed from the Parmeliacei to the Graphidacei by Reinke. Dr. Darbishire has increased the number of genera from three to eight, using, particularly, characters drawn from the color of the hypothecium. Of the

Pacific Coast species, *Rocella tinctoria* (L.) Ach., *R. phycopsis* Ach., *R. fuciformis* DC. and *Schizopelte Californica* Th. Fr. remain unchanged, while *Rocella leucophæa* of Southern California is made the type of the new genus *Dendrographa* Darbish.—W. A. S.

MISCELLANEOUS NOTES AND NEWS.

WE have to record the death of Dr. Wm. P. Gibbons, at Alameda, May 17, 1897. He was one of the pioneer Californian botanists and an early member of the California Academy of Sciences. A sketch of his life will appear in our next issue.

MISS ALICE EASTWOOD, Curator of the Herbarium of the California Academy of Sciences, returned in the middle of May from a fortnight's collecting trip in the Santa Lucia Mountains, California. The region of the southern limit of the Coast Redwood was explored and many interesting observations on the range of northern plants were noted.

MR. J. G. BAKER, Keeper of the Kew Herbarium, gives a classified list of American Erythroniums with notes on the species, in the *Gardener's Chronicle* of May 8, 1897 (Series 3, XXI, 299). Eleven western species are listed, of which four are Californian.

THE third annual meeting of the Botanical Society of America will be held in Toronto on Tuesday and Wednesday, August 17 and 18, 1897, under the presidency of Dr. John M. Coulter. The council will meet at 1 P. M. on Tuesday and the first session of the Society will begin at 3 P. M. The address of the retiring president, Dr. Charles E. Bessey, will be given on Tuesday evening at 8 o'clock. The British Association for the Advancement of Science will meet in Toronto, August 18 to 25. The opening address is to be given on Wednesday evening, August 18. The Executive Committee expects a fairly large contingent of the members of the Botanical Section of the B. A. A. S., including some Continental botanists of note. It is probable, therefore, that this meeting will give unusual opportunities for renewing or forming acquaintances among British and Continental botanists. All foreign botanists

present will be invited to sit as associate members of the Society, and to read papers. This invitation will be addressed personally to all whose intention to come to Toronto is known.

CONCERNING the Sleepy Grass of New Mexico, for which information was asked on p. 40, *supra*, Mr. F. V. Coville, Botanist to the Department of Agriculture, Washington, D. C., writes that the plant in question is *Stipa viridula robusta*.

FRITILLARIA PLURIFLORA, Torrey, is figured in the *Gardener's Chronicle* for April 10 (vol. xxi, ser. 3, p. 231, fig. 76). It appears to have flowered recently under cultivation in Ireland.

PROF. J. W. TOUMEY contributes to *Garden and Forest* for April 21, 1897, some interesting "Notes on the Pine Forests of Southern and Central Arizona," with estimates of the number of square miles of forests on the principal ranges. The forest area of Arizona south of the Colorado plateau is said to be about 600 square miles. The total area of Arizona south of this plateau is about 75,000 square miles, making it thus appear that the pine forest area of southern Arizona is considerably less than one per cent of the entire area. In the same number of the above journal, Mr. Carl Purdy, of Ukiah, has a note on *Erythronium grandiflorum* and related species.

IN the *Bulletin of the Torrey Club* for April, Mr. M. A. Howe, of Columbia University, founds a new genus of Hepaticæ, which he calls Gyrothyra, containing a single species, *G. Underwoodiana*. The material studied was collected by the author near Eureka, California, and by Macoun in British Columbia.

ERYTHEA

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AND GENERAL.

EDITED BY

WILLIS LINN JEPSON,

Instructor in Botany, University of California.

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THE CONIFERÆ OF THE SANTA LUCIA MOUNTAINS.

By ALICE EASTWOOD.

THE Santa Lucia Mountains take their name from their highest peak, which rises near the middle of the chain in Monterey County to an elevation of 6,100 feet. These mountains extend along the coast of Monterey and San Luis Obispo Counties from Monterey Bay southward, parallel with the coast. South of San Simeon Bay they trend towards the southeast, losing their identity in the low hills of the Carisa Plain. From Pt. Sur to beyond Pt. Gorda they present a precipitous front to the ocean, rising abruptly from 3,000 to 4,000 feet from the very edge of the ocean. Numerous mountain streams come tumbling down through quickly descending cañons and widen them, delta-like, forming small tracts of comparatively level land. These little benches are very fertile and well supplied with the purest water; so that, in spite of their isolation and limited area, they have been taken up by settlers, who are known throughout the county as "The Coasters."

These mountains are especially interesting to the botanist, since they are the southern limit of the flora that follows *Sequoia sempervirens* and is so characteristic of the northern coast-forests. They also contain species most abundantly represented in the Sierras, as well as many peculiar to themselves. These different floras have their representatives among the Coniferæ, so that the distribution of the Coniferæ will indicate, somewhat, the distribution of the different floras.

Sequoia sempervirens and *Pseudotsuga taxifolia* are associated together, as in the forests further north; but the latter is not confined to the coast cañons, being found also within sight of the ocean on the ridge above, near the Los Burros mine, and in other places not visited by the writer. The redwoods scarcely venture above the fog-line, which, in these steep mountains along the coast, is distinctly visible to the eye, as well as instantly perceptible to the sense of feeling. They are rarely found outside of the cañons, since the steep slopes of the hills offer an environment that is too dry. The soil is dry and the air also. It must not be thought that

the redwoods and spruces here are miserable specimens. One redwood tree in Willow Creek Cañon is twelve feet in diameter, and a spruce tree in the same cañon is more than three feet through. This redwood is said to be the largest tree in Monterey County, and it is certainly a fine specimen.

On the summit of the ridge, from which the ocean can be seen, *Pinus Coulteri* is the most noticeable tree. Somewhere in these mountains, in 1831, Coulter collected the first known specimens of this pine, noted for its enormous cones. His specimens probably came from near Santa Lucia Peak, since he records it as growing with *Pinus Lambertiana*, and it is only there that the two species are found together. *Pinus Coulteri* generally grows on exposed and lofty ridges, but in these mountains it extends down the sides of the mountain on the eastern slope almost to the banks of the Nacimiento River, where it is associated with *Pinus Sabiniana*, the Grey-leaf Pine common on the low hills of the Nacimiento and San Antonio Valleys.

On the same ridge where *Pinus Coulteri* abounds, *Pinus ponderosa* is also abundant, often growing with *Pinus Coulteri*, but frequently forming exclusive groves of scattered trees.

One poor little bush of *Juniperus Californica* was seen near a never-failing spring on the Los Burros trail. Probably the species is better represented in parts of the mountain not visited by the writer. It is said to be common near Cruikshank's ranch. The trees so far noted can all be seen, when crossing the range from the Los Burros mines, on the ocean side, to the San Migueleta Ranch, on the Nacimiento River.

Another trail further north is now known as the Plaskett trail; formerly it was called Mansfield's trail. *Pinus tuberculata* is the most noticeable conifer on the eastern side of this trail, and the trees grow almost to the base of the mountain. Its lightly-clad branches and numerous, persistent cones readily distinguish it from the other conifers.

Looking down into the deep cañon of San Miguel Creek, south of the trail, but near by, and off into the distant cañon on the north that marks the headquarters of the Nacimiento River, peculiar trees can be seen lifting spire-like summits above all the others. These

trees are known botanically as *Abies bracteata*, the rarest existing fir, and confined to a few cañons of these mountains. When once seen these trees can be recognized as far as the eye can reach. While there are few individuals, comparatively, the number of small trees coming up in San Miguel Cañon assures us that the species is in no danger of extermination.

Mr. E. C. Mansfield and the writer visited this locality May 1 of the present year, to obtain flowering specimens, which had, until then, never been collected. The trees were in full flower; the pollen had begun to float through the air, and near the tops of all large trees female flowers were plainly to be seen. Coulter records that only the middle branches bear cones. This was not so with the trees observed in this cañon. Owing to the great difficulty experienced by Mr. Mansfield in reaching the topmost boughs and in securing specimens, only a few pistillate flowers were obtained, and these Mr. Mansfield carried down, holding the twigs, to which they were attached, in his mouth, so as to keep them intact on the branches. The specimens are in the Herbarium of the California Academy of Sciences, duplicates having been sent to Prof. C. S. Sargent to be represented in the "Silva of North America." The staminate flowers were more abundantly collected, being so much more easily obtained.

The firs seen in this cañon had lost their lower branches, and, therefore, lacked the symmetrical outline from base to summit which the most perfect specimens exhibited. The writer, some years ago, saw two trees in a gulch further north which the Santa Lucia trail crosses, where the lowest branches reached almost to the ground, and the trees tapered to perfect cones with long, pointed tops waving plume-like in the breeze. The trunk, at the upper part, sends down long, slender branchlets that droop as do those of the weeping willow or weeping spruce. Even the upper boughs have a tendency to grow downwards, thus rendering the foothold of an adventurous climber somewhat precarious, since the slightest breath of wind sways the slender upper axis back and forth.

The mountaineers are all enthusiastic in their admiration of this tree, which they name the "Silver Fir." When the cones have attained full growth they have a purplish hue, and the long,

slender, exserted bracts become gemmed with drops of resin. The upper part of the tree seems full of odd-looking birdnests set with diamonds. The beauty of the fruit-laden branches can perhaps be imagined.

Further north, near the foot of Santa Lucia Peak, a third trail (spoken of above) crosses these mountains. It is known by the name of the Santa Lucia trail, and is the most rugged but most attractive of all the trails. Long ago it was much traveled by the Indians, but now a traveler rarely crosses the mountain by that route. It passes through the only grove of *Pinus Lambertiana* now left in these mountains. The writer can never forget the amazement and delight experienced when coming upon this grove. One or two young trees had been seen on the way up the eastern slope, but their identity was only guessed at until the magnificent trees far above and beyond were discovered. *Pinus Lambertiana* is said to have been abundant formerly on the slopes of Santa Lucia Peak, and a few trees are yet left. *Libocedrus decurrens*, also, then grew on the mountain. While the San Antonio Mission flourished, the best timber on Santa Lucia Peak was cut down, and these two valuable species were almost utterly destroyed. In those days it is said that the Nacimiento and San Antonio Valleys were "black with Indians." Their houses, fields, and aqueducts gave life to the hills and valleys over which the beautiful oaks alone now seem to hold sway. Were it not for the few survivors in almost inaccessible places, and the timbers and other relics of the San Antonio Mission, the story of the former prevalence of the Sugar Pine and Incense Cedar would scarcely be credited.

BIOGRAPHICAL SKETCH OF DR. W. P. GIBBONS.

By WILLIS L. JEPSON.

THE pioneer botanists of California were mostly men whose profession was that of a physician but who possessed a decided taste for the study of natural history as a pure science. The very attractive and largely unworked flora of California strongly impelled towards the gratification of this taste. There were not many physicians of

this sort, it is true, but having brought with them the scientific flame they sedulously tended it. A few men of this character came together in San Francisco, founded the California Academy of Sciences, and devoted themselves "in the days of its weakness and want" to its scientific upbuilding, with such single-heartedness that as an indirect but highly to be desired result there were won for science-work in California the bequests of James Lick and others, whose attention had been drawn to the struggle for life going on in the Academy.

Dr. William P. Gibbons was not one of the original six who met and decided on the foundation of an Academy of Sciences, but he was one of the charter members of the Academy, took an active interest in its work, attending the meetings where met Kellogg, Behr, Ransom, Trask, Bloomer and a few others. His name is frequently mentioned in the early Proceedings of the Academy, and we note that for the year 1855 he was elected Corresponding Secretary.

He was born in Wilmington, Delaware, April 19, 1812. His early education was received from his parents and in his youth he learned the printing trade. This must have been merely a means to something that he desired more, for we find him at a later date attending medical and scientific lectures in Philadelphia. It was during this period that botany became a specialty with him, outside of his subsequent profession. He was elected a member of the Philadelphia Academy of Sciences, which gave him opportunity for study and research in many departments of science.

In 1846 he graduated as a Doctor of Medicine from the University of the City of New York. In 1852 he sailed from New York for California. On the Isthmus of Panama, he was attacked by cholera, which was raging among the gold-seekers detained in that tropical climate. It is probable that he would never have reached California but for the kindly act of W. C. Ralston, afterwards one of California's most prominent citizens and financiers, who carried him in his arms aboard the vessel. He arrived in San Francisco in January, 1853, and began at once the practise of his profession. From the first he was devoted to the investigation of the botany of California. From 1856 to 1863 he lived in various parts of the Californian Sierras and Nevada, largely in order that he might

closely acquaint himself with the native vegetation. Since 1863 his home has been in Alameda.

Although an enthusiast in botanical pursuits Dr. Gibbons wrote but little. That which he has published relates chiefly to medicinal plants. For twenty years or more he was the chairman of the committee on botany of the California State Medical Society and his writings on the indigenous medical botany of California may be found in its annual Transactions. To this journal (iv, 161) he contributed a most entertaining account of "The Redwoods in the Oakland Hills." In addition to botany he developed an interest in Ichthyology, and contributed systematic descriptions of new species to the early volumes of the Academy's Proceedings. In his honor, Dr. J. G. Cooper erected *Gibbonsia*, a genus of fishes. (See Proc. Cal. Acad. iii, 108.)

The subject of our sketch was a citizen as well as a naturalist. He gave much time and energy to local affairs, particularly in educational matters, and served in various official capacities. He was President of the first Board of Education of Alameda, and worked for the free school system in the Sierras.

Dr. Gibbons was, indeed, a man of many accomplishments; genial in manner and with wide sympathies, he made many friends among the prominent scientists of the Pacific Coast and of the East. He died May 17, 1897, at his home in Alameda County, at the age of eighty-five years.

OPEN LETTERS.

I NOTICE in the April number of ERYTHEA, on p. 55, in your reference to *Asclepias eriocarpa*, Benth., you give Pilarcitos as a possible meaning for Hartweg's "Tularcitos." Tularcitos Ranch is an old Spanish grant, lying near the head of Carmel River, south-east of Monterey, and on the old trail from Carmel to Arroyo Seco, the "Release" Cañon and San Antonio, one of the routes of the mission people.

I VISITED the upper Carmel Valley in the winter-time only, and therefore had no opportunity to collect any except winter-blooming plants. But the Tularcitos Ranch is still a large one, and the

present ranch-house is near the Tularcitos pond or lake, at a short distance from an older, abandoned ranch-house. It is clear, therefore, that it is an old ranch. It is used now, as it was in the Mexican régime, as a cattle ranch, the country all about consisting of open pasture hills, without chaparral, favorable ground for *Asclepius criocarpa*.

Up the Carmel Valley, from the Carmel Mission, was one of the very few *naturally* open routes to the Soledad Mission in the Salinas Valley, and was, I know, one of the old routes of travel. From this route there was also a diverging one, passing eastward of the Santa Lucia Mountains through a defile to the San Antonio Mission, where Hartweg found *Lonicera interrupta* perhaps. It is not uncommon here and north of the Mission San Antonio as well.

Very truly yours, W. R. DUDLEY.

Leland Stanford Junior University, May 12, 1897.

MISCELLANEOUS NOTES AND NEWS.

MR. J. N. ROSE, Assistant Curator in the Department of Botany of the United States National Museum, began an extended botanical trip through Mexico in the last of May. He goes first to Guaymas, then to Mazatlan and from there proceeds east across the high Sierra Madre.

MR. WALTER SHAW, Instructor in Botany at Stanford University, has accepted leave of absence from that institution, to be spent in study at Harvard University.

THE forty-sixth annual meeting of the American Association for the Advancement of Science will be held in Detroit, Michigan, August 9-14, 1897.

MR. V. K. CHESNUT, Assistant in the Division of Botany of the Department of Agriculture, proposes to visit California during July for the purpose of making field investigations of the poisonous plants of the Pacific Coast.

THE announcement has been recently made of the death of Dr. Joseph F. James, Assistant Pathologist of the Department of Agri-

culture, Washington, D. C., and of Dr. E. S. Bastin, Professor of Botany in the Philadelphia College of Pharmacy. The latter was most widely known for his school and college text-books and for his writings on pharmaceutical botany.

DR. EMILY L. GREGORY, Professor of Botany in Barnard College, New York, and Associate Editor of the *Bulletin of the Torrey Club*, died April 21, 1897. She was the author of an "Elements of Plant Anatomy" (1896), and reviewed many histological and physiological papers for the *Bulletin*.

In a pamphlet entitled "A Sketch of Cryptogamic Botany in Harvard University, 1874-1896," Dr. Farlow gives us a history of the first beginnings and subsequent growth of botanical instruction in cryptogamic botany in that university, supplemented by an account of the research and graduate work and the facilities for such work in the way of equipment, herbaria, etc. A list of "Contributions from the Cryptogamic Laboratory" is added from which it is easy to infer the character of the facilities and equipment. The titles of the papers are largely of the like nature. While graduate students are permitted a certain range, "it has been accepted as a principle that subjects of a morphological or histological character of not too wide a range, are best adapted to those who are beginning their scientific career, and that descriptive systematic work should be postponed until a later period when practical experience has strengthened the judgment and given a broader basis for the discrimination of species."

DR. GEORGE JAMES PIERCE, Assistant Professor of Botany in Indiana State University, has been called to the Stanford University at Palo Alto, California, to take charge of the work in plant physiology. He is a graduate of the Lawrence Scientific School of Harvard University, and took his doctor's degree at Leipzig, where he studied with Pfeffer. He also studied with Strasburger at Bonn. We have his papers "On the Structure of the Haustoria of Some Phanerogamic Parasites" (*Annals of Botany*, Sept., 1893), Notes on *Corticium Oakesii*, B. & C., and *Michenera Artoceras*, B. & C. (*Bull. Torr. Club*, xvii, 301), and *Das Eindringen von Wurzeln in lebendige gewebe* (*Bot. Zeit.*, 1894).

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NOTES ON ERIOGONEÆ.

By KATHARINE BRANDEGEE.

ERIOGONUM GIGANTEUM Watson, Proc. Am. Acad., xx, 371. On Catalina Island this often forms a shrub 6 to 10 feet high, with a trunk 3 or 5 inches in diameter, the branches near the top. This arborescent form, if not entirely caused, is undoubtedly much assisted, by the sheep gnawing away the lower branches. It is a showy plant, with white foliage, and a dense whitish cyme, often a foot or more in diameter. *E. molle* Greene, Pittonia, i, 207, seems not distinguishable except by its smaller size—it appears never to make a trunk; and the heads or cymes, so far as I have seen, are only a few inches in diameter. Good specimens in late flower and fruit were collected in 1886 by A. W. Anthony (No. 115), and young plants are growing in our botanic garden.

E. GIGANTEUM var. **formosum**. Branching from the base, rarely arborescent; leaves densely white-tomentose on both sides, less so above with age, oblong-lanceolate or oblanceolate, 5 to 8 cm. long, 13 to 20 mm. wide, on stout petioles 2 to 4 cm. long; cyme larger, looser, and more foliaceous than the type; pedicels much longer and exserted.

Collected on San Clemente Island, by Dr. E. A. Mearns and T. S. Brandegee, Aug., 1894. Type in the herbarium of T. S. Brandegee, and now growing in our garden, from seeds of type.

It is somewhat unexpected to find the type passing from Catalina to a distant island, while the nearer shows a distinct variety. A similar thing occurs with *Lyonothamnus*. The type is found only on Santa Catalina, while the well-marked leaf-variety *asplenifolius* occurs on Santa Cruz and Santa Rosa Islands to the north, and on San Clemente to the south.

Eriogonum peninsulare. Shrubby at base, 3 dm. or more high, with loose, shreddy bark, and intricate, somewhat geniculate, leafy branches, which are pubescent, with spreading hairs; leaves thickish, ovate or rounded, retuse, ciliate, sparingly pubescent, 1 to 2 cm. long; petioles half as long as the leaves; bracts

ternate, nearly distinct; inflorescence of short, divaricate, leafless terminal branches; involucre sessile in the forks, distinct to the base, tomentose; segments 2 mm. long, oblong, acute; flowers very numerous, tomentose without and within, campanulate at base and separating very readily from the longer, tomentose pedicel; segments nearly alike, obovate, greenish-gray; stamens 9; fruit not seen.

Paraiso, Baja California, May 1, 1889, in the middle of the peninsula, nearly opposite Cedros Island; *E. Orcuttianum* of Proc. Cal. Acad., ser. 2, vol. ii, 201, not of S. Wats. Collected by T. S. Brandegee, and type in his herbarium.

Whole plant yellowish-green, and so much resembling *E. Orcuttianum* that it was hastily passed over, in Mr. Brandegee's list, as that species. The specimen is only a branch, but presumably taken at the base.

ERIOGONUM GOSSYPINUM Curran, has been again collected by Miss Alice Eastwood, by Mr. J. Burt Davy and others, in the same general region. The original specimen was too old to clearly show its relationship. The later ones leave no doubt that it is a close ally of *E. angulosum*. Its akenes are not lenticular as described, but globular below and only angular near the summit, intermediate between the more angular ones of *E. angulosum* and the short-globose ones of *Nemacaulis denudata*. The flowers of *E. gossypinum* are nearly those of the latter species. *Nemacaulis* as a genus is entirely untenable. There are several other species of *Eriogonum* with involucre divided quite to the base, and it is too closely related to *E. gossypinum* to be generically separable from it.

CHORIZANTHE INSIGNIS Curran, collected in the Santa Lucia Mountains by Mr. W. Vorriede and by Miss Alice Eastwood, shows as many as 9 flowers in the involucre. The seeds are not lenticular, as described; but one angle is usually more prominent than the other two, which causes a slightly flattened effect. If there are any truly lenticular seeds in *Eriogonee*, I have not seen them. What is usually meant by the term is, that the lower part of the seed is globular, or sufficiently turgid to obscure the angles. The upper part is always, so far as I have observed, triangular, but often only at the very apex, as in *Nemacaulis*; in *Eriogonum vagans*, *hirtiflorum*, etc.; in *Oxytheca dendroidea*, and many others.

ERIOGONUM SCALARE Wats., Proc. Am. Acad. xii, 261. To this species belongs *E. irretitum* Brandg. Proc. Cal. Acad., ser. 2, ii, 202. Mr. C. R. Oreutt has collected *E. scalare* at El Rosario near the original locality, which was "Canvas Point," a misreading for "Canoas." Mr. Brandegee's specimens were collected in the interior nearer the east than the west coast, and are of somewhat different habit.

SOME PARASITIC FLORIDÆ OF THE CALIFORNIAN COAST.

By CHARLES PALMER NOTT.

THE following genera of parasitic Floridæ were obtained by the writer in collections made at various times during 1896-97 at the localities named.

Sterrocolax decipiens Schmitz was found on its host *Ahnfeldtia plicata* (Hudson) Fries, at Matunec Beach, Rhode Island, in January, 1896, and again in December, 1896, at Pacific Grove, California. The specimens from Rhode Island were obtained from floating fronds of the *Ahnfeldtia*, washed ashore after a heavy southern gale, while those from the Californian shore were collected on the growing plants.

The parasite grows in abundance upon all parts of the *Ahnfeldtia* fronds, but is especially plentiful upon the upper branches. It forms knobby, wart-like, reddish-black excrescences, seldom projecting far above the surface of the host plant; so that it is with difficulty distinguished from the latter. Microtome sections were made to ascertain the internal structure and the nature of the connection with the host. The rhizoidal filaments grow out from amongst the radially arranged cortical cell-rows of the *Ahnfeldtia*, and resemble the latter so closely that the radiating cell-filaments of the parasite seem to be prolongations of portions of the *Ahnfeldtia* tissue. The thick-walled, closely-crowded rows of cells of the *Sterrocolax* form hemispherical or elliptical cushions of radiating cell-filaments, at whose apices are borne the single so-called sporangia, each containing a single spore. The latter, so far as could be ascertained, did not divide in any way, but escaped whole from the sporangia.

The genus *Sterrocolax* with its single species was described and figured by Schmitz, in *Flora*, 1893, pp. 393-397, Tafel vii., fig. 11 and 12. Buffham (*Jour. Quek. Mic. Club*, ser. ii, vol v, no. 33, Oct., 1893, pp. 291-305) observed the ellipsoidal spores escaping, and states that he found tubes through which they passed, thus leading him to the view that the spores were formed in succession. He considered the bodies to be the asexual organs of fructification of the *Ahnfeldtia* itself. M. Maurice Gomont in the *Journal de Botanique*, April, 1894, confirms the statement of Schmitz in regard to the structure of the parasite, and states that the manner of attachment is similar to that of the parasitic genus *Actinococcus*. Schmitz and Hauptfleisch in their arrangement of the Floridæ in the *Naturlichen Pflanzenfamilien*, p. 366, regard the systematic position of the genus *Sterrocolax* as uncertain, owing to the fact that antheridia, procarps, and cystocarps are as yet unknown.

Gonimophyllum Buffhami Batters, occurred very frequently at Pacific Grove and Carmel Bay, California, in December, 1896, upon *Nitophyllum Ruprechtianum* J. Ag. The plants were a pale pink color, contrasting strongly with the deep lake-red of the host-plant. The parasite seemed to prefer the lower portions of the frond as its habitat, occurring on the *Nitophyllum* near its base much more frequently than elsewhere. It grew in patches extending in some cases an inch in breadth, while the individual fronds reached a height of ten millimeters. Antheridial, cystocarpic, and tetrasporic plants were collected, and compared with the description and figures given by Batters (*Journal of Botany*, March, 1892), who founded the genus. This writer states that the parasite was never found upon the cystocarpic plant of *Nitophyllum laceratum*, its host in his case, but always upon the barren, antheridial, or tetrasporic plants. So far, the writer has found *Gonimophyllum* only upon the tetrasporic *N. Ruprechtianum*, as the cystocarpic plant occurs but seldom, and the antheridial plant has not, so far as is known, been observed on the Californian coast.

In structure the parasite shows a well-marked differentiation into vegetative and reproductive portions. The lower vegetative part consists of creeping, rhizoidal filaments, which ramify among the tissues of the *Nitophyllum*, causing local irritation and swelling of

the latter at the point of attack. From this basal tissue rise small leaflets, resembling the *Nitophyllum* in structure, which are almost wholly given over to reproductive purposes.

The structure of the reproductive organs bears a close resemblance to the corresponding parts of the host plant, so much so that the parasite is placed with the *Nitophylleæ* in classification.

Hitherto, *Gonimophyllum* has been observed only at Deal on the British coast, where it occurs on *Nitophyllum laceratum*, Grev.

Janczewskia verruciformis Solms-Laubach, was collected at Pacific Grove and Monterey Bay, California, in December, 1896, and May, 1897, growing upon *Laurencia pinnatifida* Lamx, and also upon *Rhabdonia Coulteri* Harvey. The identification of the latter specimen, however, rests upon vegetative characters only. Its occurrence upon the latter form is an interesting circumstance, in view of the fact that the various parasitic Florideæ occur, in so many cases, upon genera nearly related to themselves. A considerable quantity of the *Janczewskia* was obtained in all stages of development and including the three forms, male, female, and tetrasporic. The procarps and cystocarps were carefully examined and compared with the figures and descriptions given by Solms-Laubach (*Mém. d. l. Soc. nation. des Sc. natur. de Cherbourg*, Tome xxi, 1877) with which they closely agreed in external appearance and internal structure. Material was also sent to Professor W. G. Farlow, of Harvard University, who kindly examined the specimens and verified the determination. The fronds of *Janczewskia* grow upon any part of the *Laurencia*, forming small, knobby outgrowths, light red in color, which are readily distinguished from the darker hue of the host, so that the parasite is plainly seen in the water. The plant reaches a height in some cases of five millimeters. The three forms are distinct from each other and when well developed have each a characteristic appearance.

The procarps first appear as small cellular outgrowths upon the surface of the frond, but the cystocarp later becomes surrounded by a thick-walled pericarp, formed by the growing out of the vegetative tissue about the procarp. The antheridia are borne in little hollows in the thallus as modified lateral branches of the thallus cells. The tetraspores are formed by the growth and division of cells lying in the cortex of the parasite.

A marked feature in the structure of the parasite is the differentiation into assimilatory and rhizoidal structure. The cells which comprise the cortical tissue possess chromatophores and contain a certain amount of pigment. The central tissue is composed of cells much more elongated, and destitute of chromatophores. These at the point of attachment of the parasite to its host form regular cell-connections with the latter and apparently derive a considerable amount of sustenance from the host plant.

Three species of *Janczewskia* are known at present. The typical species, *J. verruciformis* Solms, occurs in the Mediterranean Sea upon *Laurencia obtusa*. Another species, *J. Tasmanica* Falkenberg, is found upon *Laurencia Forsteri* on the coast of Van Diemen's Land, while the remaining species grows upon *Cladhymenia oblongifolia* of the South-Australian sea.

It is of interest to note the further extension of the range of these European and Australian species to the Californian coast, upon which a number of other species of parasitic Florideæ, not yet satisfactorily determined, have also been found.

SHORT ARTICLES.

SPHEROPLEA ANNULINA.—The writer called attention in February, 1896 (*ERYTHEA*, iv, 35), to the fact that this rare alga had been found at San Bernardino by Mrs. Austin (cf. Farlow, *Botan. Gazette*, viii, 225, 1883) and that an additional locality had been discovered in the Los Angeles River by Miss S. P. Monks, of the Los Angeles State Normal School. Since then it has been rediscovered at San Bernardino by Mr. S. B. Parish, and an additional locality, this time north of the Tehachapi, is reported by Mr. J. Burt Davy, of the Botanical Department of the University of California. Mr. Davy found it in thick sheets, lining the bottoms of drying pools in the "Black Lands" just east of Tulare, in Tulare County. Sheets a foot or two in diameter were obtained and they were of a brick red color. Sets of specimens from Messrs. Parish and Davy will be distributed in the next fascicle of the *Phycotheca Boreali-Americana*.—W. A. SETCHELL.

RECENT ACTIVITY IN NORTH AMERICAN AGROSTOLOGY.—Considerable activity has recently been displayed by the comparatively new *Division of Agrostology* of the United States Department of Agriculture, in the publication of papers, which not only bear upon the economic aspect of the grasses and forage plants of North America, but also contain descriptions of several new species and varieties.

Bulletin No. 4, issued February 6, 1897, contains six papers: The genus *Ixophorus*; A list of the grasses collected by Dr. E. Palmer in the vicinity of Acapulco, Mexico, 1894–95; Some Mexican grasses collected by E. W. Nelson in Mexico, 1894–95; Some American *Panicums* in the herbarium Berolinense and in the herbarium of Willdenow; Native and introduced species of the genera *Hordeum* and *Agropyron*; and Miscellaneous notes and descriptions of new species. In the fifth paper a new species of *Hordeum* is described under the name *Hordeum boreale*, and a new variety, *depressum*, of *H. nodosum*. Neither the types nor type-localities are cited for these or some other novelties, a fault likely to cause trouble to future students of the genus, and one which will facilitate the re-naming of some of Mr. Scribner's plants, and their possible relegation to the catalogue of *species incognite*.

Several new species and varieties of *Agropyron* are described in this Bulletin and the new generic name *Chaetochloa*, Scribner, is published to replace the *Setaria* of Palisot de Beauvois and the *Ixophorus* of Nash.

Bulletin No. 8, issued May 6, 1897, contains two papers: New or little-known grasses; and Leaf-structure of *Jouvea* and of *Eragrostis obtusiflora*.

We must protest against the cumbersome title, with which these Bulletins are burdened. While Professor Scribner so far sees the advantage of abbreviation as to use trinomials, it appears not to have occurred to him, that the citation of the place of publication of these new species will be a very awkward task. However much one can abbreviate it, a citation such as "Scribn. & Smith, in U. S. Dep. Agric., Div. Agrost. [Grass and Forage Plant Investigations], Bull. No. 4, p. 36, Pl. V, Feb. 6, 1897," is unnecessarily long and inconvenient. The title "Studies on American Grasses" suggested

by Mr. Scribner in a prefatory note in Bulletin No. 8, and which appears as an addition to the one already quoted, is scarcely available for citation, as each of the bulletins bearing it is paged independently, so that the particular Bulletin one might wish to refer to could not be properly indicated without using the longer title.

The figures are poor, which is an especially serious error in the case of grasses. *Leophorus Pringlei* is described as having leaves "scabrous on the margins" and racemes "pubescent at the base, scabrous along the angles," but there is not a sign on the plate that the plant is other than glabrous throughout. We notice also that there is no reference from the plates to the text, and in some cases none from the text to the figures. There is a plate bearing the name *Paspalum scabriusculum*, but we fail to find the description of a species under that name, nor does the name appear in the index. It is an open question, whether two species of *Paspalum* were intended to be published in this Bulletin, or whether *Paspalum scabriusculum* is a synonym of the *P. scabrum* described on p. 36; the description of the pubescence of *P. scabrum* does not agree with the figure of *P. scabriusculum*.—J. BURTT DAVY.

MISCELLANEOUS NOTES AND NEWS.

MR. J. BURTT DAVY has been collecting the alkali plants of the Honey Lake region in northeastern California, under most favorable circumstances. He returned to Berkeley July 1.

WE are in receipt of Fascicle 2 of the Synoptical Flora of North America, by Asa Gray, LL. D., continued and edited by Benjamin Lincoln Robinson, Ph. D., with the collaboration of Dr. Trelease, Dr. Coulter, and Professor Bailey. This fascicle contains the Polypetalæ from the Caryophyllacæ to the Polygalæ. A fuller notice will be given our readers in an ensuing number. [Issued June 10, 1897. Cambridge Botanical Supply Co., Cambridge, Mass. \$2.60.]

DR. EDWARD PALMER, of Washington, D. C., has gone again to Mexico to collect for the U. S. Department of Agriculture. He is now on the west coast.

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NO. 8

ERYTHEA

A JOURNAL OF BOTANY, WEST AMERICAN
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EDITED BY

WILLIS LINN JEPSON,

Instructor in Botany, University of California.

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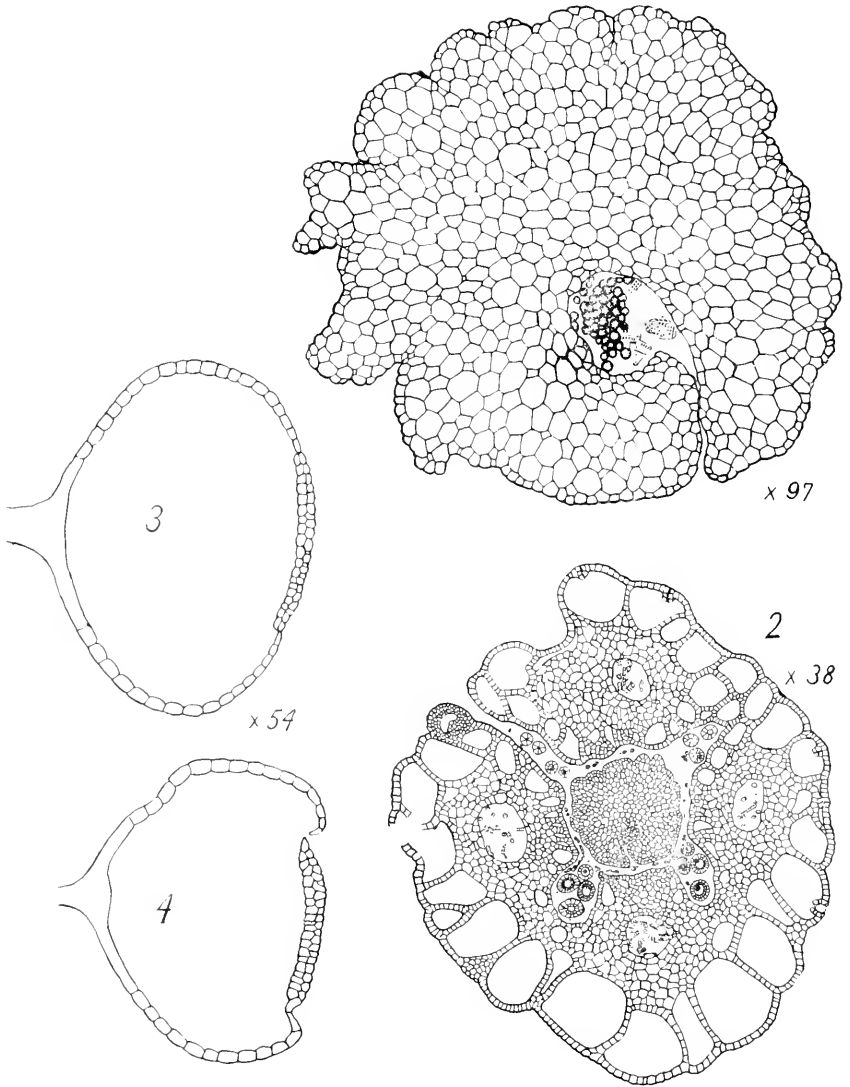
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CRYPTOMITRIUM TENERUM (Hook) Aust.

NOTES ON CALIFORNIA BRYOPHYTES.—III.

By MARSHALL A. HOWE.

DURING the past year a few miscellaneous notes on the Californian mosses and hepatics,—on their distribution, peculiarities of structure, the occurrence of novelties, additions to the state list, etc.,—have been accumulated, which are, perhaps, worthy of record.

Among the plants remarked upon below, *Stableria* is a genus not before attributed to North America, *Pellia Ncesiana* is new to the hepatic flora of our country, and *Blasia pusilla*, *Cephalozia extensa*, *Scapania convexa*, *Scapania glaucocephala*, *Plagiochila asplenioides*, *Dichodontium flavescens*, *Tortula montana*, *Tortula ericæfolia*, *Tortula angustata*, *Dicranoweisia contermina*, *Mnium glabrescens*, *Leersia rhabdocarpa*, *Polytrichum commune*, *Brachythecium lamprochryseum*, *Brachythecium velutinum*, *Camptothecium megaptilum*, *Amblystegium irriguum*, and *Hypnum (Limnobium) pseudo-arcticum*, are additions to the Californian list, though two or three of these have probably been known from the state under other names.

HEPATICÆ.

Cryptomitrium tenerum (Hook.) Aust. This plant having been somewhat imperfectly described by Hooker and Austin, Herr F. Stephani of Leipsic obtained through Mr. O. F. Cook, then of Syracuse University, a specimen which he described in detail in the *Botanical Gazette* for February, 1892 (xvii, 58–60). In the course of this description Herr Stephani states that the peduncle is bicannaliculate and that the involucre is monogynous. Schiffner, too, in Engler and Prantl, *Die Natürlichen Pflanzenfamilien* (i, Abt. 3, 25), makes use of “Träger mit 2 Wurzelrinnen” in his key to the Marchantiaceous genera in separating *Cryptomitrium* from *Neesiella* (Duvalia). As these observations are not in harmony with the results obtained by us, and as both the characters referred to are of importance in determining the affinities of the plant, we have thought it worth while to subjoin sketches of microtome sections of Californian specimens of *Cryptomitrium*.

Our material was collected in Fruitvale, Alameda Co., on February 18, 1897. *ERYTHEA*, Vol. V, No. 8 [31 August, 1897].

ruary 1, 1896, was fixed with 1% chromic acid, and sectioned by use of the ordinary paraffine method. The peduncles are found to possess uniformly throughout their entire length but a *single* root-hair furrow, as shown in Fig. 1, and the archegonia occur in groups of *four*, alternating with the rays, as is shown in the horizontal section represented in Fig. 2. The latter section is very slightly oblique and exhibits only three archegonia in one of the four groups, but the fourth appears in a neighboring section at a little different level. Figs. 1 and 2 were made by tracing over photomicrographs taken by Dr. Edward Leaming, of the College of Physicians and Surgeons, Columbia University. So far as we know, but a single archegonium of a group is fertilized. The evident discrepancies between our observations and those of Stephani will possibly lead to the suspicion that there has been some confusion of plants. Yet we are informed that the specimen sent to Herr Stephani by Mr. Cook came from the Underwood Herbarium, and all the specimens of *Cryptomitrium* now in the Underwood Herbarium are apparently identical with ours even in the matter of possessing unicanaliculate peduncles. The carpocephala in the Underwood Herbarium are too old to enable us to determine the number of archegonia with certainty.

The operculum of the capsule in *Cryptomitrium tenerum* is composed of two layers of cells, while the walls are otherwise unistratose, a fact which has not been noted hitherto. This is shown in Figs. 3 and 4, which are camera-lucida sketches of vertical sections of the walls of nearly mature capsules.

Blasia pusilla L. Beside a pool, Blue Lake, Humboldt Co.

Pellia Neesiana (Gottsche) Limpr. In shaded places beside streams, North Fork of Little River, Mendocino Co.

Riccardia pinguis (L.) S. F. Gray (*Aneura pinguis* Dumort.). In a mountain stream, Hay Fork, Trinity Co. Also collected by Professor Underwood in Marin Co. in 1888.

Riccardia major (Nees) Lindb. [*Aneura multifida* (L.) Dumort., var. *major* Nees]. Common on moist banks and on logs and stones about streams in the Coast Range.

Riccardia multifida (L.) S. F. Gray, var. *ambrosioides* (Nees) Lindb. On decaying wood and moist banks, Olema, Mendocino, Eureka, and Hay Fork.

Cephalozia extensa (Tayl.) Spruce. On old logs in deep woods, Mendocino and Eureka.

Cephalozia Turneri (Hook.) Lindb. Since reporting the discovery of this plant in California,¹ it has been found in so many localities that it can be considered in no sense rare. It appears to be fairly abundant on shaded banks in the Coast Range, at least in San Mateo, Marin, Sonoma, Mendocino, and Humboldt Counties, and has also been collected by Mr. F. W. Koch in the extreme southern part of the state—in San Diego Co. It grows often in company with *Catharinea undulata* and *Trichostomum flexipes*, or, sometimes, excluding all else, forms mats on rocks and stones or on the exposed roots of old stumps.

Scapania Bolanderi Aust. Common on stumps and living trunks of *Sequoia sempervirens* in deeply shaded cañons in the coast counties north of San Francisco.

Scapania glaucoccephala (Tayl.) Aust. On an old log, Russian Gulch, near Mendocino.

Scapania convexa (Scop.) Pearson [*S. umbrosa* (Schrad.) Dumort]. On logs in woods and also on argillaceous soil beside a stream, North Fork of the Little River, Mendocino Co., and on a log in a shaded cañon near Eureka.

Diplophyllum Dicksoni (Hook.) Dumort. On the face of a shaded cliff, near the road between Cazadero and Fort Ross, Sonoma Co.

Plagiochila asplenoides (L.) Dumort. Humboldt Co. on a log in woods, Blue Lake, and on shaded rocks in Deer Creek Cañon, Russ and Graham's Ranch.

MUSCI.

Phascum acaulon L. (*P. cuspidatum* Schreb.). Berkeley, with *Pottia Starkcana*; Redding, M. S. Baker and F. P. Nutting; Santa Monica, Dr. Hasse.

Mildcella bryoides (Dicks.) Limpr. (*Phascum bryoides* Dicks., *Pottia bryoides* Mitt.). Pasadena, February 20, 1885, Dr. E. Palmer(?). The second station for America, its first being on south side of a hill near Oakland (Bolander). A well-developed rudiment of a peristome is present as first pointed out by Milde and later more fully described by Limpricht.

¹ERTHEA, iv, 59, 1896.

Eucladium verticillatum (L.) Br. Sch. This was collected in Calaveras Co. by Dr. Bolander thirty years ago but for some unknown reason the genus was omitted from the Lesquereux and James Manual. It has since been collected by Mr. S. B. Parish in Santa Ana Cañon, by Professor McClatchie at Pasadena, and, by the writer, in Mitchell Cañon, Mt. Diablo, and under shelving rocks near the sea at Mendocino. Outside of California, it has been reported from two stations in British Columbia (Macoun) and from White Bay, Newfoundland (Waghorne). It is likely to be found in many other localities in America, as it has probably often been passed by on account of its usually sterile condition.

Dicranoweisia contermina Ren. & Card. On rocks in meadows, Big Valley Mts., Modoc Co., M. S. Baker and F. P. Nutting, 1894.

Dichodontium flavescens (Dicks.) Lindb. [*D. pellucidum* (L.) Sch., var. *serratum* Br. Sch.]. On stones beside a stream, Hay Fork, Trinity Co.

Dicranella heteromalla (L.) Sch. On moist bank near Eureka. This moss which is so common in Europe and the eastern states is apparently rare in California. Bolander collected it in the neighborhood of Mendocino and, according to the Geological Survey Botany, also "near Redwood City."

Ditrichum Schimperi (Lesq.) Barnes & Heald. (*Leptotrichum Schimperi* Lesq.) On moist banks near Eureka.

Tortula ericæfolia (Neck.) Lindb. (*Barbula ambigua* Br. Sch.) Pasadena, Dr. E. Palmer(?). From U. S. National Herbarium.

Tortula angustata Wils. [*Barbula subulata* (L.) P. Beauv., var. *angustata* Sch.] Humboldt Co.: on shaded bank near McBride's, Mad River, and on Russ and Graham's Ranch.

Tortula montana (Nees) Lindb. (*Barbula intermedia* Brid.). On rocks, Berkeley; also near Redding and at Morley's Station, Shasta Co., Baker and Nutting.

Scouleria aquatica Hook. On rocks along Mad River, Russ and Graham's Ranch, Humboldt Co.—mostly of var. *nigrescens* Kindb.

Rhacomitrium canescens (Weis, Timm) Brid. On stones in a meadow subject to inundation, Blue Lake, Humboldt County. Leaves with long, hyaline, very papillose points.

Hedwigia albicans (Web.) Lindb. (*H. ciliata* Ehrh.). Ascribed somewhat doubtfully to California in the Geological Survey Botany, but occurs on rocks about Berkeley, Mt. Tamalpais, and in various other localities.

Hedwigia albicans (Web.) Lindb., var. **detonsa**, n. var. Perichaetial leaves entire or slightly denticulate; stem leaves diaphanous at apex for $\frac{1}{3}$ – $\frac{1}{2}$, the inner perichaetial sometimes for one-half their length; margins plane or very slightly reflexed at base; calyptra usually glabrous. On rocks. Shasta County: Oak Run and Morley's Station, M. S. Baker and F. P. Nutting. Also collected later by the writer at Pieta, Mendocino County, and on Mt. Diablo. We now have this plant from four different stations and it differs constantly from *Hedwigia albicans* in the entire absence of cilia on the margins of the perichaetial leaves. It is quite possible that it deserves specific rank, but, as we find no other constant character to distinguish it and as the ciliation in *H. albicans* is somewhat variable, we prefer, for the present, at least, to regard it as a variety. Kindberg's sub-species *subnuda* appears to be not very closely akin, for in this, at least as represented in Can. Mus. No. 615, the perichaetial leaves are quite well provided with cilia. Our variety is possibly identical with *Hedwigia ciliata epilosa*, referred to by Schimper in a note on p. 285, Syn. Musc. Europ., vol. ii ed. 2, but, that, so far as we have been able to discover, is a *nomen nudum*.

Braunia Californica Lesq. Mt. Tamalpais; Sims and Oak Run, Shasta Co.; the var. *pilifera* (Mitt.) L. & J. at Oak Run and also near Hay Fork.

Ancetangium Californicum (Hampe) McClatchie. (*Zygodon Californicus* Hampe.) On shaded perpendicular rocks at Ukiah, abundantly fruiting; also in the San Gabriel Mts., A. J. McClatchie (sterile).

Leersia rhabdocarpa (Schwaegr.) Lindb., var. Upper leaves with a smooth hyaline hair point, sometimes 1 mm. long, yellow only at base; capsule rather longer and narrower than in European specimens. On lava rocks near Egg Lake, Modoc Co., June 8, 1894, M. S. Baker and F. P. Nutting. New to California.

Physcomitrium Californicum E. G. Britton. Beside rivulet near Hyampum, Trinity Co. Determined by Mrs. E. G. Britton.

Physcomitrium turbinatum (Michx.) Brid. Cow Creek, Shasta Co., Baker and Nutting; also at Ukiah.

Funaria Californica Sulliv. & Lesq. Pasadena, March 20, 1888, Dr. E. Palmer (?). From U. S. Nat'l Herbarium.

Bartramia stricta Brid. Oak Run, Shasta Co., M. S. Baker and F. P. Nutting; Oakland Hills, Miss Edith S. Byxbee; Mitchell Cañon, Mt. Diablo.

Stableria gracilis (Wils.) Lindb. (*Bryum gracile* Wils., *Orthodontium gracile* Schwaegr.). On charred stumps and logs, mainly of *Sequoia sempervirens*. First collected in Turner's Cañon between Cazadero and Fort Ross, Sonoma Co., March 15, 1896, later at various stations in Mendocino Co., and near Eureka, Humboldt Co. Most of these specimens, in our judgment, can not be distinguished even varietally from the European plants. The processes of the endostome are often as long as the cilia, but they are so described by Boulay and by Husnot and are sometimes equally long in Wilson's *Muse. Brit.*, No. 220. *Stableria gracilis* was discovered by Wilson in Cheshire, England, in 1833. Since then, three or four English stations and two in Finistère, France, have been added. It is another interesting link in the chain of relationship between the bryophyte flora of California and that of Europe.

Stableria gracilis (Wils.) Lindb., var. **Californica**, n. var. Leaves linear-lanceolate, acuminate, broader than in the typical form and without subulate points; antheridia surrounded by a few small bracts, on a short gemmiform branch. Near Eureka, No. 936, in part.

The leaves of this variety are often strikingly different from those of the type, but it grows mingled with the ordinary form and plants bearing leaves of a transitional character are found. The specimens which we have identified with the type, so far as observed, are paroicous, but var. *Californica* appears always to be autoicous. Braithwaite describes *Stableria gracilis* as exhibiting both these methods of bearing the antheridia.

Mnium glabrescens Kindb. Common on logs and rocks about streams in deeply shaded cañons, Mendocino and Humboldt Counties. This seems to take the place of *Mnium punctatum* (L.) Hedw. in the Coast Range of California. The latter has, however, been collected in the Sierras, in Mariposa Co., by Miss Byxbee.

Leucoclepis acanthoncura (Schwaegr.) Lindb. (*Mnium Menziesii* Muell.) Not uncommon on shaded banks of streams and moist rocks in Sonoma, Mendocino, and Humboldt Counties. Has also been collected in the counties of Marin and San Mateo, but is apparently rare south of San Francisco. It occurs in the Mt. Shasta region, too, but poorly developed.

Pogonatum alpinum (L.) Röhl, var. *arcticum* (Sw.)? On shaded rocks in Deer Creek Cañon, Russ and Graham's Ranch, Humboldt Co. Plants 6–11 cm. high and always simple. Altitude (est.) 1,000 ft.

Polytrichum commune L. In moist meadows near Eureka. The first record of the occurrence in California of this widely distributed moss.

Pterygophyllum lucens Brid. On densely shaded banks of streams near the water-line, North Fork of the Little River, Mendocino Co., and about Eureka, Humboldt Co. (*c. fr.*). Also collected in California by Dr. Bolander, though not so reported, so far as we know, in any bryological work of American authorship.

Camptothecium megaptilum Sulliv. On shaded northern slopes of the Hay Fork Mts., Trinity Co.

Camptothecium Amesiae Ren. & Card. On moist bank, Mitchell Cañon, Mt. Diablo, mixed with *C. pinnatifidum*; Rubio Cañon, Pasadena, McClatchie; Sonoma, Mr. F. T. Bioletti.

Brachythecium lamprochryseum C. Muell & Kindb. Determined by Dr. A. J. Grout. On log in a stream, Sisson, Siskiyou Co.

Brachythecium velutinum (L.) Br. Sel. On logs and soil in woods, Sisson.

Isothecium Brewerianum (Lesq.) Mac. & Kindb. Common on logs and rocks in San Francisco, Marin, Sonoma, and Mendocino Counties. Our remark in ERYTHEA (iv, 54, 1896) in reference to connecting forms between *Isothecium stoloniferum* and *I. Brewerianum* was based upon erroneous conceptions of the two species. The short leaf-cells characterize all forms of *Brewerianum* and always, we believe, distinguish it from any form of *stoloniferum*. *Isothecium Howei* Kindb. is a form of *I. Brewerianum*.

Eurhynchium colpophyllum Sulliv. On trees with *Alsia Californica*, etc., Olema, Marin Co.,—mostly, var. *flagelliforme* Barnes.

Also, on moist bank with *Camptothecium Amesia*, *C. pinnatifidum*, and *Brachythecium albicans*, Mitchell Cañon, Mt. Diablo.

Eurhynchium Oregonum (Sulliv.) Mac. & Kindb. Not infrequent on the ground and on old stumps, logs, and sticks, in very moist woods in the coast counties north of San Francisco.

Eurhynchium strigosum (Hoffm.) Br. Sch. With *Amblystegium serpens*, Big Valley Mts., Modoc Co., M. S. Baker & F. P. Nutting.

Rhynchostegium rusciforme (Weis.) Br. Sch. On stones in running water, Cañon Diablo, San Bernardino, Mr. S. B. Parish; Pasadena, Professor McClatchie.

Plagiothecium undulatum (L.) Br. Sch. On logs and humus in moist, densely shaded places, Mendocino and Humboldt Counties.

Amblystegium irriguum (Hook. & Wils.) Br. Sch. In Big Valley, near Bieber, Lassen Co., Baker and Nutting; Rubio Cañon, near Pasadena, McClatchie.

Hypnum (Limnobium) pseudo-arcticum Kindb. On rocks under running water, San Bernardino Mts., Mr. S. B. Parish, Feb. 20, 1896.

Hypnum circinale Hook. On trunks of *Pseudotsuga taxifolia* near Eureka. The perichaetial leaves in our specimens are often plainly costate, the costa obsolete forked, with the stronger branch sometimes ascending to one-third or even to almost one-half the length of the leaf. We observe the same character, slightly less pronounced, in No. 474, Sulliv. & Lesq. Musc. Bor-Am. Exsicc. (ed. 2), issued by the authors as *Hypnum circinale* and made by Mueller the type of his *Hypnum Sequoieti*.

Department of Botany,

Columbia University, June 15, 1897.

ERYTHEA

A JOURNAL OF BOTANY, WEST AMERICAN
AND GENERAL.

EDITED BY

WILLIS LINN JEPSON,

Instructor in Botany, University of California.

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While the articles on the general and special morphology and classification of Pacific Coast plants impart to the journal a West-American character, papers on physiological botany, geographical distribution and general topics will constantly be given place. Not the least interesting feature of the issues are the short articles, news notes, open letters and comments on current literature.

It is proposed in the early ensuing numbers to publish engravings of a considerable number of Californian plants which have, heretofore, been inadequately studied, imperfectly described and poorly or not at all illustrated. Another feature of interest will be historical papers on Californian Botany and Botanists.

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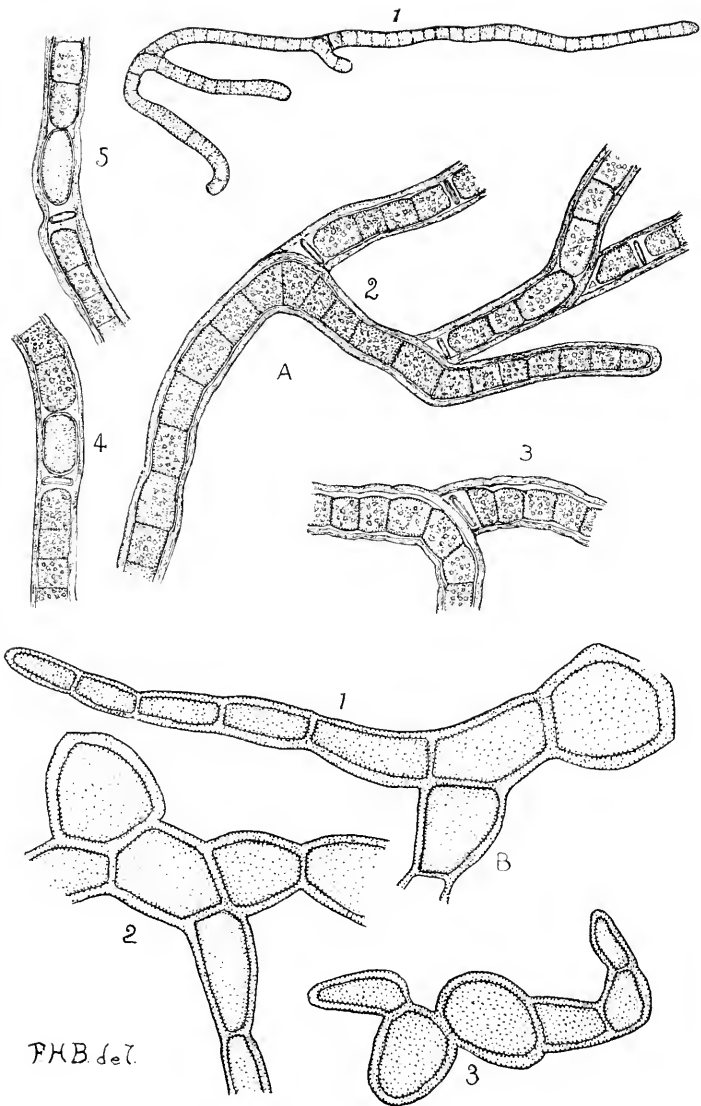
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TOLYPOTHRIX SETCHELLII AND GOMONTIA HOLDENII.

SOME PERFORATING AND OTHER ALGÆ ON FRESH-WATER SHELLS.

By F. S. COLLINS.

ON August 24, 1895, Dr. W. A. Setchell and Mr. Isaac Holden found, at Twin Lakes, Salisbury, Litchfield County, Conn., some *Unio* shells, on which appeared to be quite a growth of algæ. Mr. Holden sent me some of the material, and after examining it, and submitting some to Dr. E. Bornet, of Paris, I find the following species represented, part of them perforating the substance of the shells, part attached to the outside.

PLECTONEMA TEREBRANS Born. & Flab. This was very abundant all through the shells, and when the latter were decalcified, formed a dense mat, which made it rather difficult to distinguish the other algæ that grew in company with it. I do not find that it has been hitherto mentioned as occurring in this country, but Mr. Holden reports that it is common in marine shells on the shores of Long Island Sound, in company with *Gomontia polyrhiza* and the other species usually found in marine shells. It is figured and described in the *Bulletin de la Soc. Bot. de France*, xxvi, 158, Pl. 10, figs. 5 and 6. The filaments are 1 to 1.5 μ diam., flexuous, and generally rather freely branched.

HYELLA FONTANA Huber & Jadin. This species also is new to this country; it is scattered through the shells, sometimes in rather dense, chroococcoidal masses, sometimes in loosely branching filaments. It is described and figured in the *Journal de Botanique*, vi, 285. Like the *Plectonema*, it penetrates the interior of the shells, but in the Twin Lakes specimens it is much less abundant than the latter.

Gomontia Holdenii. Irregularly branched; cells with thick walls, varying in shape, oval, cylindrical or polygonal; the terminal cell cylindrical or tapering, not clavate; diameter of cells varying from 12 to 50 μ ; sporangia (only once observed) ovate with elongate base, about 100 μ long, 30 μ wide. In old shells of *Unio*.

The large, mostly oval cells are quite distinct in appearance from
ERYTHEA, VOL. V, No. 9 [19 September, 1897].

the cells of *G. polyrhiza*, which is common in marine shells along the coast. At the time the figures were drawn I had not succeeded in finding any sporangia; since then I have found two; they were of oval shape, narrowing at the base so as to seem somewhat stipitate, about 100μ in length and 30μ in diameter at the broadest part. The sporangia of *G. polyrhiza* are variable in form, and later observations may show that the sporangia are equally variable in this case. In the absence of information as to their formation and development the description is necessarily incomplete, but there is no doubt of the distinctness of this species from *G. polyrhiza*. The plant occurs only in small quantity, and is almost always covered with a dense mass of *Plectonema*, so that it is very difficult to examine.

In addition to the species of perforating algæ mentioned, the shells contain also a very fine filamentous plant, which agrees well with the description and figure of the fungus *Ostracoblabe implexa* in the paper by Bornet and Flahault previously mentioned, p. 171, pl. 12, figs. 1-4.

The *Plectonema* is the only species occurring in sufficient quantity to be noticeable to the naked eye; it gives a pale bluish green stain to the shell; under the microscope it is of the same color, but brighter. The tubes containing the *Ostracoblabe* look pinkish under the microscope, but the plant itself was found by Bornet and Flahault to be quite colorless; *Gomontia* is grass-green and *Hyella* pale brown; but neither is abundant enough to show externally.

Besides the species in the substance of the shells, several algæ were growing on the outside; among them were *Scytonema Myochrous* Ag., *Dichothrix Hosfordii* (Wolle) Bornet, *Microcoleus lacustris* (Rab.) Farlow, a sterile *Bulbochæte* and a young *Nostoc*; the two latter not specifically determinable. Also on all the shells was a *Tolypothrix*, fairly abundant, and apparently not hitherto described.

Tolypothrix Setchellii. Filaments scattered or arranged in parallel series and forming a layer, flexuous, 7 dm. long, $5-6\mu$ diam., occasionally thickened and subtorulose, repeatedly pseudo-branched; branches patent; sheaths thick, gelatinous, refractive, colorless or yellowish; trichomes pale ærugineous, 4μ thick, torulose,

articulations equal to the diameter or longer; heterocysts discoid. On shells in fresh water.

In this plant one or more cells adjoining a heterocyst often take on the appearance of an ordinary heterocyst, separating from the other cells, forming a thicker membrane, especially at the end opposite the heterocyst; these cells also take a slightly different color from the ordinary vegetative cells under the action of chloriodide of zinc.

Hyella fontana, *Plectonema terebrans*, and *Gomontia Holdenii* are distributed in Collins, Holden, and Setchell, Phycotheca Boreali-Americana, under Nos. 303, 306, and 316, respectively.

I am much indebted to Dr. Bornet for his kindness in identifying the already known species, and pointing out the distinctive points of the new species.

EXPLANATION OF PLATE IV.

A, *Tolypothrix Setchellii*; fig. 1, general habit of filament; fig. 2, portion of a branching filament; fig. 3, branch with discoid heterocyst; fig. 4, heterocyst with changed adjacent cell; fig. 5, heterocyst with several such cells.

B, *Gomontia Holdenii*; figs. 1, 2, and 3, portions of fronds, showing various shapes of cells.

Figures A 1, and B 1, 2, and 3, are magnified 325 diameters; A 2, 3, 4, and 5, are magnified 860 diameters. The figures were drawn with camera by Mr. F. H. Billings.

CALIFORNIAN HERB-LORE.

THE Mexicans call *Yucca* "Keote" and use the root for soap. Some of our own people, who use it claim that it is very nice for washing flannels.

The "Yerba de la Pasma," *Gutierrezia Californica*, is made into a decoction and the Mexicans bathe in it for whatever ails them.

"Yerba mansa" is from *manso*, gentle, and is used for mild poultices, especially applied to the eyes. This plant is the *Anemopsis Californica* of botanists.—MRS. I. HAGENBUCK, Dulzura, San Diego County, Cal.

DR. BEHR reports that the Spaniards, in early days, used a decoction of the leaves of *Rhamnus Californicus* as a preventive against the poisoning from poison-oak. Mr. Castro, who owned San Lorenzo in the year 1851, told him about it. Those who are susceptible should bathe the face and hands in the decoction, allowing it to dry. If, on the return home, a bath be taken in water containing soda and the body be afterwards dusted with rice powder, immunity from the poisoning is guaranteed. Most people will find that the use of the decoction alone is sufficient.—A. E.

THE Spanish people in the vicinity of San Gregorio in San Mateo County call the *Rhamnus* "Tunitas." There is a creek near by so named, undoubtedly from this common shrub.—GEORGE T. RUDDOCK.

REVIEWS AND CRITICISMS.

On some Lithothamnia. By M. FOSLIE. Det. kgl. Norske Videnskabers Selskabs Skrifter, No. 1, 1897.

On page 39 of the last volume of this journal, attention was called to the fact that the Californian coast had been credited with five species of this genus of Corallines, two of which were new to science. In the present paper, M. Foslie describes four more from our coast, thus increasing the number to nine.

The four new species are *L. proboscideum*, Monterey; *L. grumosum*, Carmel Bay and San Pedro; *L. Setchellii*, San Pedro; and *L. decipiens*, San Pedro. The last three were collected by the writer of this note, but the collector, date of collection, and other exact data are wanting in the case of the first species. Mr. Foslie has still other material from California and his final monograph on the genus will be awaited with interest.—W. A. SETCHELL.

SHORT ARTICLES.

LAMINARIA SESSILIS AG. IN CALIFORNIA.—In 1862, Harvey described among other new things collected by Lyall at Vancouver Island, a singular kelp to which he gave the name of *Laminaria*

apoda. In 1867, J. G. Agardh referred this species to the *Laminaria sessilis* of his father, C. Agardh. The locality whence came the type specimens of *L. sessilis* seems to be in great doubt, there being no greater certainty than that they came from some portion of the Pacific Ocean. Lyall's specimens came from the Straits of Fuca. While collecting at Fort Ross, in Sonoma County, the type locality for several of the kelps of our western coast, it was the writer's good fortune to find an abundance of this species growing upon the rocks between tides. This seems to be the southernmost locality for this species unless it may perhaps extend a few miles farther south to Point Reyes. It seems quite certain that it does not extend south of Point Reyes to any extent, since careful search at Duxbury Reef, San Francisco, Santa Cruz, and Monterey have failed to reveal it. Its southward extension indicates that more Vancouver forms may ultimately be found upon the Californian coast and that Point Reyes probably marks the boundary of a southern extension of the Vancouver algal flora.—W. A. SETCHELL.

THE NORTH AMERICAN SPECIES OF CHRYSOSPENIUM.—A preliminary revision of the North American species of this genus by Mr. J. N. Rose appeared in the April *Gazette* (xxiii, 274). *Chrysozplenium glechomæifolium* as a name is replaced by *C. Scouleri*, which as a varietal name antedates the name currently employed. Mr. Rose gives the range of the species as "Oregon and Washington." It is credited in the *Flora Franciscana* to Humboldt County, Calif., and at a later date (May, 1895) specimens were brought to us from Navarro, Mendocino Co., by Miss Edith Byxbee, a student of the University of California. This is the most southerly known station. *C. Beringianum* from St. Paul Island is described as new. The other two species are *C. alternifolium* and its variety raised to specific rank as *C. tetrandrum*.—W. L. J.

THE SOUTHERN RANGE OF LAWSON'S CYPRESS.—The occurrence of *Cupressus (Chamaecyparis) Lawsoniana* as far south as Humboldt Bay, Cal., has been recently questioned. Mr. Henry Melde, of Eureka, informs me that it is still to be seen along the gulches of the Mad River, attaining between seventy-five and one hundred feet in height.—J. B. D.

CORRECTION.—Since the printing of my notes on page 79 preceding, my attention has been called to the fact that the akenes of *Eriogonum pusillum* and its allies are truly lenticular.—K. B.

MISCELLANEOUS NOTES AND NEWS.

MR. and MRS. J. G. LEMMON are collecting this season in the Yosemite region of the High Sierras.

THE late Dr. Bastin's chair in the College of Pharmacy of Philadelphia has been divided between Dr. Low and Prof. Henry Krämer.

DR. FISCHER VON WALDHEIM succeeds the late Dr. Th. Batalin as Director of the Imperial Botanical Garden at St. Petersburg, Russia.

PROF. W. A. SETCHELL examined during June the algal flora of the coast near the mouth of the Russian River, California, with very interesting results.

ISSUES No. 17 and No. 18 of C. G. Lloyd's "Photogravures of American Fungi," just received, are most excellent representations of the open and closed forms of *Scleroderma Corium* (Guers.) Grav.

THE post of Director of the Royal Botanical Gardens, Ceylon, formerly filled by the late Dr. Trimen, has been placed in the charge of Mr. J. C. Willis, M. A., Senior Assistant and Lecturer in Botany in the University of Glasgow.

P. A. RYDBERG, of Columbia University, expects to spend a part of the summer collecting in Montana. E. O. Wooton, a graduate student of the same institution, goes to New Mexico to make collections which he will offer for sale.

MR. S. B. PARISH returned to San Bernardino, California, in the latter part of June, from an extended trip through a large part of San Diego County, including the mountains and seacoast. Many valuable data were gathered concerning the distribution of the plants of the region.

DR. LUCIEN M. UNDERWOOD, Professor of Botany in Columbia University, New York City, and Dr. H. H. Rusby, of the New York College of Pharmacy, have been spending the summer at the Kew Herbarium. Dr. Rusby has been working up his South American collections.

A PRIZE of one thousand marks is offered by the Prince Jobnowski Society at Leipzig, Germany, for the best study of the causes which produce and control the direction of the lateral axes of shoot and root system. The memoir must be submitted to the secretary of the Society by November 30, 1900.

DR. EZRA BRAINERD, of Middlebury, Vt., Mr. Marcus E. Jones, of Salt Lake City, Utah, Dr. Harshberger, of the University of Pennsylvania, have been botanizing in California this summer. Dr. Brainerd has been especially devoting himself to field studies of the Carices in the Sierra Nevada, and Mr. Jones to the Astragali.

THE BERLIN ACADEMY OF SCIENCES offers a prize of two thousand marks for a memoir based upon researches and observations on the origin and behavior of varieties of cereals during the past twenty years. The memoir may be written in German, Latin, French, English, or Italian, and must be presented by December 31, 1898.

MR. T. S. BRANDEGEE, of San Diego, has been botanizing—the season being a favorable one—on all the islands off the western coast of Lower California, including several small ones never before visited by a botanist. He went with the schooner Wahlberg—A. W. Anthony's vessel—as far down as San José del Cabo, where he left the schooner, which continued to Socorro and Clarion Islands, with a botanical collector aboard.

DR. JULIUS VON SACHS died at Würzburg, on the 29th of last May. He was born in Breslau in 1832, and for many years prior to his death was Professor of Botany in the University of Würzburg. Sachs was the author of the celebrated *Vorlesungen über Pflanzenphysiologie*, better known to readers of English as Sachs' Physiology of Plants. A sketch of his life, by Prof. Francis Darwin, appeared in *Nature*, lvi, 201, July 1, 1897.

THE ALABAMA EXPERIMENT STATION has published a list of the Fungi of Alabama, as its Bulletin No. 80, compiled by Professor Underwood and Mr. F. S. Earle. Eleven hundred species are enumerated. But little has hitherto been known of the fungous flora of that region, and the list will be welcomed by mycologists, especially as it appears to be decidedly up to date, and contains much bibliographical and analytical matter.

MR. F. V. COVILLE has been investigating the wanderings of John Jeffrey, explorer of the Oregon Botanical Association of Edinburgh. The results of his researches among various rare papers and files of private letters are published in the Proceedings of the Biological Society of Washington (xi, 57-60) under the title "The Itinerary of John Jeffrey, an early botanical explorer of western North America." Jeffrey sailed from London in 1850 for Hudson Bay and crossed the Rocky Mountains at Athabasca Pass between Mount Brown and Mount Hooker. The winter of 1851-52 he spent on Vancouver Island. From about August 1 to November 1, 1852, he engaged in an expedition to the valleys of the Umpqua, Klamath, Trinity and Rogue Rivers, Siskiyou Mountains and Mount Shasta. In the next year (1853) he proceeded again southwards, collecting in the Umpqua Valley, Mount Shasta, Applegate River, Scott Mountains and the Coast Range, on the Sierra Nevada in latitude 38°, in the Sacramento Valley and the American fork of the Sacramento, and at San Francisco Bay. From San Francisco Jeffrey went to San Diego and thence to Yuma. It is conjectured that he was lost on the Colorado Desert, as nothing more was ever heard of him. He collected *Pinus Jeffreyi* and other rare plants.

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AN UNDESCRIBED BLACK-CAP RASPBERRY.

By C. V. PIPER.

Rubus Hesperius. Habit of *R. leucodermis*, 1 to 2 meters high; young stems glaucous, older ones brownish and shining, densely beset with strong prickles, which are straight on the larger branches but more or less recurved on the smaller ones; leaves trifoliate, or on young, vigorous shoots pedately 5-foliate; leaflets 5 to 8 cm. long, ovate, acuminate, thickish, coarsely and doubly serrate, perfectly green and glabrous on both sides, not shiny, armed on the midrib beneath, and even on the lateral veins with recurved or straight prickles; lateral leaflets on very short (1 to 2 mm. long) petioles; terminal leaflet sometimes 3-lobed; petiole stout, usually glaucous, 2 to 5 cm. long, armed with stout recurved prickles; stipules setaceous, about 8 mm. long; flowers in terminal corymbs, or a few in the axils of the upper leaves; these solitary or in clusters of two or three; peduncles or pedicels stout and more densely armed than the branchlets; sepals in fruit green, glabrous, deltoid-lanceolate, long-acuminate, 12 mm. long; petals and stamens not seen; fruit nearly black, without bloom, dry and rather tasteless; young carpels neither glaucous nor tomentose; seeds large.

Closely related to *R. leucodermis* Dougl. and *R. occidentalis* Linn. from both of which it is readily distinguished by the entire absence of pubescence on the under side of the leaves. It is also much more strongly and densely armed than either.

The plant occurs sparingly in the Snake River cañon at Wawawai and Alмота, Whitman County, Washington. It grows usually along stream banks but occasionally in crevices of moist cliffs.

Agricultural College, Pullman, Wash.

NEW WEST AMERICAN LILIES.

By CARL PURDY.

Lilium occidentale. Eureka Lily. Following Baker's synopsis of lilies this species falls in sub-genus V, Martagon. Bulb shortly rhizomatous as in *L. pardalinum* but not dichotomously branching as in that species, nor forming clumps; scales

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overlapping closely, either in one long or two shorter joints; stems 2 to 6 feet high, terete, smooth, dark green; leaves scattering below, but in whorls of 5 to 12 (or more) in the middle of stem, lanceolate, acute, 2 to 4 inches long, 3 to 4 lines wide, shining green, smooth; flowers from a few to 15, umbellate or racemose; when many, often 6 or 7 will be produced in a circle below with the upper scattering; pedicels 3 to 9 inches long, nodding at top; segments of perianth $1\frac{1}{4}$ to $2\frac{1}{2}$ inches long, the lower broadly lance-ovate, 4 to 6 lines wide, oftener blunt at tip, sometimes acuminate, broadly overlapping at base and forming the lower perianth of a broad tube; the upper $\frac{2}{3}$ of the segments revolute (at length) to the pedicel (the outer segments soon become revolute, the inner tardily so, for some days broadly spreading); lower $\frac{2}{3}$ of segments light orange red, thickly spotted with roundish black spots; upper $\frac{1}{3}$ a deep crimson; the style straight, green $\frac{2}{3}$ included in the tube; stamens little longer, spreading but little from style; anthers oblong, 2 inches long, dark red; capsule not known.

From boggy places in barrens and woods about Humboldt Bay to above Arcata; this lily takes the place which from San Francisco to Mendocino County is filled by *L. maritimum*. It is the sea-coast lily of Humboldt County, Cal. *Lilium maritimum* extends no further than Ten Mile River in Mendocino County. The *L. maritimum* reported from Humboldt County, Bot. Cal., p. 166, is *L. occidentale*. The fact that it has the most westerly extension of any American lily, may pardon the name. Its nearest relative is *L. maritimum*, which it resembles in habitat, bulb, leaves, style and stamens and in the dark red of its perianth tips. Its larger flowers, with long revolute lobes, strongly separate it from that species. Its bulb is very different from *L. pardalinum*, as also the style, stamens and coloring, although there is a suggestion of *L. pardalinum* in the full flower. Another link in the long chain of lilies.

Lilium Bakerii. Following Baker's synopsis of lilies this species falls in sub-genus V, Martagon, and is nearest to *L. Columbianum*. Bulb ovoid, exactly as in *L. Columbianum*; stem 2 to 6 feet high, bearing few to 10 flowers, rather stout, green, smooth, terete leaves lanceolate, light green, mostly in whorls; inflorescence racemose; flowers horizontal; buds nodding; segments of perianth $1\frac{1}{4}$ inches long, 5 lines wide, acute, lower $\frac{1}{2}$ of segments forming a closely

constricted tube from which upper $\frac{1}{2}$ spreads rotately, tips not recurved; stamens exerted, a little shorter than segments, not spreading much from the straight style, which they exceed a little. Inflorescence strictly racemose, lower pedicels 4 to 5 inches long, upper $1\frac{1}{2}$ to 2 inches long; color orange red, a little more orange than in *L. Columbianum*, lower portion dotted thickly with small maroon spots. Very fragrant, perfuming the air for rods around. Pedicels bracted with 1 to 3 bracts. Capsule as in *L. Columbianum*.

This little lily is close to *L. Columbianum* in general, but the form of perianth clearly distinguishes it from that species in which the segments of perianth are closely reflexed from the middle. Its fragrance is also a distinctive point.

In sandy woods along Puget Sound in northern Washington and southern British Columbia. Named in honor of J. G. Baker, whose work in the genus *Lilium* is so eminent. The bulb at its largest is 5 inches in circumference and weighs 2 ounces.

LILIUM PARVUM, var. luteum. Bulb, as in *L. parvum*, rhizomatous, not forming clumps, scales often 3-jointed. Leaves mostly scattered, some in whorls in the middle of stem, obovate-lanceolate, light green, smooth; stems from slender and few-flowered forms to tall, short and many flowered forms; the segments of perianth are revolute from the base, and the color a clear brilliant reddish-orange throughout, not tipped with red, spotted with small spots of bright red; capsule as in *L. parvum*.

This showy form of *L. parvum* is from Plumas County, where it was collected by Mrs. Austin. I do not agree with those authors who would limit *L. parvum* to the funnel-formed type and throw any or all of those forms with reflexed petals into *L. pardalinum*. I consider the peculiar 3-jointed scales, the pale foliage, and the shorter, rounder capsule more specific characters than the form of the flower, and would throw all of these alpine lilies into *L. parvum*. *L. pardalinum*, var. *minor*, is, in my opinion, a form of *L. parvum*.

REVIEWS AND CRITICISMS.

The Synoptical Flora of North America. Vol. i, Part II, Fascicle II. Caryophyllaceæ to Polygalaceæ. By ASA GRAY, LL.D., Late Fisher Professor of Natural History in Harvard University, AND OTHERS. Edited by BENJAMIN LINCOLN ROBINSON, Ph. D., Curator of the Gray Herbarium of Harvard University. Issued June 10, 1897. Cambridge Botanical Supply Co., Cambridge, Mass.

With the issuance of the second fascicle of the Synoptical Flora the treatment of the polypetalous orders is carried as far as the end of Polygalaceæ and the last of the manuscript, which Dr. Gray left unpublished, is now before the students of American botany. But a comparatively small part of the fascicle is, however, the work of Dr. Gray, since much, just here, remained unfinished at the time of his death. The Caryophyllaceæ, Sapindaceæ and other orders, in whole or in part, have been written by Dr. Robinson; the Hypericaceæ have been done by Prof. J. M. Coulter; the Vitaceæ and the genus *Citrus* by Prof. L. H. Bailey; while Prof. Wm. Trelease has contributed the Linaceæ, Geraniaceæ, Aquifoliaceæ Celastraceæ and Rhamnaceæ.

Doubtless the most impressive feature of these pages is the evidences of thoroughness in their preparation, not only observable in the diagnoses but more conspicuously, perhaps, in the numerous citations to recent literature. This last was surely a most trying phase of the editor's work. It is no June day's task to pass satisfactory judgment upon each and every paper in the mass of current literature bearing upon the work in hand—yet no paper must be hastily gone over or ignored since hidden beneath an amateurish dress (or worse) facts or discoveries deserving recognition or incorporation may possibly be lurking.

Regarding mere matters of form a word of criticism may here be set down. In the first fascicle "n. sp." was added to *nomina nova*, and in the present fascicle in similar cases we find "n. comb." The indication in the first case is wrong and in either case superfluous, it seems to us. It is, moreover, not in keeping with Dr. Gray's practise, who habitually wrote the name of a new species or a new combination without any indication, a custom which always appealed to us as perfectly natural and simple.

The two orders, which most interest West American botanists are, naturally, the Caryophyllaceæ and the Rhannaceæ. In the genus *Ceanothus* of the latter order thirty-six species are recognized, and six varieties. Without doubt Dr. Trelease was wise in his rather close limitation of the number of species, for continued exploration will tend to decrease the number of species and increase the number of varieties. *Ceanothus divergens*, which now figures as a variety of *C. prostratus*, seemed at one time a clear species. The range of *C. prostratus* in the Coast mountains has been extended, during the last summer, so far southward of the locality given in the Synoptical Flora that the species is now known to join on to the variety not only morphologically but, furthermore, geographically. The Coast Ranges immediate to San Francisco Bay, particularly northward, are wonderfully rich in *Ceanothus* forms, many natural varieties, not well known or even named, seeming distinct species to the local collector, are of both interest and importance, and for these, descriptions will some day be prepared and given place. In this way the necessary emphasis of the longitudinal and altitudinal variants can be made. It is also to be hoped that field research will explain or justify the curious range assigned to the plants called *C. pinetorum*, *i. e.*, "Lake County to Tamalpais and Tulare County."

The preparation of the Caryophyllaceæ, a most difficult order, Dr. Robinson himself assumed. The soil-variations in this group are especially numerous and perplexing; characters, which are available to the systematist, when dealing with plants from a restricted area, disappear when the problem is the consideration of all available material. Hence inevitable reductions: *Spergularia gracilis* is reduced to *S. Platensis* of South America and similar things befall elsewhere. The study of *Silene* and *Lychnis* has developed much that is new and valuable. In this connection it is interesting to note that *Silene multinervia*, Wats., which most Californian botanists believe to be an alien, is retained for the present as a native, the author having been unable to refer it to any foreign species. *Cerastium pilosum*, however, is definitely excluded from our State, the plant of Point Reyes being now referred to *C. arvense*, var. *maximum*, Britt. & Hollick. For twenty years the description of Bigelow's Point Reyes specimen under the title of *C. pilosum* has been doubtfully copied from one local flora into another.

Not only in lesser details of method and of form but in general treatment the Caryophyllaceæ as presented us repeats in a striking way the characteristic spirit of the orders written by the inceptor of the Flora. It is, furthermore, a pleasure to find the elaboration of all the orders, although done by different men, so very consistent and even.

It is given us to understand that Dr. Robinson is now engaged upon the Leguminosæ, which with the completion of the orders as far as Caprifoliaceæ, will fill out the present gap in the sequence. The Synoptical Flora, although not then complete, will in a sense be complete, in that the parts published will be given continuity.—
W. L. J.

MISCELLANEOUS NEWS AND NOTES.

IT is announced that Dr. J. E. Humphrey, of Johns Hopkins University, died in Jamaica, August 17.

A BRONZE statue of Darwin at the entrance to the public library and museum in his native town of Shrewsbury, England, was unveiled August 10.

MR. F. V. COVILLE, the government botanist, has recently been botanizing in Oregon, having spent two months or more in the Cascade Forest Reserve.

WE are in receipt of "The Principles of Fruit Growing," by Prof. L. H. Bailey, the latest issue of the Rural Science Series. [MacMillan, New York, 1897, \$1.25.]

PROF. SARGENT and MR. WM. CANBY passed through San Francisco in September from Alaska, Washington and Oregon. Mr. John Muir was with the party during their northern journeyings.

PART IV of Prof. Greene's *Flora Franciscana* was issued on August 5. It comprises the Valerianæ, Dipsacæ and Compositæ, and many new genera and species and new names are proposed. [Payot, Upham & Co., San Francisco, \$1.00.]

THE British Association for the Advancement of Science, met August 18 to 26 in Toronto. The English botanists present were Bower, Farmer, Green, Marshall Ward, Wager and Seward. Professor Magnus represented the University of Berlin.

THE CURIOUS may find interest in the following prospectus lately come to us: "ORCUTT. A Journal of American Science, published weekly; 10 cents a copy; \$5.00 a year; \$50 for life, strictly in advance. No complimentary copies; no free samples; no exchanges; no advertisements in the text; no premiums; no discounts to agents—the whole income going to make it larger and better. C. R. Orcutt, San Diego, California."

IN the September number of the *Land of Sunshine*, we find an illustrated article on "The Heart of Santa Catalina," by Mrs. Blanche Trask. This is a very happy account of the herbaceous and arboreal vegetation and of the color effects of plants, and rocks, and water, by one who has botanized with great delight on every part of the island, along the edges of the craters and in the most remote corners. A mound of *Echinocystis fabacea*, 12 feet high, is shown in one illustration.

THE Botanical Society of America met in Toronto, August 16 and 17. The following officers were elected: President, N. L. Britton of the New York Botanic Garden; Vice-President, J. C. Arthur, Purdue University; Secretary, C. R. Barnes, University of Wisconsin; Treasurer, Arthur Hollick, of Columbia University; Councillors, B. L. Robinson, of the Gray Herbarium, Harvard University, and F. V. Coville, of the Division of Botany, U. S. Department of Agriculture. Some of the papers presented were: "A Case of Ecblastesis and Axial Proliferation in *Lepidium apetalum*," by B. L. Robinson; "Movement of Protoplasm in Cœnocytic Hyphæ," by J. C. Arthur; "Pollen Grains and Antipodal Cells," by J. M. Coulter; "The Transition Region of the Caryophyllales," by F. E. Clements; "A Revision of the Species *Picea* Occurring in Northeastern America," by D. P. Penhallow; "Bibliographic Difficulties," by E. L. Greene; "The Botanical Gardens of Jamaica," by Wm. Fawcett.

DR. HENRY N. BOLANDER, formerly of the California Geological Survey and one of the most well-known of the early botanical explorers of the Pacific Coast, died at Portland, Oregon, August 28, 1897. A sketch of his life and botanical work, accompanied by a portrait, will appear in an early ensuing number of this journal.

"THERE are nine and sixty ways of constructing tribal lays." The botanical staff of the Royal Botanical Gardens and Mu-

seum at Berlin, have recently drawn up a code of rules for their guidance in nomenclature. These rules (prefaced and annotated) were published in the *Notizblatt* for June. As they have been reprinted in *Flora*, in the *Bulletin de L'Herbier Boissier* (with criticism by John Briquet), in the *Journal of Botany* (with criticism by James Britten), in the *Botanical Gazette* (with criticism by B. L. Robinson) and in the *Bulletin of the Torrey Club* (with criticism by N. L. Britton), we content ourselves with a very brief summary of the more important points: Priority is, in general, to be a fundamental principle in the choice of names; initial date to be the years 1753-4. A generic name not in general use for fifty years after its establishment, shall be dropped unless taken up in large floras or monographs. Generic names, once synonyms, should not be used again in an altered sense. A species transferred to another genus must there retain its oldest specific name with the name of the author of the specific part in brackets. All specific names should be written with small letters except those derived from personal names and those which are substantives. Avoid tautological binomials, as "Linaria Linaria." The most significant feature of the rules is that, in most cases, exceptions are allowed. Here the critics—at least some of them. But whether one conscientiously follow rules which admit of exceptions, or whether one interpret and apply absolutely rigid laws, according to personal judgment, does not seem to matter vastly, for in either case there will, perforce, be failure to secure "uniformity" in names, so long as every botanist is equally privileged to sit in judgment.

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AND GENERAL.

EDITED BY

WILLIS LINN JEPSON,

Instructor in Botany, University of California.

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NOTES ON CACTEÆ.—I.

BY KATHARINE BRANDEGEE.

Cactææ of Baja California.

THE first collection, from this region, of any importance or extent was made by William M. Gabb, who, in the service of the "Lower California Company," which then held a conditional grant of the greater part of the peninsula, traversed the country from Cape St. Lucas to San Diego. This was in the year 1867, and at the request of Dr. Engelmann, he made specimens of all the different kinds, he was able to distinguish. They were, however, so small and fragmentary (the greater part of the collection could have been carried in his vest pocket) and the notes so vague, that Dr. Engelmann, though he believed many to be new species, never ventured to publish any of them, and they remained in his herbarium for nearly thirty years, under the tentative names he had given them until their publication by Prof. J. M. Coulter.*

The second collection was made by T. S. Brandegee in the years 1889, 1890, 1892, 1893. He knew nothing of the Gabb collection, and Engelmann being dead, he determined and described the species to the best of his ability in various papers published in the Proceedings of the California Academy of Sciences and in *Zoe*.

The third collection was made by MM. Cumenge and Dignet in the vicinity of Santa Rosalia, and the results published by Dr. Weber, who had not learned of Mr. Brandegee's papers, in *Bulletin du Mus. Hist. Naturelle*, No. 8, Paris, 1895.

In the meantime Mr. Jones had published a single species, and Mr. C. R. Orcutt several, as the result of various expeditions into the northern part of the peninsula.

The work of Professor Coulter was in the nature of a revision of all the previous collections excepting those reported by Dr. Weber, of which he appears not to have known. In spite of the advantages given him he found such difficulties that, as he states, "the undertaking would have been abandoned only that it seemed but proper to contribute to the knowledge of the group such facts as has come

*Contr. Nat. Herb. iii, No. 2, 1894; and No. 7, 1896.

to light in the course of several years' study, especially as an excellent opportunity had been given to examine Dr. Engelmann's types and unpublished notes."

It may be doubted, whether the benefits derivable from the bringing together of scattered descriptions, is at all commensurate with the confusion caused by the publication of these notes, which every botanist knows Dr. Engelmann would never have allowed to appear. If Engelmann had lived, they might have become intelligible to his trained mind, as he would have received unnamed all the material collected by American botanists and he would have been in correspondence with Dr. Weber. The botanical world would have been spared a good many synonyms and, what is infinitely worse, a lot of "new species" vaguely characterized and vaguely localized, which only an exhaustive knowledge of an extensive region can determine with certainty. It is somewhat the custom, and usually deservedly so, to discredit the species, so called, which occur in trade or agricultural journals, but no one of them could have done worse than to publish such a diagnosis as that of *Opuntia tesajo*, to which the honored name of Engelmann has been appended. The motives of the editor were no doubt kindly, but his work only emphasizes the impropriety of making a dead man responsible for names published at any considerable interval after his death, more particularly where the work of a specialist is edited by some one untrained in the specialty.

In the researches necessary to the preparation of this paper, Professor Trelease, of the Missouri Botanical Garden, has been extremely kind in affording me an opportunity to study and compare Gabb's types with living forms, nearly all of the Baja California species being now represented in our garden. Dr. Weber also responded generously to our request for portions of his types. In this way a considerable number of the species can be made out with certainty, and when they have attained some size and borne flowers and fruit, can be more satisfactorily compared with the species of Mexico proper.

MAMILLARIA.

This large genus appears to me divisible into four well-marked sub-genera or sections, better and more clearly separable from each

other than is the genus from *Echinocactus*, into which it grades through *Coryphantha*. The new sub-genus *Cochemiea** is in aspect and in its flowers the most distinct of all.

1. *Eumamillaria*.† Plants globose or elongated, with watery juice, and cylindrical or conical grooveless tubercles. Flowers borne usually in a ring near the top of the plant, cup-shaped or expanded, as broad or broader than long. Sepals oppressed. Stamens and styles shorter than the corolla.

2. *Coryphantha*. Plants globose or elongated, with watery juice, often robust. Tubercles grooved on the upper side. Flowers as in *Eumamillaria*, but borne at the extremity of the groove in the axils of young tubercles, so usually nearer the vertex of the plant.

3. *Cochemiea* n. subgen. Plants cylindrical, usually much elongated, with watery juice and grooveless tubercles. Flowers mostly in a ring near the vertex, several times longer than broad, scarlet, tubular, slender, somewhat curved, and oblique with spreading, unequal, petaloid sepals, so making the flower apparently double as in *Cereus flagelliformis*. Stamens and style red, exserted.

4. *Lactescentes*. Plants depressed-globose, rarely a little elongated. Juice milky. Tubercles usually angular and somewhat leathery. Flowers as in *Eumamillaria*, but mostly small.

In the Botany of the Mexican Boundary Survey Dr. Engelmann unfortunately confounded *Mamillaria Goodrichii*, Scheer, with the species common about San Diego, and the rediscovery of the former now makes it necessary to separate them.

MAMILLARIA (EUMAMILLARIA) GOODRICHII, Scheer. "M. caule erecto cylindraceo basi ramoso axilis nudis, mamillis confertissimis parvulis viridibus, pulvillis nudis, aculeis exterioribus 12 diaphane albis rigidiusculis subbifarie patentissimis intertextis, centralibus 4 longioribus basi albidis superne brunneis, infimo validiore uncinato.

Caulis poll. 4 altus, diametro vix sesquipollicari, basi ramosus, aculeis undique supertextus; mamillæ vix conspicuæ subtetragone

* From "Cochemie," the name of one of the extinct Indian tribes of Baja California, from which the native races have entirely disappeared.

† I have not been able to determine whether the type of *Mamillaria* belongs to *Eumamillaria* or to *Lactescentes*.

compressæ; aculeorum exteriorum 8 laterales bifarie radiantes, et 4 inferiores paulum breviores, omnes diaphanei, subrigidi, cum vicinis intertexti; centralium 3 superiores aciculati, erecto-patuli, et infimus longior et crassior rigidissime hamatus. Flores ignoti.

Hæc planta quam Dom. Goodrich in Californiæ insula *Corros* detexit, in hortis infeliciter periit. Valde accedit ad diagnosin *M. Beneckeï Ehrenb.*, sed propter patriam diversam notatu digna.*

As connected with the voyage of the *Herald*, it may be proper to add, that Mr. J. Goodridge, surgeon, found a *Mamillaria* on the island of Cerros, east of California, which was by me forwarded to Prince Salm-Dyck, unfortunately in a very imperfect state. It has been placed by him under his *Mamillariæ heterochloræ*, page 10 of his enumeration, and is described by him as *Mamillaria Goodridgii* Scheer, thus: * * * "The prince seems to think that it approaches to *M. Beneckeï*, Ehrenb, but that, on comparing the actual plants, does not appear to me to be the case. About Guaymas a *Mamillaria* somewhat similar to *M. Goodridgii* was found, but more like a *Mamillaria anguinea*, with a central spine strong and hooked; also a very robust species of *Mamillaria sphaacelata*."†

"The cactus family [on Cedros Island] was represented by some four or five species; among them a giant cereus and a very minute species of *Mamallaria*, with a disproportionately large flower, exceedingly fragrant." Report of Dr. John A. Veatch in Ross Browne's Sketch of Lower California, p. 152, 1869.

The foregoing was until three years ago the sum of our knowledge of *M. Goodrichii*. It will be noticed, that Scheer corrects Salm-Dyck's "Corros", but himself locates the island to the "east" of California. In both cases these were probably errors of the printer. It is unfortunate, that the name was originally printed *Goodrichii*, as it gives room for difference between those, who rigidly adhere to a name as it first appears, and those, who would correct obvious errors.

The plant of Scheer was brought from Cedros Island by Captain Porter in 1894 and the next year from La Paz; from San Martin Island by A. W. Anthony in 1896; from San José del Cabo by T. S. Brandegee in 1893 and from Natividad Island in 1897. Dr. Palmer's No. 693 from Cedros Island, not seen, may belong here.

* *Cactæ Hort. Dyck.*, p. 91, 1850.

† F. Scheer in *Botany of the Herald*, 286.

The plant is of more slender growth than the San Diego species, with naked or sparsely woolly axils, much larger, more or less rose-colored flowers, and longer slender, subulate, style-divisions. In the twoscore plants, I have seen, the flowers were all hermaphrodite. A stouter form with stronger spines sent recently by Captain Porter from Topolobampo, Sinaloa, appears to answer to that mentioned by Scheer as occurring at Guaymas.

The species is very near *M. Grahami*, differing chiefly in the less numerous spines, and both may belong to previously described Mexican forms.

MAMILLARIA (EUMAMILLARIA) DIOICA. *M. Goodrichii* of Engelm., not of Scheer. Simple or cæspitose, or occasionally branching above; beginning to flower at one inch or less, but attaining a height of 6-10 inches. Tubercles green or sometimes glaucous, cylindrical, often angular; axillæ sparsely woolly in the growing part, bearing 4-15 setæ, often as long as the tubercle; outer spines usually white, radiant, 11-22, covering the whole plant, centrals 1-4, the superior turned upward among the radials, the lowest longer and stouter and porrect, 8-15 mm. long; flowers 10-22 mm. long, yellowish-white, sometimes reddish, incompletely dioecious; petals lanceolate-acuminate, much longer and more spreading in the male flowers; fruit, like the flowers, borne in a circle near the top, clavate or oval, scarlet, 10-25 mm. long; seeds as in most of the related species black, somewhat pyriform and minutely pitted.

From San Diego a short distance north but southward to Cape St. Lucas always so far as known near the coast. Some plants brought by Mr. Anthony from San Juanico, Baja California, have the radial spines brown, and plants from San José del Cabo show colored rings of growth. It has been found as far as known on none of the islands excepting Todos Santos near Ensenada.

M. DIOICA var. INSULARIS. *Cactus Palmeri* Coult. Contr. Nat. Herb. III, 108, not *M. Palmeri* Jacobi, in Otto and Dietr. Alg. Gart. xxiv (1856) 82.

Differing from the type in its more densely cæspitose form, more woolly axils, and shorter spines, which are usually whiter, shorter, more numerous, and the centrals ordinarily straight. Flowers and fruit as in the type.

This plant was named as a species principally because of

straight central spines, but in the numerous specimens brought from San Benito Island* (it has been found nowhere else), many have the lower central hooked and darker, as in the type of *dioica*. Both the type and the variety are nearly dioecious, many plants male, with imperfect, less-divided style-branches, which rarely bear fruit, and the few which occasionally appear very slender and few-seeded; many female, with entirely abortive anthers and very small flowers, which usually produce a dense row of thick oval or clavate, coral berries; others hermaphrodite or imperfectly dioecious in all degrees.

It is probable, that many species of Mamillaria have the same peculiarity. I have observed plants of other species growing in our garden, which were completely unisexual.

MAMILLARIA (LACTESCENTES) BRANDEGEL. Engelm. in Coult. *Cactus Brandegei* Coult. l. c. 96.

MAMILLARIA (LACTESCENTES) GABBII. Engelm. in Coult. *Cactus Gabbii* Coult. l. c. 109.

These two plants are closely related and may belong to a single species. Mr. C. R. Orcutt has collected not far from San Quentin a form which is intermediate. The species of this section are unusually variable in their spines and the peninsular forms may be variations of species found in Mexico proper.

MAMILLARIA (COCHEMIEA) HALEI. Brandg. Proc. Cal. Acad. ser 2, ii 161. Stems clustered 3-5 dm. high; tubercles rather crowded, short conical from a broad base, woolly but not setose in the axils; spines 15-25, sub 3-seriate, all straight, centrals 6-9, the lower one 3-4 cm. long, porrect or deflexed, twice as long as, and much stouter than the others, radial spines shorter than the centrals, variable in number and arrangement; flowers 4-5 cm. long.

Collected so far only on Magdalena and Santa Margarita Islands. MAMILLARIA (COCHEMIEA) PONDII Greene, Pitt., i, 268. Stems 1-4 dm. high, branching at and along the whole length of the older reclining ones, tubercles short, conical, not crowded, with woolly and conspicuously setose axils; spines 25-35 in about 3 series, whitish, light

* Confined so far as known to this island, unless Palmer's No. 901 from Guadalupe Island, Contr. Nat. Mus. i, 24, may belong to this variety.

to very dark brown, the outer radiant, short, white, variable in number, the next 5-8, brown, longer, the central row 3, two of them rarely 1 or 3, strongly hooked, 2-4 cm. long, much exceeding the others; fruit oval or obovate, 2-3 cm. long, scarlet, seeds black and pitted.

Description amended from numerous specimens brought from Cedros Island by A. W. Anthony, and now flowering in our garden. It has been collected also by Mr. Brandegee, on Natividad Island, where it is even more abundant than on Cedros.

MAMILLARIA (COCHEMIEA) ROSEANA, Brandg. *Zoe*, ii, 19. *M. Radliana* Quehl, *Monats. f. Kakteen.* ii, 104, 1892 with cut. The fruit of this differs much from that of the related species. It is broad, flattened at the top and shorter than the somewhat remote tubercles, so that a plant in fruit looks, as if crowded with a row of flat scarlet buttons pressed in between. In some specimens a single stout seta is found in the axils. The spines, especially the central one, vary greatly in length. This is the most widely diffused of the Cochemiea, extending over the lower half of the peninsula. It is found also on Santa Margarita Island and on Carmen Island. The locality given for *M. Radliana* is simply "Mexico."

MAMILLARIA (COCHEMIEA) SETISPINA, Engelm. in Coult. *Cactus setispinus* Coult. l. c. 106. This species is as yet only known from herbarium specimens of Gabb and of Mr. Brandegee.

It is possible, that some of the elongated species of Mexico proper will be found to belong to this section, when the flowers are better known.

ECHINOCACTUS VIRIDESCENS Nutt. To this species belongs *E. limitus* Engelm. in Coult. l. c. 374, *E. peninsule* Engelm. in Coult. l. c. 361, as to "near San Diego," and also, according to Mr. Orcutt, *E. Orcuttii* Engelm. in Orcutt, *West Am. Sci.* ii, 46, 1886.

ECHINOCACTUS PENINSULÆ Web. Bull. Mus. Hist. Nat. 1895, p. 5 (reprint), *E. Wislizenii* Engelm. of Mr. Brandegee's list in part. *Echinocactus peninsule* Engelm. in Coult. l. c. iii, 361, as to the type Gabb. No. 11, but not "near San Diego."

It is doubtful, if more than three species can be separated from the group represented by the ill-defined and incompletely known forms noted under *E. Californica*, *E. viridescens*, *E. Orcutti*, *E. cylindraceus*, *E. Emoryi*, *E. Wislizenii*, *E. peninsule* and their varieties.

E. Emoryi appears to be little understood. To it in most cases is referred any specimen belonging to this section, which lacks radial spines.

CEREUS GUMMOSUS Engelm. in Brandg., Proc. Cal. Acad., ser. 2, ii, 162 and Zoe ii, 20. *Cereus Cumengeti* Web. Bull. Mus. Hist. Nat. 1895, p. 2 (reprint). *C. flexuosus* Engelm. MSS. in Coult. l. c. iii, 411. The flower of this species is thus described by Dr. Weber: "Flower nocturnal, large 25 cm. long by 10 cm. broad, lively rose-color without, white within." Mr. Brandegee described it as "four to five inches in length, purple." In examining it this year at San José del Cabo, he found that his memory had been at fault—that it was purplish outside, creamy white somewhat tinged with rose inside.*

CEREUS STRIATUS, Brandg. Zoe ii, 19, and Proc. Cal. Acad. ser. ii. 163. "Cereus sp. small, vine-like, with neither flowers nor fruit.—Santa Margarita and Magdalena Islands."† *Cereus Diguetti* Web. Bull. Mus. Hist. Nat. 1895 p. 4 (reprint). At the time of original publication Mr. Brandegee did not know that this species had tuberous roots. He observed them the following year, and plants have been growing in our garden since 1894, but have not yet flowered. Professor Coulter says the flowers are purple, but does not give the source of his information. Mr. Brandegee had seen only dried remains of the flowers. Dr. Weber says, "According to M. Diguett, the flowers are nocturnal, white, about 15 cm. long." He compares the tubers to a bunch of dahlia roots. Mr. Orcutt‡ considers this species identical with, or only a form of, *C. tuberosus* Poselger; in this he is, however, certainly in error.

CEREUS BRANDEGEI Coult. l. c. 389, was recently brought in living specimens from San Juanico, by A. W. Anthony. To this, as far as can be made out from the fragment, belongs *C. Sambor-gianus* Coult. l. c. 391. Captain Porter has brought from La Paz

*Since the foregoing was in type *C. gummosus* has flowered in our garden on a cutting brought from Cedros in July. It is nocturnal, 13 cm. long, creamy-white, the cylindrical tube and sepals brownish-purple.

†Dr. Edward Palmer, just returned from Topolobampo, brings me from that place a specimen of *Cereus striatus*. He reports it also as growing at the old "Rancho de Guaymas" a few miles from the city.

‡Review of the Cactaceæ of the United States, by C. R. Orcutt, San Diego, July 3, 1897.

a plant which apparently belongs here, although the lower central is much flattened and longer proportionately than in the type. It has not yet flowered.

CEREUS MAMILLATUS Engelm. in Coult. l. c. 405. The type of this is only a few cm. long and consists apparently of a rib sliced off so near the surface, that the tubercles are almost disconnected, and pressed quite flat from the side. Some error is to be suspected in the description as to "ribs 20-25," for it otherwise agrees well with a cæspitose plant brought by Captain Porter from the vicinity of La Paz. It has not yet flowered. The "mamillæ" in the growing plant are not nearly so disconnected as is described. When the plant ceases growing or dies, the intervals between the areolæ become much depressed. Notes of distance between areolæ and projection of tubercles are of very little value, depending, as they largely do, on the state of growth, and the texture of the tissue of the particular species.

CEREUS MARITIMUS Jones, Am. Nat. xviii, 973, 1883. In the original diagnosis the flowers are described truly as "light yellow." In Professor Coulter's paper the species was redescribed, evidently in ignorance of the original publication, as having "red" flowers. *Cereus flaviflorus* Engelm. in Coult. l. c. 391 is without doubt the same.

CEREUS ENGELMANNI Parry, Am. Jour. Sci., ser. 2, xiv, 338. From the center of the peninsula northward in the more elevated parts. It is reported from Cedros Island by Professor Greene, and a short spined specimen growing in our garden is said to have come from that place. These reports still require verification, the plant not having been seen on the island by Mr. Anthony or by Mr. Brandegee.

CEREUS POLYACANTHUS Engelm. of Coulter's report is a doubtful species. Mr. Orcutt's plant I have not seen. Mr. Brandegee's plant from La Paz, so referred by Coulter, appears to be *C. mamillatus*.

CEREUS PACIFICUS Coult. l. c. 397; *C. phœniceus pacificus* Engelm. in Orcutt West. Am. Sci. ii. 46 (1886). The type came from north of Ensenada not 100 miles below the boundary. Mr. Brandegee found it on the slopes of San Pedro Martir at about 7,000 feet elevation. Of the plants from Comondu Cliffs, and

Sierra de la Laguna, the flowers are not known, and as they have long stems—sometimes several feet—hanging from cliffs, the reference may be an error.

CEREUS EMORYI Engelm. Am. Jour. Sci. ser. 2, xiv, 338, 1852, has been collected by Mr. Brandegee as far down as El Rosario, but it probably extends very much farther down along the western coast.

CEREUS ERUCA Brandg. Proc. Cal. Acad. ser. 2, ii, 163, pl. vii, 1889. Of this species the flowers are still uncertain. It has been growing in our garden for nearly three years, but has not flowered. The color of the tissue of the plant is nearer orange than yellow. The plant from Todos Santos,* doubtfully identified with this species by Coulter, appears to be *C. Brandegei*.

CEREUS SCHOTTII, at least the Lower Californian form, with *C. Sargentianus* Orcutt, *C. cochal* † Orcutt and a plant from the vicinity of Guaymas—perhaps *C. alamosensis* Coult. l. c. 406—form, with perhaps several others, a remarkable section of *Cereus* distinguished by numerous axillary buds. Flowers are often produced side by side as Mr. Orcutt notes, and as shown in some of Mr. Brandegee's specimens of *C. cochal*, but usually they appear in succession. Mr. Brandegee notes that "about Todos Santos *C. Schottii* runs into some very peculiar forms, the tops of the stems differing in their spines in no respect from the lower part," ‡ and Orcutt says, "So-called 'sterile stems' produce flowers freely." §

CEREUS THURBERI Engelm. Am. Jour. Sci., ser. ii, xvii, 234. This species of the southern part of the peninsula is perhaps correctly identified, but I have not seen complete material from the Sonoran type locality.

CEREUS PRINGLEI Wats. Proc. Am. Acad., xx, 368 (1885).

CEREUS PECTEN-ABORIGINUM Engelm. in Wats. l. c. xxi, 429 (1886). To these two species of Sonora and Chihuahua, without

*There is apt to be some uncertainty as to the place meant by this name. The Todos Santos of Mr. Brandegee's notes is between Magdalena Bay and Cape St. Lucas. Ensenada de Todos Santos, the Todos Santos mentioned by Coulter under *C. pacificus*, which is not a hundred miles from San Diego, is called Ensenada.

†Mr. Orcutt, l. c. 9, considers this identical with *C. geometrizans*.

‡Zoe, ii, 20.

§Orcutt, l. c. 29.

doubt belong *Cereus calvus* & *C. titan*, Engelm. in Coult. l. c. 409; the specimens of Gabb are such scraps that it may never be known with certainty to which. They probably both belong to *C. Pringlei*, certainly both do as to fruit. The woolly groove connecting the areolæ is not constant in these plants. It is present or absent in various parts of the same rib. Of course the trunks of all the giant species are more or less "bald" in age.

OPUNTIA TUNA (L.) is about the old missions and cultivated everywhere on the peninsula.

OPUNTIA ENGELMANNI var. LITTORALIS Engelm. Bot. Cal. i, 248. Northern part of the peninsula, along or near the coast.

OPUNTIA PYCNANTHA Engelm. in Coult. l. c. 423. Type Agassiz' specimen in Herb. Mo. Bot. Garden, but the "good joint, flower and ripe fruit" are in the herbarium of Mr. Brandegee.

OPUNTIA PYCNANTHA MARGARITACEA Coult. l. c. 424. These two plants have been brought to San Diego in living specimens by Captain Porter.

OPUNTIA ANGUSTATA COMONDUENSIS Coult. iii, 425, described as having "joints semi-obovate (one side straight as if an obovate joint had been divided in the median line), states what actually occurred. Mr. Brandegee, in making specimens of the larger *Platopuntias*, splits the joint and then divides it longitudinally down the center. Of course the plant has nothing to do with *O. angustata*, the reference having been made on account of the supposed shape of the joint.

OPUNTIA TAPONA Engelm. in Coult. l. c. 423. This and the above are the common *Platopuntias* of the southern part of the peninsula; both are growing in our garden. The type of the last species is less than an inch square.

OPUNTIA INVICTA Brandg. is the stoutest of the *clavate*, the joints, well developed, attain a circumference of 3 dm. It has flowered and fruited abundantly this year in San Diego. There is no ground whatever for the suspicion that it might be a species of *Cereus*. Its flowers and fruit are exactly *Opuntia*.*

* OPUNTIA BRADTIANA (Coult.) *Cereus Bradtianus* Coult. l. c. 406, is perhaps the nearest relative of *O. invicta*. In both species the tubercles are more or less confluent into vertical ridges. In *O. Bradtiana* they are almost completely so. The spines are, however, barbed and the young joints are covered with conspicuous subulate leaves, so that there can be no doubt that it belongs to *Opuntia*, although I have not seen fruit or flower.

OPUNTIA PROLIFERA Engelm. Am. Jour. Sci., ser. 2, xiv, 338 (1852). Southward some distance into the peninsula—how far is not yet known. The plant from Guadalupe is doubtfully identified.

OPUNTIA CHOLLA Web. l. c. 6 is the *O. prolifera* of Mr. Brandegee's lists as to the plant of the southern part of the peninsula. To this may belong the specimen from Magdalena Island referred by Prof. Coulter to *O. fulgida*.

OPUNTIA MOLESTA Brandg. Proc. Cal. Acad., ser. 2, ii, 164. To this may belong *O. Calmulliana* Coult. l. c. 453, and *O. clavellina* Engelm. in Coult. l. c. 444—closely related species.

OPUNTIA CIRIBE Engelm. in Coult. l. c. 445, "from Comondu and Loreto northward beyond Rosario." Gabb's fragment appears to be lost, but in our herbarium is a sheet containing two specimens, one from Purisima and one from Comondu, which answer to the description. The sheet has the name *Opuntia Bigelovii* Engelm. written upon it between the labels and attested by the initials J. M. C. It is also growing in our garden, collected by Captain Porter somewhere in the peninsula.

OPUNTIA SERPENTINA Engelm. l. c. . Northern part of the peninsula. *O. serpentina* of Mr. Brandegee's list, from Magdalena Bay, is certainly not that species. *Cereus* (?) Californicus Nutt. in T. & G. Fl. N. Am. i, 555, 1840, is the oldest name of this species, though Nuttall appears to have described the plant of *O. prolifera* and the flower of *O. serpentina*.

OPUNTIA ALCAHES Web. l. c. 6 (1895). This species and *O. cholla* are the common cylindric Opuntias of the Cape Region. *O. alcahes* is very near, if not identical with *O. echinocarpa nuda* Coult. l. c. 446.

OPUNTIA FULGIDA Engelm. Syn. Cact. 306, as to Mr. Brandegee's specimen from Calamajuet, has yellow flowers with only a slight reddish tinge on the outside, as is common in many of the yellow-flowered species.

OPUNTIA RAMOSISSIMA Engelm. Am. Jour. Sci., ser. 2, xiv, 339 (1852). *O. tessellata* Engelm. Syn. Cact. 309 (1856). This has not been found on the peninsula, so far as I know, but it occurs on San Benito Island.

OPUNTIA TESAJO* Engelm. in Coult. l. c. 448. "With very short, woody stem, and growing in little clumps 3 dm. or less in diameter; joints slender and not distinctly tuberculate; flowers simple, bell-shaped, yellow—Type, Gabb 26 in Herb. Mo. Bot. Gard. 'Among rocks, especially toward the west coast and in the more central portions.'" The type, such as it was, is missing.

A description like this must, in the absence of the fragment representing the type, be forever uncertain. The plant, with which it is now doubtfully identified, is *O. leptocaulis stipata*, as to Mr. Brandegee's specimens from San Gregorio, San Enrique and Agua Dulce, so referred by Professor Coulter. It is no form of *O. leptocaulis*.

OPUNTIA ROTUNDIFOLIA Brandg., Zoe, ii, 21. The seeds of this plant look, in the dried specimen, much like the pulvini on the fruit, which probably is the reason Professor Coulter could not find them. Abundant living specimens recently received from San José del Cabo show, that the stems are not always spineless, nor the leaves always round. It may be identical with *Pereskia rotundifolia* DC., which appears from the picture to be not true *Pereskia*, but a *Pere-skioïd* *Opuntia*. A very similar, if not identical, plant has been collected at Topolobampo by Captain Porter, and later by Dr. Palmer, who says that it is called "the yellow rose of Sinaloa."

*The *tasajo* is a plant resembling the *pitahaya* in the inner arrangement of its branches, which also are bare of leaves and thorny, although they are not so large and thick, nor of one piece, like those of the *pitahaya*, but each one is composed of various pieces, of about two inches in length, and united by certain stems, which separate during a high wind, or anything rudely touching them. These pieces detached from the bush, keep green for many months, although there may not be any moisture in the ground; and, if rain should fall before they are gathered, they take root and form new plants.

The fruit of the *tasajo* is similar to the *tuna* (prickly pear), but never ripens, consequently is of no use, but on the contrary is a nuisance, as it blocks the roads. Only in some places, where firewood is scarce, its branches answer for burning, as it kindles readily, but consumes quickly. The pieces of the *tasajo* are smaller and not so long as the little flnger.—From Hist. of California by Father Clavijerro in Ross Browne's Sketch of Lower California.

SHORT ARTICLES.

CARPENTERIA CALIFORNICA.—The first collector of this plant, as is well known, was General Fremont, who obtained it on one of his expeditions through the interior of California. No definite locality was known for *Carpenteria*, until Dr. Gustav Eisen rediscovered it in Fresno county on Big Dry Creek, in the foothills northeast of Fresno city. The shrubs, of which there were probably about one thousand, grew on the southern exposure of a chaparral hill about a mile above the Toll-House near what is known as the Grape-Vine Spring on the road to Pine Ridge. The altitude is about 3,500 feet, where are found the last Digger Pines (*Pinus Sabiniana*) and the first Sugar-Pines (*Pinus Lambertiana*); it is also the lower limit of *Fremontia*, which extends 500 feet higher up. The shrubs were about seven to eight feet in height, and the flowers very striking in their showiness. The particular hill, on which the species was found, was about a mile in circumference. Big Dry Creek does not empty into Kings River, but loses itself in the San Joaquin plains.

Dr. Eisen collected about twenty-five pounds of the fruit, which was sent to a Washington florist, who distributed seed to other florists of the eastern United States and Europe. From such a source came the plants, that were offered for sale in their catalogues. From seed of the same collection a single plant was also grown in the experimental garden of the Department of Agriculture of the University of California. This bush has never fruited, but it has been easily propagated by cuttings.

The above account of the single known locality was drawn up from a verbal description by Dr. Eisen. The rediscovery of the species was made in 1875, and the locality was revisited during several years thereafter.—W. L. J.

THE CARNATION-RUST IN CALIFORNIA.—Although the disease known as the carnation-rust, which is caused by the fungus *Uromyces caryophyllinus* (Schrank) Schroet., has been known in the eastern United States since about 1891, it does not appear to have been reported thus far west of the Rocky Mountains. I first noticed its presence at Berkeley, in the fall of 1896, and observations made since then seem to show, that it is quite widely disseminated through-

out the Bay region. It often becomes a serious pest, especially during the wet winter-months, and florists find their only safeguard is to avoid excessive moisture and renew their stock frequently with young, uninfected plants.—W. C. BLASDALE.

OPEN LETTERS.

I SEND you by to-day's mail, under separate cover, a species of thistle [*Centaurea solstitialis* Linn.], that is a very obnoxious weed, hurtful to growing crops, and that often kills horses, which eat it, when matured and dry. It will grow on good land, uninterrupted, to the height of three to four feet, and so thick, that you can not force a team and mowing-machine through it. To mow it does not kill it, it seems only to improve its productiveness for seed; neither will flooding the ground kill the seed. . . . I have known flood-water to remain on the ground for four months, two feet deep, and the thistle to grow after the water receded. . . . It is locally called "Buckthorn" and "Russian Thistle."

W. R. MUMMA.

Grand Island, Colusa Co., Cal., September 3, 1897.

MISCELLANEOUS NOTES AND NEWS.

COUNT VICTOR TREVISAN, an Italian cryptogamist, died April 18, 1897, at Milan. His writings were largely algological.

IN advance of the eighth annual report of the Missouri Botanical Garden we have as a separate "The Mosses of the Azores and of Madeira," by C. Cardot.

THE Berlin Academy of Sciences has recently awarded nearly \$20,000 to scientific investigators. Prof. Adolf Engler, of Berlin, received 2,000 marks for the publication of monographs on African botany, and Dr. G. Lindau, 900 marks for studies on lichen.

PLANS are now being prepared for an enlargement of the Missouri Botanical Garden. There is to be added a tract of some eighty acres, which will be mainly used for synopses of the flora of North America and the flora of the world, one plan following the arrangement of Bentham and Hooker, the other that of Engler and Prantl.

THREE new species of West American Coniferæ are distinguished by Mr. J. G. Lemmon in *Garden and Forest*, May 12, 1897 (x. 183-4). They are as follows: *Pinus scopulorum* (*P. ponderosa*, var. *scopulorum* Engelm.), Rocky Mountains. *Picea Columbiana* (*P. Englemanni* in part), Oregon to British Columbia, eastward to Montana. *Abies Shastensis* (*A. magnifica*, var. *Shastensis* Lemmon), Mt. Shasta and Scott Mountains to the Cascade Mountains in southern Oregon.

THE SUCCESSOR of the late Sir Ferdinand Baron von Mueller as Government Botanist of Victoria, is Mr. J. G. Luehman, who was for twenty-eight years his assistant. Mr. Luehman has been definitely placed in charge of the National Herbarium of Melbourne, with the title of Curator. This herbarium is under the ministerial control of the Chief Secretary of Victoria, and it is a fortunate fact that the present Under Secretary of the department is also a botanist, and takes a keen interest in the welfare of the herbarium.

IN the proceedings of the Biological Society of Washington (XI, 61-65, April 21, 1897) Mr. F. V. Coville sets aside *Camassia* as a generic name for the Camas Plant and renames the species under *Quamasia*, Raf., as follows: *Camassia Leichtlinii* Wats., becomes *Quamasia Leichtlinii*; *Camassia Cusickii* Wats., becomes *Quamasia Cusickii*; *Camassia esculenta* Lindl. (originally described by Pursh as *Phalangium quamash*) becomes *Quamasia quamash*; *Camassia Howellii* Wats., becomes *Quamasia Howellii*; *Camassia Fraseri*, Torr (originally described as *Scilla esculenta* Ker) becomes *Quamasia esculenta*. *Camassia Quamash* Greene is cited as a synonym of *Quamasia quamash* (Pursh). It is not the plant of Pursh, although Greene applied Pursh's specific name to it. It is *Camassia Leichtlinii* (or *Quamasia Leichtlinii*) and should be placed as a synonym of that species.

ERYTHEA

A JOURNAL OF BOTANY, WEST AMERICAN AND GENERAL

EDITED BY

WILLIS LINN JEPSON

INSTRUCTOR IN BOTANY, UNIVERSITY OF CALIFORNIA

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THE PUBLICATION OF NEW BINOMIALS IN
WORKS OF COMPOSITE AUTHORSHIP.

By B. L. ROBINSON.

As the use of *n. sp.* and *n. comb.* in the Synoptical Flora has been mentioned several times with adverse criticism, it may be as well to state, why such abbreviations were employed. While Dr. Gray was carrying on the Flora alone, there was naturally no reason, why the name of a new species should be followed by any particular sign to indicate its novelty. The mere omission of the authority, which was regularly given with the old species, was a sufficient indication of a new one. When, however, the work passed into other hands, and the text was prepared by several authors, it became desirable, indeed well nigh necessary, that the authority for each new species or new combination should be expressly indicated. If this necessity is not at once apparent, it becomes so when we observe the innumerable errors which have resulted from the omission of such authorities in works of composite authorship. For months after the advent of the Russian thistle in America, it was commonly referred to as *Salsola Kali*, var. *Tragus*, DC., although the *Chenopodiaceae* of the Prodomus were described by Moquin, whose name as author appears clearly enough at the head of each page, but not after his new variety. Even in the 6th edition of Gray's Manual *Lychnis Githago* is ascribed to Lamarck, although the part of Lamarck's Encyclopedia where this combination appears, is signed by Desrousseaux. Without needless multiplication of examples, it is clear that the omission of the authority in the case of novelties, published in works of composite authorship, is a pernicious practice leading to subsequent error and misunderstanding.

But, on the other hand, if authorities alone are given, no difference is shown between the new names and the old ones. That such a distinction is desirable, needs no argument for those who have had any experience in examining new publications for purposes of indexing, reviewing, or synonymic cross-reference.

ERYTHEA. Vol. V, No. 12 [26 December, 1897].

In the first fascicle of the Synoptical Flora, all new binomials were, for these reasons, indicated by *n. sp.* In the case of actual novelties, such as *Clematis Suksdorjii*, this practice does not appear to be open to any serious criticism, and even with new binomials, such as *Erysimum occidentale*, which result from a generic transfer, such a use of *n. sp.* is not really untruthful, since it is used in the by no means unprecedented sense of *nova species generis*, or new species of the genus concerned.

However, such a use certainly seems undesirable, since it obscures the more or less useful distinction between actual novelties and new combinations resulting from generic changes. To bring out this distinction also, the abbreviations *n. sp.* and *n. comb.* were respectively applied in the second fascicle of the Flora. The editor shares the critics' dislike of these expressions, yet feels strongly that in this case something of the sort is necessary to secure perfect clearness, which after all is the chief aim in scientific composition.

A NEW CALIFORNIAN IRIS.

By CARL PURDY.

Iris Watsoniana. Rhizome widely spreading, very stout, 6 to 9 lines in diameter; sheaths not splitting into coarse fibers; leaves 4 to 5 in a tuft, linear, clearly ribbed (but not so strongly as in *I. Douglasiana*), ascending, the upper third curving down as in *I. Douglasiana*, 6 to 9 lines wide, 20 to 30 inches long, longer than the scapes, rosy at base, long acuminate; stem stout, solid, compressed, 20 to 30 inches high, bearing 2 to 3 leaves which are 8 to 9 inches long, 4 to 5 lines wide; stem 2 to 3 headed, each branch 2 to 3 flowered; flowers not enclosed in spathes, the lower narrow bract 1 inch below lower flower; bract-spathes 2 to 3 inches long, green, lanceolate; pedicels 9 lines to 2 inches long; perianth tube 6 lines long, deep purple veined with white and yellow, varying to light lilac and sometimes pure white; the usual shade is as dark a purple as is found in the dark *I. macrosiphon*; falls

obovate, very broadly clawed, $1\frac{3}{4}$ inches long by 6 inches wide, lips recurved; standards as long, oblanceolate, unguiculate, 3 inches broad; style branches $1\frac{1}{2}$ inches long; crests large, denticulately toothed; capsule ovate oblong, long acuminate to apex, abruptly to base.

Described from fresh flowers collected at Eureka, Humboldt Co.; common in that region and forming great masses. Its habitat, growth, and thick rhizome are suggestive of *I. longipetala*. The flower is more that of *I. Douglasiana*. It has the gracefully drooping leaves of that species, but the branched leafy scape, the distant bract, and the capsule are very distinctive, and the range of color quite different. I take pleasure in naming this beautiful Iris after the late Dr. Sereno Watson in remembrance of many kindnesses.

SHORT ARTICLES.

CORRECTION IN NOMENCLATURE.—The grass known as *Milium multiflorum* Cav. is the *Piptatherum multiflorum* of Beauvois and has been referred to *Urachne parviflora* Trin. which is *Agrostis miliacea* Linn.

Bentham & Hooker united *Piptatherum* Beauv. and *Urachne* Trin. with *Oryzopsis*, and have been followed by Hackel; this plant should, therefore, be called **Oryzopsis miliacea** (L.).

J. BURTT DAVY.

CENTAUREA SOLSTITIALIS IN COLUSA Co.—Mr. W. R. Mumma writes, that the St. Barnabas' Thistle was first seen near Grand Island eighteen years ago (1879), but that he cannot learn, from whence or how it came there.

NEWS NOTES AND CURRENT COMMENT.

DR. P. MAGNUS of Berlin visited San Francisco in September and was a guest of the botanists of the vicinage.

MR. J. B. DAVY of the University of California is now in England for a limited period. He expects to spend a few weeks at Kew in looking up early Californian types.

MR. S. B. PARISH, of San Bernardino, California, has re-

cently distributed a fourth century of "select plants of Southern California." The specimens are choice and will be found equal to those of previous sets.

THE COMPLETION of the Flora of British India, on which Sir Joseph Hooker has been engaged for twenty-five years, is announced. Although advanced in years Sir Joseph will undertake to complete Trimen's unfinished Flora of Ceylon.

DR. R. A. PHILLIPPI, for many years the most well-known of South American botanists, has recently resigned the Directorship of the National Museum at Santiago, Chili, which he has held for forty-three years. He is now ninety years of age.

DR. AUGUSTINE HENRY, the well-known explorer of China, writes to the *Kew Bulletin* that the region about Yunnan, "the most interesting in the world," is evidently the headquarters of most of the genera which are now spread all over Europe and Asia in great part. He finds the wild tea in that country; hitherto tea has been found wild only in Assam.

THE Department of Botany of this University has recently moved from its old and much crowded quarters in South Hall to a building recently erected for its exclusive use, a further notice of which will be given in a future number of this journal.

THE Board of Directors of the Southern California Academy of Sciences at Los Angeles for 1897-8 is as follows: W. A. Spaulding, President; Abbott Kinney, First Vice-President; Dr. A. Davidson, Second Vice-President; Dr. E. A. Praeger, Treasurer; B. R. Baumgardt, Secretary; Dr. Jos. C. Nevin; Dr. H. M. Bishop; J. D. Hooker; Prof. J. A. Foshay; W. H. Knight; J. S. Vasburg. The "Bacteriologist and Botanist" of the Agricultural Experiment Section is A. J. McClatchie.

THE DIVISION OF BOTANY of the U. S. Department of Agriculture has issued a timely eight page Circular ("No. 12.—Revised."), on the Camphor-Tree. The circular has

been compiled by Mr. Lyster H. Dewey, and comprises a concise and full account of the tree, its native range, range under cultivation, uses and products, conditions of successful cultivation, propagation, planting and cultivation, the distillation of camphor-gum, refining, and the outlook for a future market.

W. A. STILES, editor of *Garden and Forest*, died October 6th. Shortly after leaving Yale College he came to California from New Jersey and was a member of the engineer-corps, which located the line of the Central Pacific Railroad. He was a man of many and varied interests and accomplishments, being a remarkable mathematician, a politician in the best sense and a lover of music as well as of nature.

OF WRITINGS of Eastern botanists relating to Western America, tardily claiming our attention, we have to note in brief two issues of Prof. Greene's *Pittonia*. Part 16 contains, among other things, a paper on "Ranunculaceous Monotypes" and another on "New Western Plants." Part 17 contains descriptions of 5 new species of *Eriogonum* and 15 new species of clover, a goodly number of the latter being from Middle California. There are various other articles nomenclatorial and systematic.

THE seventh fascicle of the *Phycotheca Boreali-Americana* just issued by Messrs. Collins, Holden and Setchell contains the following Californian species: 317, *Sphaeroplea annulina*; 323, *Scytisiphon lomentarius*; 327, *Taonia Lennebackerae*; 329, *Lemanea annulata*; 330, *Nemalion Andersonii*; 332, *Gelidium crinale* var. *spathulatum*; 332, *Agardhiella Coulteri*; 335, *Nitophyllum latissimum*; 336, *N. multilobum*; 337, *N. uncinatum*; 338, *Ricardia Montagnei*; 339, *Poly-siphonia Baileyi*; 343, *Platythamnion heteromorphum*.

INASMUCH as the cultivation of cacti removed from their native habitat is attended with difficulties of a nature serious to the ecologist, no site for a cactus-garden could be better than one in the midst of the cactus-region, where the species may be grown side by side under perfectly normal conditions.

Such a garden has been begun at the University of Arizona, which is to be commended for its energy in this direction. Incidentally the cactus-herbarium of Professor Toumey is worthy of mention, not so much on account of its completeness as for the unique character of the specimens, it having been shown, that with skill and care the entire plant or a satisfactory representation of it might be preserved in a dried state.

A VERY full and instructive account of the plants used by the Klamath Indians of Oregon is given by Mr. F. V. Coville in Vol. V, No. 2 (June 2, 1897), of the Contributions from the United States National Herbarium. A very considerable number of plants are utilized for food, the fruits of the more insignificant annuals not being neglected. The achenes of *Polygonum Douglasii*, for example, are gathered, and the calyces rubbed off by hand; the product is then parched and ground into a meal, which is eaten dry or boiled; if boiled, the material turns red. The seeds of *Chenopodium Fremonti* and *Nymphaea polysepala* are also employed as food, the pods of the latter being gathered in enormous quantities. The roots of *Purshia tridentata* steeped in water serve as a remedy for lung and bronchial affections, and the fibre of *Urtica Breweri* is used in the manufacture of cords and nets. An alphabetical list of Indian plant names concludes the paper.

SUBSCRIPTIONS for Vol. VI, 1898, are now due and the price, \$1.50, should be remitted to Erythea, Berkeley, California. The January number will be issued on the 3rd of the month. The February number will be issued about February 10th. The May number will contain a sketch of the life of the late Dr. Bolander, accompanied by a portrait.

ERRATA.

- Page 19, lines 28 and 29, read italicized words in small caps.
- “ 43, line 28, for *macrocarpe* read *macrocarpa*.
- “ 45, “ 27, for *are* read *is*.
- “ 46, “ 5, between and *Melobesia* insert 299.
- “ 46, “ 6, for *Haro* read *Harv*.
- “ 52, “ 22, for *alismæafolius* read *alismæfolius*.
- “ 56, “ 13, read *Stachys pycnantha*.
- “ 56, “ 26, for *Northern Butte* read *northern Butte County*.
- “ 58, “ 4, for *Hebenaria* read *Habenaria*.
- “ 58, “ 30, for *Nutalli* read *Nuttalii*.
- “ 78, “ 18, for *of the like nature* read *of a like nature*.
- “ 87, “ 1, for *Notes on California Bryophytes* read *Notes on Californian Bryophytes*.
- “ 96, “ 33, for 7 dm. read 7 dmm.
- “ 103, date line at foot of page for No. 9 read No. 10; also like error on cover.
- “ 113, line 8, for *oppressed* read *appressed*.
- “ 126, “ 21, for *Quamaia* read *Quamasia*.

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