PROCEEDINGS

OF THE

CALIFORNIA ACADEMY

OF

NATURAL SCIENCES.

VOLUME II.

1858-1862.

SAN FRANCISCO:
TOWNE & BACON, EXCELSIOR PRINTING OFFICE.
1863.

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FOUNDERS OF THE ACADEMY.

APRIL 4th, 1853.

Henry Gibbons, M.D.	Albert Kellogg, M.D.
* T. J. Nevins, Esq.	* Andrew Randall, M.D.
Lewis W. Sloat, Esq.	John B. Trask, M.D.

* Deceased.

LIST OF THE MEMBERS

OF THE

California Academy of Natural Sciences.

JANUARY, 1863.

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Agassiz, Prof. Louis ..... Cambridge, Mass.
Andrews, Prof. E. B. ..... Marietta, Ohio.

Bache, Prof. A. D. ..... Washington, D. C.
Baird, Prof. S. F. ..... Washington, D. C.
Barnard, James M. ..... Boston, Mass.
Boynton, C. W. ..... Guyamas, Mexico.
Brown, B. B., M.D. ..... Sacramento, Cal.
Browne, L. A. ..... Big Oak Flat, Tuolumne Co., Cal.

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Cope, Edward D. ..... Philadelphia, Pa.
Craveri, Frederico ..... Bra. Piedmont,
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Darlington, William, M.D. ..... Westchester, Pa.
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Dunn, George W. ..... Alameda, Cal.

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Hough, D. E.....Oakland, Cal.

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Le Normand, Réné.....Vire, Calvados, France.
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Pumpelly, Raphael.....Japan.

Quetelet, Baron A.....Brussels, Belgium.

Reid, R. K., M.D.....Stockton, Cal.
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Sartwell, H. P., M.D.....Penn Yan, Yates Co., N. Y.
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Shumard, B. F., M.D.....St. Louis, Mo.
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Storer, D. H., M.D.....Boston, Mass.

Torrey, Prof. John.....New York City.
Trowbridge, Lieut. W. P.....Philadelphia, Pa.

Tryon, George W.....Philadelphia, Pa.
Van Beneden, Prof. P. J.....Louvain, Belgium.
Veatch, John A., M.D.....Virginia City, Washoe.
Verhaeghe, L.....Ostend, Belgium.

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Bosqui, Edward,
Brewer, W. H.

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Payot, Henry
Petersen, George C.
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Ransom, Leander
Rémond, Auguste

Stivers, Charles H.

Trask, John B., M.D.

Whitney, J. D.
Woodward, R. B.

JANUARY 4th, 1858.

ANNUAL MEETING.

President in the Chair.

The following Officers were elected for the year:

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T. F. MOSS,
DR. J. N. ECKEL, } .....VICE PRESIDENTS.
DR. W. O. AYRES,.....COR. SECRETARY.
EDWARD BOSQUI,.....TREASURER.
DR. J. B. TRASK,.....REC. SECRETARY.
WM. HEFFLEY,.....LIBRARIAN.

CURATORS.

DR. J. B. TRASK,.....GEOLOGY AND MINERALOGY.
H. G. BLOOMER,.....BOTANY.
DR. J. A. VEATCH,.....CONCHOLOGY.
DR. L. LANSZWEERT,.....ZOOLOGY.

COMMITTEES.

DR. AYRES,
DR. TRASK,
COL. RANSOM, } .....PUBLICATION.
DR. ECKEL,
MR. HEFFLEY,
DR. TRASK, } .....LIBRARY.
MR. MOSS,
MR. HEFFLEY,
DR. KELLOGG, } .....FINANCE.

JANUARY 11th, 1859.

ANNUAL MEETING.

President in the Chair.

The following Officers were elected for the year:

LEANDER RANSOM,.....PRESIDENT.
T. F. MOSS,
DR. J. N. ECKEL, } .....VICE PRESIDENTS.
DR. W. O. AYRES, ...COR. SECRETARY.
EDWARD BOSQUI, ...TREASURER.
DR. J. B. TRASK, ... REC. SECRETARY.
WM. HEFFLEY,.....LIBRARIAN.

CURATORS.

DR. J. B. TRASK,..... .....GEOLOGY AND MINERALOGY.
H. G. BLOOMER,.....BOTANY.
DR. J. A. VEATCH,.....CONCHOLOGY.
DR. W. O. AYRES,.....ZOOLOGY.

COMMITTEES.

DR. AYRES,
DR. TRASK, } .....PUBLICATION.
COL. RANSOM,
DR. ECKEL,
MR. HEFFLEY, } ....LIBRARY.
DR. TRASK,
MR. MOSS,
MR. HEFFLEY, } .....FINANCE.
DR. KELLOGG,

PROCEEDINGS

OF THE

California Academy of Natural Sciences.

February 22, 1858.

President in the Chair.

A section of wood from a tree forming a mark of boundary, was presented by the president, with the following paper:

The question is often mooted in our courts, whether the age of a tree can be determined with any degree of accuracy by referring to the rings or growth of the wood.

From the observations I have made during a period of twenty years, or more, I have long since been convinced, that as a general thing each ring or growth of the timber represented a year of the existence of the tree.

The specimen presented this evening, goes to substantiate more clearly, my previous conclusions.

During the month of February, 1853, one of the deputy-surveyors ran a line extending from the Mount Diablo meridian, in the Sacramento Valley, designated as the 4th standard line north.

On this line, posts were set and monuments erected as the corners to townships, and sections, and the divisions between sections, called ¼ section posts.

One of those divisions happened to be at the place occupied by an oak tree, and, as is usual, the tree was "blazed," or hewn on one side, and with a marking-iron the figure and letter ("¼ S") were cut into the blazed spot on the tree.

On the first of the month, just five years from the date of the marking of the tree, the same surveyor was connecting the survey of a rancho with the standard line, and probably from curiosity split out a block from this oak, uncovering the mark, and forwarded it to me.

The block here presented, it will be seen, shows the commencement of growths on either side of the blaze, which is some three inches wide. The next growth extends so as to cover about one-half the space, while the third meets in the center with the thin bark between. The fourth growth completely envelopes the crevices and bark, being much thicker in the center than at the sides, and the fifth forms the perfect circle of the tree.

It is precisely five years from the period when the tree was marked, and there are five perfect growths enveloping the blaze.

The new wood, in forming over the blaze, does not unite with the old wood, but becomes so firmly connected or pressed against it, as to leave the reverse in possession of the marks ($\frac{1}{4}$ S) in a very perfect form.

July 26, 1858.

President in the Chair.

Dr. Kellogg exhibited a specimen and drawing of a new species of *Cyclobothra*, with the following description:

C. cærulea, (Kellogg) or Blue Star Tulip.—Stem four to six inches, infolded by the single radical leaf nearly the whole length; umbel five or six flowered; peduncles one and one-half inches long; bracts variable, from minute setaceous to long lance-linear, often colored with pale pinkish bloom. Flowers small, pale blue, decked with innumerable specks and striæ of darker blue; petals obovate, subacute, serrulate-fimbriate, somewhat ventricose; base cuneate glabrous, bearded to the apex; petaloid sepals lanceolate-acute or convolute-acuminate, also bluish spotted and streaked, carinated two-thirds the length of petals, filaments flattened, attenuated upwards, about half the length of anthers; anthers large, erect, looking inwards, whitish, with a pale bluish tinge; recurved stigmas, beaked at the point; capsule oblong-ovate, at length pendulous by the recurved necks of the peduncles. The solitary radical leaf long, linear, twisted, erect; bulb about the size of an hazel nut.

This specimen was found above Forest City, not far from the region of perpetual snow. We have seen but three or four specimens; probably a rare plant.

In our specimen from Placerville presented to the Society, and figured Dec. 4th, 1854, there was a manifest effort to form a second

umbel. In this specimen, the stem is apparently a scape, the flowers are paler blue, smaller, more globose, and bracts colored.

A beautiful species, worthy of the attention of florists.

August 2, 1858.

President in the Chair.

Dr. Kellogg presented a specimen, accompanied by a drawing, of what appears to be a new species of *Calochortus*.

C. lilacinus, (Kellogg) or Blue Beard Butterfly Tulip.—Stem six to eight inches high, two-flowered, on long penduncles, (four or five in.) flowers pale lilac, one to one and one-half inches diameter; petals (three) broadly cuneate, apex truncately rounded, erose-dentate, inner surface bearded below the middle, nectariferous scale ciliated along the margin, the claw below and laterally glabrous, adorned with two bright purple spots about the size of a large pin's head, one on each side of the nectar scale within, also a few purple lines marking the base without; (three) petaloid sepals lanceolate, membranous apex convolute-acuminate, revolute, color similar to petals, but paler; filaments colored, strongly recurved against the petals, diminishing from a broad base to a fine point; anthers erect, looking inwards, more than half the length of the filament; pollen pale blue; capsule winged, ovoid; leaves linear-lanceolate, or broadly linear, twisted, erect, sheathing, two radical, bracts short linear acute.

Flowers in May and June. Specimens from Napa Valley. The first we saw was a monster of four petals, eight stamens, four stigmas, and four cells, etc. The flowers invariably open in the morning and close at four, P. M., whether indoors or out. Allied to *C. splendens*, but differs in general by its more diminutive size, truncate erose petals, nectar scale and variegations, and above all the winged ovoid capsule, which forms so close a connecting link with the genus *Cyclobothra;* in fact, the plant in general more nearly resembles this latter genus.

The following new species of *Campanula* was also presented, with the description. The specimen was presented before the Society July 16th, 1855, but the description delayed for lack of the lower leaves:

C. filiflora, (Kellogg) or Tubular Bellwort.—Stem about a foot in height, pentangular, with intermediate nerves or slighter ridges, angles minutely scabrous, alternate leaves small, less than one inch on very small petioles, ovate-lanceolate, acute or acuminate; apex entire, mucronate-dentate below, scabrous throughout.

Flowers from the axils of the leaves in trichotomous fascicles of three to nine; pedicels as long as the capsules, bracts minute subulate, at the base of each pedicel, (except the largest when it relates to the leaf). Corolla sub-filiform, tubular, one-half to three-fourths of an inch in length, sub-pentangular; throat somewhat contracted, border minutely five-parted, scarcely visibly expanded; color pale blue.

Anthers (five) included, adherent by their backs to the tube of corolla, about three times the length of the filaments, filament free, one eighth of an inch long. Style somewhat enlarged upwards, exsert in an oblique or curved direction; upper two-thirds villous, glabrous below, pale lilac above. Stigma stigmatose, three-parted recurve-spreading.

Calyx divisions, subulate glabrous; capsule membranous, inflated, whitish, marked by ten green lines on salient angles, three-celled. Seeds oblong-ovate, attached to a central fleshy receptacle depending from above.

October 25, 1858.

President in the Chair.

Dr. Kellogg exhibited a drawing of a species of *Brodiæa*, very common in this vicinity, supposed to be new.

B. terrestria, (*K.*)—Bulb similar to others of this class, of the size and general form of a hazel nut, i. e. of a flattened base, rimmed at the origin of rootlets at the flower season; outer coat dark shreddy fibrous.

Scape very short or subterranean; umbel many flowered, successively developed, radiated pedicels two to three inches long. Flowers funnel-shaped, border six-parted, three outer divisions lance-acute, three inner somewhat broader, obtuse or emarginate; stamens six, three-fertile, opposite the internal divisions, introrse sagittate; another extending a little beyond the abrupt point of the colored filament, points incurved; three sterile stamens petaloid, emarginate, mucronate, infolded, longer than the fertile. Flowers blue on the divisions; the deep blue line which streaks the elevated nerve or rigid center above, is of a greenish tinge below. Style one-fourth of an inch long; stigma three-cleft, divisions recurve-spreading, stigmatose; leaves radical, long, very narrow, so closely folded as to appear perfectly rounded (terete?) or terete-filiform, but by age or drying, opening out so as to make manifest their canaliculate character.

Specimens have often been before the Society, and no plant is more common. Our botanical curator has cultivated them for many years. If described, we have not been able to recognize it as the plant in question.

January 17, 1859.

President in the Chair.

Dr. John A. Veatch read the following paper on the occurrence of Boracic Acid in the sea-water of the Pacific.

The existence of Boracic Acid in the sea-water of our coast was brought to my notice in July, 1857. I had, in the month of January of the previous year, discovered borate of soda and other borates in solution in the water of a mineral spring in Tehama county, near the upper end of the Sacramento Valley. Prosecuting the research, I found traces of Boracic Acid—in the form of borates—in nearly all the mineral springs with which the State of California abounds. This was especially the case in the Coast mountains. Borate of soda was so abundant in one particular locality that enormous crystals of that salt were formed at the bottom of a shallow lake or rather marsh, one to two hundred acres in extent. The crystals were hexehedral with beveled or replaced edges, and truncated angles; attaining the size, in some cases, of four inches in length by two in diameter, forming splendid and attractive specimens. In the same neighborhood, a cluster of small thermal springs were observed holding free boracic acid in solution. A few hundred yards from these, a great number of hot springs, of a temperature of 212° Fr., rose up through the fissures of a silicious rock. These springs held a considerable quantity of borax, as well as free boracic acid. Many other localities furnished similar indications, but in less extensive form.

In progress of the examination, I found that the common salt (chloride of sodium) exposed for sale in the San Francisco market, and which, it was understood, came from certain deposits of that article on the sea-margin in the southern part of the State, also furnished boracic acid. I was led to attribute it to the fact of mineral springs emptying into the lagoons furnishing the salt. It was, therefore a matter of no small surprise, when on a visit to the localities, I found no trace of acid in any of the springs in the adjacent district. This led to an examination of the sea-water, and a detection of an appreciable quantity of boracic acid therein. It was at Santa Barbara, where I first detected it, and subsequently at various points, from San Diego to the Straits of Fuca. It seems to be in the form of borate of soda, and perhaps of lime. The quantity diminishes toward the North. It is barely perceptible in specimens of water brought from beyond Oregon, and seems to reach its maximum near San Diego.

This peculiarity seems to extend no great distance seaward. Water taken thirty or forty miles west of San Francisco gave no trace of acid. In twelve specimens, taken at various points betwixt this port and the Sandwich Islands, furnished me by Mr. Gulick, of Honolulu,

only that nearest our coast gave boracic acid. In ten specimens kindly furnished me by Dr. W. O. Ayres, taken up by Dr. J. D. B. Stillman, in a trip of one of the Pacific mail steamers from Panama to this place, no acid was discovered south of the Cortes Shoals.

I have not as yet been able to obtain specimens of water south of San Diego, nearer the shore than the usual route of the mail steamers. Neither have I been able to test the breadth of this boracic belt any further than the fact above stated, of no acid being found at the distance of thirty or forty miles west from the Golden Gate. I think it probable that it is confined within the submarine ridge running parallel with the coast, the southern portion of which is indicated by certain shoals and island groups. The source of the acid is undoubtedly volcanic, and the seat of the volcanic action is most likely to exist in this submerged mountain range. It strengthens the probability of the eruptive character of the Cortes Shoals.

I hope in future to be able to make more accurate and extended examinations, unless some one more capable of doing justice to the subject should take it in hand. With this view, I solicited the attention of Dr. J. S. Newberry to these facts while he was in this city, on his way to join Lieutenant Ives' Colorado Exploring Expedition, hoping he might think it worthy of investigation during his stay on this coast. With the same view, I now submit them to the Academy.

January 24, 1859.

Dr. J. A. Veatch in the Chair.

Dr. Kellogg exhibited a drawing and specimens of an *Abies*, from Fort Langley. Although closely allied to *A. canadensis* of the Atlantic slope, he considered it a distinct species.

A. bridgei, (Kellogg)—in honor of Mr. Bridges, to whom he was indebted for the specimens.

Leaves evergreen, solitary, linear-cuniform, obtuse, somewhat flattened, fleshy, slightly grooved above, ridged beneath, very minutely scabrous, serrate, petiolate, somewhat two-ranked.

Cones numerous, solitary, terminal, pendant, elliptic-ovoid, about twice the length of the leaves.

Scales about thirty or more, oblong, roundish above, concave; margin entire, thin, translucent, finely corrugate-striate on the back, base abrupt, sub-auricled, stoutly attached to the ligneous axis. Bracts three-lobed, ciliate, villous, (about one-eighth of an inch long).

Seeds (including the wing) scarcely less than the scales; wings oblong obliquely, broader at the base, somewhat suddenly narrowed

above, obtuse, laterally warped or carinated; seeds proper, ovate, light brown or drab color, uniformly marked by three minute ovate glands on the side looking towards the base of the cone.

Male aments on long stipes in sub-cylindrical capitula; the racemose clusters of three to seven, (each singly springing from a brownish scaly bud,) arranged towards the base of the coniferous branchlets, or rather *above* (speaking with reference to their natural pendent position,) thus facilitating the fructification of the cones below.

Cones about an inch long, five-eighths broad, pale cinnamon brown. The bract scales at the base of the cones, persistent, imbricate in several diminishing series; the five inner linear, membranaceous, twice the length of the second series which are broad ovate; the remainder in similar form successively decreasing. The leaves very variable in length, exceedingly numerous and somewhat plumosely scattered on the upper side of the branchlets, uniformly on petioles one-sixteenth of an inch, bright shining green above, glaucous beneath.

A tree eighty to one hundred feet in height, of dark verdure and graceful appearance; the branchlets are very villous, slender and drooping. Abundant on both north and south banks of Frazer river. The timber is firmer, finer and straighter grained than the Canadian hemlock spruce, which it represents on the Pacific Coast.

The fruit is remarkably abundant; *e. g.*, a specimen of eight inches long, has sixty cones.

The branchlets are also equally numerous, and like the Canadian spruce, it probably varies much in this respect.

April 25, 1859.

President in the Chair.

Dr. Kellogg exhibited a drawing, accompanied by specimens of a new species of *Fritillaria*, from New Idria, California; presented by Dr. Veatch, and cultivated by H. G. Bloomer.

F. viridea, (Kellogg).—Stem eight inches to one foot high, three to six-flowered.

Leaves lance-linear sub-acute; fleshy lowermost leaves in a whorl of three or four, upper alternate. (Its own proper solitary radical leaf disappearing, when of sufficient age and strength to fruit.) Radical leaf ovate-lanceolate, entire, glabrous, fleshy; about eight-nerved, slightly folding, and tapering into a short grooved petiole.

Flowers pale greenish; nectariferous portion, darker green; not spotted, somewhat translucently nerved, small, about four or five,

widely expanded, secund in the axils of the upper leaves; petals lanceolate; apex minutely villous glandular, rostrated. Three parted pistil long recurved, (one-third longer than stamens) stigmatic apex rostrated, (as in most, if not all, of our native species).

Root gregarious; the numerous bulblets, oblong acuminate; the flowering stem springing apparently from the base, without a bulb, and shooting down one or two fusiform radicals. In this respect it differs essentially from a true *Fritillaria*.

June 13, 1859.

President in the Chair.

Dr. Kellogg exhibited specimens of a new species of *Collinsia*, found by Dr. Lanszweert, in the vicinity of Oakland.

C. solitaria, (Kellogg).—Stem simple, or (rarely branched) slender, somewhat articulated, internodes at least twice the length of leaves, six inches high, minutely pubescent.

Leaves opposite; lower pair on long, slender petioles, lamina oblong-ovate or spatulate, three-nerved entire; the mature stem leaves sessile, and membranously connivent, slightly sheathing the stem, lance-linear, margins revolute, minutely pubescent, above glabrous, beneath one-half to three-fourths of an inch in length.

Calyx cleft about one-half or three-fourths the distance; segments bright green; the united sub-membranous portion below, bright purple.

Flowers axillary, solitary, on long (purple) peduncles, (one-third longer than the leaves) purple blue, tube as long as the calyx; at the base of the upper lip, at the lateral margins of the throat, are two tooth-like processes, also at the base of the lower lip—*i. e.*, two above, and two below; lowermost largest; the two shorter declined stamens pubescent on the upper surface.

Capsule spherical, half-superior.

July 18, 1859.

President in the Chair.

Dr. Kellogg exhibited a drawing and a specimen of a liliaceous plant, brought from New Idria by Dr. J. A Veatch, and cultivated by Mr. H. G. Bloomer; a plant closely allied to *Hesperescordium*, and probably new. The genus is named in honor of Dr. J. A. Veatch.

Veatchia, (Kellogg).—Flowers six-parted, persistent, articulated with the pedicel. Filaments inserted into the base of the segments, inside of a nectariferous fleshy crystalline circle or network; ovary sessile.

Veatchia crystallina, (Kellogg) Veatch's Diamond Flower.—A bulbous plant, with a scape six to eight inches in height, umbel few-flowered, flowers white, sub-campanulate rotate, with a narrow funnel-form base or obsolete tube. Stamens six, opposite the petals, rising from the mid-rib nerve at the border of the crystalline throat. (N. B. The inner petals connivent by means of a somewhat enlarged fleshy crystalline network, entirely separate from the filaments, passing outside, thus surrounding the bases, which are neither dilated nor membranous.) Anthers blue, filament attached near the base; sub-sagittate, apex recurved, segments of the perianth with revolute margins, three outer lanceolate, conduplicate-acute above, apex ascending as if cornuted; three inner proper petals ligulate, emarginate, apiculate by the terminus of the mid-rib nerve; style scarcely longer than the stamens; stigma sub-three-lobed, stigmatose, continuous with the capsule; ovary sessile, broadly pyramidal, sub-triangular, three-celled; seeds few, black and angular, similar to *Brodiæa*.

Dr. Kellogg also exhibited a drawing and specimens of a new plant of the Asphodel family, found by Dr. J. A. Veatch at New Idria, and cultivated by Mr. H. G. Bloomer, botanical curator to the Academy. For this plant a new genus is also formed.

Bloomeria, (Kellogg).—Perianth six-parted rotate, persistent, stamens six, fertile, three opposite inner petals longest, filaments separately entering a nectariferous funnel-form tube. Flowers in a simple umbel, root bulbous, solid.

B. Aurea, (Kellogg) Golden Bloomeria.—Scape slender, (one foot in length) minutely scabrous backwards along the striæ of both scape and pedicel, scape hollow.

Leaves radical, (solitary ?) fleshy, three-nerved, (the other two outer nerves indistinct or obsolete) three-eighths to one-half of an inch in width, as long as scape, margin scabrous, otherwise glabrous, narrowed and channeled towards the base.

Umbel twenty-five to thirty-flowered. Flowers deeply parted to the base, segments equal, linear-lanceolate, acute, three-nerved, sub-revolute or widely spreading; apex of the three outer divisions apiculate beaked. Filaments filiform, glabrous, included each in its respective tube, and attached to the lowermost bases of the petals, and together with the petal somewhat adnate to the base of the ovary. These

tubes are incurved at their bases; margins recurve-expanding, outer margin crenulate or entire, inner three-toothed; laterally awned, obcompressed, papillose throughout. (In general form, it may be remarked, each of the six staminal tubes resembles an awned achenia of many composites.)

Anthers (verditer blue) two-celled, oblong, affixed below the middle, apex recurved, introrse; style scarcely longer than the stamens; stigma sub-three-lobed.

The three interior membranous involucers broad-acute, five-nerved, subulate bracts interspersed, pedicels unequal, (one to three inches in length) inflorescence successive, somewhat centripetal, continuing in blossom a month or more.

This bulbous plant resembles *Calliproa lutea*, for which it is easily mistaken, especially in bud, when marked by the strong green lines on the back of the petals. It is, however, every way a more delicate plant, one of remarkable beauty; its bright golden blossoms, in lasting succession, render it worthy of the attention of florists. It was found by Dr. J. A. Veatch, at New Idria, and long cultivated by Mr. H. G. Bloomer, Botanical Curator of the Academy, in honor of whom we have dedicated it.

August 1, 1859.

President in the Chair.

L. pardalinum, (Kellogg), Leopard Lily.—This splendid native lily is considered only a variety of *L. canadense;* but we think further comparative observations made in the growing state, will prove it to be a different species. It certainly differs as distinctly from *L. pardalinum*, as that does from *L. canadense*, (of which we have never entertained a doubt). We have arrived at this conclusion from careful culture and attentive observations, for more than five years. We have specimens and drawings of both species. There is, also, a narrow-leafed variety, quite common in this vicinity—var. *angustifolium*.

L. pardalinum may be described as follows:

Leaves lanceolate, acuminate, recurved, three to five-nerved, nerves glabrous, margins somewhat scabrous, (four to five inches long, about an inch wide) colored alike deep green above and below, obscurely veiny, remotely verticillate (nine to twelve in a whorl) scattered above and below. Lower leaves spatulate obtuse, clothed with a mealy bloom.

Flowers on long peduncles, ascending in graceful curves from an obtuse angle at the stem, recurved above, stiffly nodding; one to three flowers terminating the stem, lower whorls of four to six flowers;

broadly bell-shaped petal strongly revolute ; stamens and style equal ; stigma not divided.

The color of the flowers orange in the center, with dark brown or deep purple spots ; the spots of this species larger and more sparsely distributed ; the outer half of the petal painted bright red with well defined limits.

This is a remarkably hardy and most singularly prolific lily. The annual production of bulbs is as abundant as the common potato (*Solanum tuberosum*). When boiled or roasted, they are rather too bitter to be palatable, but in this respect they do not differ from the native potato. By suitable washings, they might serve for food ; and, perhaps, by careful culture, prove a useful addition to the agricultural resources of colder climates, especially in the damp and unproductive localities of northern latitndes.

It is well known that the Chinese, among us, make use of the scales of a species of lily which they import, to a considerable extent. They are apparently very nutritive, so far as we are able to decide from the few trials we have made, having very much the flavor of the common garden bean.

Dr. Kellogg also exhibited a drawing and growing specimens of a new species of lily from the Sierra Nevada.

The bulb has been cultivated with much care during the last four years, by Mr. H. G. Bloomer, our Botanical Curator.

L. washingtonianum, (Kellogg) Lady Washington Lily.—Leaves small, (*i. e.*, about two inches long, one-half to three-eighths wide) approximate, verticillate, (in whorls of six to twelve) somewhat scattered above and below, cuneate-lanceolate, waved, three to six-nerved, nerves inconspicuous, very slightly scabrous on all parts exept the midrib, which is smooth and shining.

Stem erect, glabrous, three to four feet high, two or more flowered, on peduncles four or five inches long. Flowers patent, open, tubular funnel-form ; petals recurved from the upper third of the somewhat narrow lanceolate lamina, finally becoming revolute ; claw linear-unguiculate, (slender claw one and three-fourths inches long) deeply channeled. Flowers at first white, with barely a discernable blush of pink, turning to lilac-purple as it fades ; a few delicately shaded spots in the throat ; the three outer segments quite distinct, without any ridge or crest ; lamina plain, parallel veins or striæ regular.

The general open appearance of the flower is somewhat similar to the *L. Catesbœi*. In this respect it differs from any species or variety of California lilies. They are also remarkable for their fragrance ; having the odor of the tuberose, but more delicate.

These beautiful flowers look frankly forwards and upwards. It is

worthy of remark, that in all our specimens the three upper stamens are a little shorter, and the anthers erect; while the three lower longer filaments, have traverse versatile anthers as usual—is this a uniform feature? Style (green) exsert (one-half inch longer than stamens) stigmatose portion somewhat extending down the rounded angles—three-lobed (not parted). Capsule triangular, somewhat turbinate, sparsely verrucose, angles deeply channeled, vertical.

A dried specimen of the flower and leaf, accompanied by a figure, was presented by me before the Academy, Nov. 11th, 1854, but without a written description, our materials not being fully satisfactory. From that time to the present, we have diligently cultivated this bulb; we have also another specimen of white lily which has not yet gained sufficient strength to flower.

We have retained the common name by which this lily was first known to us. This, and most of our lilies, when cultivated, should be placed in shady localities.

August 29, 1859.

Mr. Rowlandson in the Chair.

Dr. Kellogg presented specimens of a new species of *Ledum*, brought from the Sierra Nevada by Mr. Hutchings.

L. californicum, (Kellogg).—Leaves obovoid and oblanceolate, cuneate mucronate, margins revolute, reticulate granulate, glaucous beneath, golden glands abundant; apex obtuse or sub-acute, coriaceous petioles minutely pubescent and glandular, about one-fourth of an inch in length, lamina one to two inches; mostly crowded at the extremity of the branches.

Flowers in a terminal fasciculate-corymb; peduncles filiform, minutely pubescent and glandular; ochreous bracts deciduous, lance acute, margins villous; calyx colored, (white, as are also the flowers) five-toothed, divisions minute acute, terminated by a tuft of hairs.

Petals five, distinct, spreading, oblong, sub-acute, stamens ten exsert, filaments filiform, hirsute towards the base.

A small shrub from one to two feet in height.

September 19, 1859.

President in the Chair.

Dr. Kellogg read a description of two new species of *Pentstemon*, accompanied by specimens found by Mr. Hutchings.

P. canosobarbatum, (Kellogg) or GREY-BEARDED PENTSTEMON.—Stem glabrous, glaucous fruticose(?) Leaves lanceolate cuneate at base, sharply remote serrate, short cuspidate, somewhat recurve spreading, petioles short, (radical leaves unknown). Peduncles one to three-flowered, scarlet or red.

Calyx segments equal, ovate-lanceolate, very slenderly acute.

Corolla colored, tube short, (as in *P. breviflorus*) one-fourth of an inch in length, about one-third longer than the calycine segments; resupinate(?) Upper lip three-lobed, vertical or slightly reflexed: lesser middle lobe lanceolate acute, lateral ones obliquely broader or rhombic lobes, bearded externally; lower lip slightly two-notched, horizontally somewhat ascending carinate, densely bearded below, mostly at the extremity, with white or long transparent frosted hairs.

Sterile filament short, naked, somewhat erect, villous at the base. Style longer than the stamens. Stigma simple, slightly capitate. Stamens exsert, anthers glabrous. Filaments geniculate at the base, flattened below the prominent angle, margins of the expanded base villous, glabrous above from the angle, ascending in a corresponding curve with the lengthened lower lip.

P. rostriflorum, (Kellogg).—Stem glabrous, somewhat ancipital by the decurrent mid-ribs of the leaves.

Leaves linear-lanceolate, entire, sessile mid-rib sharply prominent, decurrrent erect or sub-spreading. Peduncles two-flowered, (rarely more than one fully developed) glandular, second ascending, as long or longer than the leaves. Bracts minute. Calyx lanceolate attenuate-acuminate, lower segments scarcely longest, acuminate, glandularly villous, villi very minute.

Flowers tubular, (nerved) creamy yellow, one inch in length, tube three-fourths, refracted, not ventricose; minutely glandularly villous externally, mostly at the lips; upper lip longest, staight, somewhat vaulted, two notched; lower lip two-lobed, lobes linear acute.

Stamens nearly equal, two longest of the length of the flower, inserted at the lowermost margin of the tube, declined ascending above, thickened and compressed at the base; shorter pair, with the fifth inserted into the tube one-eighth of an inch above the base; fifth filament shorter than the stamens included in the upper lip, glabrous.

Style about the length of the stamens.

September 26, 1859.

President in the Chair.

Dr. A. Kellogg read the following paper on new genera and species of plants, found by Dr. John A. Veatch, at Cerros Island.

Rhus lentii, (Kellogg). Stem stoutly branched, leafy, the younger branches somewhat angled.

Leaves ovate, or sub-acute, (one to one and one-half inches long) alternate, petioles about one-eighth to one-fourth of an inch in length, quite entire; margins rounded, corneous, pinnate veins imbedded in the thick coriaceous lamina. Leaves pale dull velvety glaucous, and minutely short pubescent above; densely white hoary villous beneath.

Flowers in terminal open compound panicles, peduncles and pedicels one eighth to one-fourth of an inch long, hoary, short hirsute. Calyx segments 5, ovate, sub-acute, both surfaces hirsute, thick carinated; margins thinner, translucent, very villous. Petals five, ovate, both surfaces short hoary hirsute, hairs longer towards the inner base of the short claw. Stamens five, glabrous, inserted into the conspicuous crenated torus, or smooth fleshy disk. Style one, hirsute, stigma two-parted, sub-capitate about equal.

Fruit large (about ½ an inch in breadth), rhomboid, compressed, the drupe somewhat fleshy, densely clothed with red acid hairs.

This species closely resembles *R. laurina* of Santa Barbara and its vicinity. Our specimens from that locality, however, have dentate varnished leaves with very prominent veins, and of a different form; also crowded axillary and terminal panicles; flowers in *R. lentii* larger, 3 or 4 times the size. Calyx bright scarlet, quite ornamental; petals of a lighter tinge, about twice the length of the calyx; flowers perfect.

This species of *Rhus* would be considered by some authors as a *Malosma*, or more properly *Lithræa* of Miers, an originally Chilian genus.

Linosyris Dentatus, (Kellogg).—Stem two to three feet in height, suffruticose, light and hoary.

Leaves crowded and fasciculate, cuneate-spatulate, sessile, 3-nerved, cut-serrate, mostly at the rounded sub-acute apex, remote or entire towards the base; teeth very sharp, with a horny mucro, pruinose ciliate near the stem, scabrous above and below.

Flowers at the extremity of the leaf branches, in compound clustered sub-capitate corymbs, the corymbose subdivisions somewhat umbelletiform, or three or four pedicels springing from a common point, with lance-linear bractoid involucels surrounding the common base. Heads twenty to twenty-five-flowered, obovoid.

Scales of the involucre numerous, unequal, imbricated in five or six series, outer short, oblong-lanceolate brownish tips, glandular on the back; margins thin scarious; apex acute, dentate, carinate; inner scales linear membranaceous, longer than the disk. Receptacle alveolate toothed.

Achenia oblong, silky villous, angled base; pappus copious, unequal, scabrous or plumose hirsute.

Corolla infundibuliform, on a slender tube; teeth glabrous, about one-fourth of the length of the tube; anthers equal or exsert by their white villous appendages. Style included, brownish purple; appendages shorter than the stigmatic portion, oblong-ovoid.

A new genus is proposed, founded upon a remarkably ornamental shrub, belonging to the natural order, Scrophularinæ.

Saccularia, (Kellogg).—Calyx five-parted, ovate-oblong, acute, quincuncial estivation. Corolla tubular, bilabiate; tube elongated, sub-cylindrical, saccate below at the base; upper lip erect; lower lip spreading. Stamens four, fertile, didynamous, without any rudiment of a fifth; throat mostly naked; style filiform. Stigma undivided as in Pentstemon, simple or lobed. Capsule globose, slightly depressed, and compressed, ventricose somewhat obliquely; each cell opening by an irregular eight-toothed orifice, near the apex. Seeds numerous, oblong truncate, small; testa ribbed lengthwise, deeply chinked; surface of the elevations irregular or toothed, dark brown. Seeds attached to a roundish rugose-pitted placenta, which is involved, and fixed by the complete and permanent dissepiment.

S. Veatchii, (Kellogg).—Stem suffruticose, with myriads of slender, twiggy rods, of nearly uniform size, very straight, bright green or glaucous, glandularly villous and somewhat canescent above; branches ternate and opposite; erect, terminal twigs; frequently constricted at the bifurcation.

Leaves verticillate by threes or opposite, lanceolate, mucronulate, acute; a mucronate gland at the apex; short petioled, or subsessile, entire, hirsute above at the base, glandularly villous on the lamina above, densely glandularly hirsute below; small, (one-sixteenth to half an inch long) very remote.

Flowers in elongated terminal racemose panicles, (six inches to a foot in length) whorled in threes; a bract (or leaf) at the base of each pedicel; pedicels filiform, erect, ascending, bent above, one-flowered; lower pedicels longer than the flower; upper about half as long.

Tubular flowers about one to one and a quarter inches in length, minutely glandular villous externally; upper lip erect, notched, reflexed at the sides, glandular villous within; lower lip recurve-spreading somewhat trifid, lateral portions shorter or sub-equal, middle lobe rounded, obtuse, folded under, bearded above with glandular hairs; a broad line of short stipitate or papillose glands, extends back from the middle lobe to the base of the tube; throat otherwise naked.

Style filiform, glabrous, persistent; stigma simple, acute (minutely

stigmatose at the point) included, or sub-exsert; filaments filiform, glabrous, and slightly thickened above, flattened, and glandularly villous along the base; anthers very small, glabrous, lobes divaricate.

This remarkable shrub appears to be closely allied to *Galvezia* of Dombey. As at present defined, it however differs in the style, not being thickened at the top, nor emarginate; neither is the stigma two-lobed. Other points of difference of less importance readily suggest themselves, which must be our apology for distinguishing it from that Peruvian genus.

This singularly sociable shrub, in general appearance, somewhat resembles an *Ephedra*—thousands of straight, apparently leafless twigs, of almost uniform stems, spring up from a common base to the height of four or five feet, banded together in exceedingly dense, impenetrable groups of two to four feet in diameter. The trim green twigs are at all times ornamental and attractive by their singularity; but when in full bloom, the innumerable long, outward curving branches laden with long, scarlet blossoms, thick, proudly pouting lips and pretty spurs, must render it an object of rare beauty. When fully known, and properly appreciated, we shall expect to see it zealously sought after by the ornamental gardener and florist.

Diplacus stellatus, (Kellogg).—Stem shrubby, erect, striate, stellate, hoary, dry. Leaves lanceolate, narrowed at the base and apex, quite entire; margins revolute, clammy, varnished, green above dry, densely stellate and hoary beneath; apex terminated by a large gland.

Peduncles short, axillary, solitary (about half the length of the calyx, or one-fourth that of the leaves).

Calyx tubular, elongated, (three-fourths to one inch in length) five-angled, angles slightly winged, teeth unequal, two upper longest.

Flowers small, tube long, (one inch or more) somewhat arched.

Stem light cinnamon or orange color.

Marah minima, (Kellogg).—Stem herbaceous, filiform, angular, scabrous along the angles. Tendrils two-parted.

Leaves palmate, cordate-sinuate, three to five-lobed, (seldom cordate-angled) one to two inches in diameter, on scabrous petioles, about the length of the lamina; upper and lower surfaces studded (dotted?) with minute circular siliceous bullæ, or somewhat shagreen scabrous, minutely repand toothed.

Sterile flowers in compound racemes, two to three inches in length, from the same axils as the fertile, greenish white, campanulate-rotate, border five-parted, calyx teeth minute or obsolete.

Fertile flower on a long stipitate tube; calyx segments minute, acute or subulate; stigma with globular lobes obliterated.

Fruit minute, (quarter to half an inch in length) echinate, (prickles very stout, with a broad base) oblong, tapering to either extremity, often somewhat obliquely inflated, greenish, marked by darker green lines running back from the acuminate apex, two-celled, longitudinal dissepiment complete, about two seeds in each cell, attached laterally to the infolded margins of the dissepiment or parietal.

Seeds erect, or sub-imbricate, ascending, fruit bursting at the apex, forming a double orifice by the strong marcescent, persistent dissepiment and parietes.

Seeds black, rough, warted, warped, oblong, flattened, somewhat truncate above, tapering towards the base, margins obtuse.

In general size and outline, the seeds resemble a grape or raisin seed.

The form of the fruit, foliage, etc., resemble the *Marah muricata*.

Arctostaphylos veatchii, (Kellogg).—Leaves oblong, obtuse or subacute, and acuminate, bony mucronate; margins entire or repand, scabrous, dentate, revolute, membrano-coriaceous, somewhat varnished, green, reticulate, wrinkled, sparingly short frosty villous above, densely short lanate frosty hoary (white) beneath, feather veined, hoary; petioles one-fourth to half an inch in length.

The tender branchlets of the season also hoary.

Racemes terminal, (or only lateral by subsequent growth) stout, rough, irregularly sulcate, naked, erect, berries large, (size of the largest peas).

Flowers unknown.

The pubescence, it may be remarked, has a granular appearance.

Pentstemon cerrosensis, (Kellogg).—Stem suffruticose, branching below, glabrous, glaucous.

Leaves coriaceous, somewhat corrugate or bullate, glaucous above and below, quite entire, lanceolate and ovate-lanceolate, obscurely three-nerved, apex recurved, mucronate, lower leaves on decurrently thickened petioles (about one inch in length), base clasping, a connate ring encircling the stem, decussate, densely crowded near the base; upper leaves sessile, clasping, cordate lanceolate.

Peduncles short, stout, mostly two-flowered. Secund bracts minute, recurve, lance-ovate.

Calyx divisions ovate-lanceolate, acuminate, stoutly indurate, mucronate striate, and distinctly three-nerved.

Corolla tabular, somewhat obliquely ventricose downwards, slightly curved or carinate ascending, border five-notched, divisions sub-equal, very short, throat naked, contracted, yellow.

Stamens glabrous throughout, two or more stamens, (when not

inserted into, and thence decurrent along the tube), attached to the lower margin of the tube, flattened at the base.

Style sub-equal, persistent, simple, glabrous, fifth filament short, declined, glabrous, somewhat clavate.

Capsule conic, two-celled, four-valved, seeds black and angular.

Dr. Kellogg presented a specimen of *Calliproa* from Mariposa, which differs from *Calliproa lutea* in many respects, and it is thought may prove a new species.

Caurantea, (Kellogg).—Scape striate, regularly scabrous backwards along the striæ, six to eight inches in height.

Umbel about twelve-flowered—peduncles (two to three inches in length) striate, with transparent scabrulous elevations, also hooked backwards.

Scarious involucres variable, about six in two series—three outer longest lance acute, conspicuously three to five brown nerved.

Perianth obconic funnel-form, limb scarcely longer than the pointed tube, three outer segments lanceolate-acute, apex slightly rostrated on the back; the three inner lanceolate-ovate emarginate; segments marked by a strong green line along the back, extending down to the acutely pointed base of the tube (under the glass) consisting of two parallel veins. Stripe or pedicel of capsule over one-fourth of an inch in length.

Bulb and leaf unknown.

October 2, 1859.

Dr. J. A. Veatch, in the Chair.

Dr. Kellogg read descriptions of the following plants brought from Cerros Island by Dr. J. A. Veatch.

Rhamnus Insulus, (Kellogg), Cerros Island Buckthorn.—Branches neither spinescent nor thorny, light spotted gray bark, wood white, young branchlets with peduncles and petioles minutely villous.

Leaves sempervirent, thin, lucid, membranaceous, prominently reticulated lamina, finely pinnate veined; colored nearly alike above and below, rigid, oval obtuse, repand-mucronate dentate; the scabrous-like teeth somewhat hooked backward, glabrous and shining above and below, small (one-half to three-fourths of an inch long) on short petioles (one-tenth of an inch).

Fruit axillary, solitary, obovate, greenish black, invariably two-seeded, on peduncles twice the length of the petiole.

The specimen is without flowers, but appears to be new. We have also another from Clear Lake, probably undescribed.

Simmondsia pabulosa, (Kellogg), Goat Nut.

Descriptive Note by Dr. Veatch.—An evergreen bush, or shrubby tree, from three to six feet in height; growing in the ravines as well as in the crevices and fissures of nearly perpendicular cliffs. Trunk remarkably crooked, with short, zig-zag, joint-like bendings. Bark smooth and whitish. Branches spreading horizontally from the summit; much entangled and partaking of the character of the stem. Foliage dense and green; leaves and young twigs somewhat succulent. The top presents something of the appearance of a huge bunch of mistletoe.

Fruit generally abundant, ripening in July and August; has the taste of a chestnut, with a slight bitterness.

The goats and deer of the island are exceeding fond of both the fruit and leaves, and seem to live mostly upon them.

The shrub is ornamental, and deserves to be cultivated for its beauty as well as for its fruit. The barren spots in which it thrives would suggest its usefulness upon some of the barren and bleak hills of Upper California, which are worthless from their strong and arid character, but which might be valuable when planted with the *Simmondsia*.

Specific Characters.—Branches opposite, nodose, greyish; branchlets somewhat angled, greenish hoary, hirsute.

Leaves opposite, oblong-ovate, ovate-lanceolate, sub-mucronate, obtuse, and often a few leaves obovate-emarginate, somewhat cuneate at base; pale glaucous green above, fleshy, coriaceous, inconspicuously three-nerved in growing state; rigid wrinkled, often ochreous beneath when dry, hirsute above and below; sharpened entire margins, slightly scabrulose, on very short glandless hirsute petioles; lamina varying from one-half to one and one-half inches in length.

Sterile flowers numerous in axillary dichotomous panicles, shorter than the leaves, seldom sessile and solitary, or in small glomerules; common and particular pedicels bracted, each separate flower with a minute ovate hirsute bract scale at the base. Petals imbricate, greenish, five in number, unguiculate, carinate; apex obtuse, inflexed ciliate, somewhat erose-dentate, spreading, slightly villous within, hoary villous hairs without, glandless; stamens mostly ten, shorter than the petals.

Filaments shorter than the anthers, subulate from a broad base, somewhat clustered in parcels of three or more, or imperfectly monadelphous, anthers erect, two celled, opening longitudinally.

Calyx divisions five, increasing in size as the fruit attains to maturity, the apex of the lobes often elongating to one-half or three-fourths of an inch, erect or recurved, usually from two to four small scales in a lower series, quincuncially imbricated.

Capsule a dry chartaceous nut, in a leafy cup, similar to a hazel nut, obtusely triquetrous; in appearance beaked like an acorn, with three persistent, sub-capitate styles, three-celled, three-valved, opening in three-divisions at the ventral suture, by abortion one-seeded, three-filiform placentas rising from the axis of the calyx recurved at the apex to which funicle the ovule is attached or suspended—the perfected ovule is obtusely triangular-conic, apex pitted, grooved down the angle adjacent to the placenta to the truncate base, hazel brown, sparsely hirsute.

Delphinium flammeum, (Kellogg), OR FIERY LARKSPUR.—Stem simple, one foot to eighteen inches in height, hirsute, with white somewhat appressed hairs throughout, raceme few-flowered, petioles slender, dilated at the base, digitately five-parted, lobes attenuate cuneate, trifid, divisions long linear-subulate. Spur long and slender, undulate, subulate, apex ascending, (about one inch, or twice as long as lateral sepals) bright scarlet; two upper appendiculate, spur-included, petals yellow; lamina two lobed, upper lobe narrow elongated, recurved, tipped with pink, one-nerved along the lower margin, erect, lip or limb of the spur ovate, sub-acute, lateral sepals obovate, obliquely expanded, claws about five-nerved; two lower petals relatively very small, obliquely oval, two-cleft, glabrous unguiculate.

Capsules three, naked; stigma two-toothed, somewhat unequal teeth.

Bracteoles subulate, approximate to base of the flower; flower sparsely hirsute externally, glabrous and naked within.

October 10, 1859.

President in the Chair.

Dr. Kellogg read descriptions of the following new plants discovered by Dr. J. A. Veatch at Cerros Island.

Staphylea geniculata (Kellogg).—Stem short, erect, about a foot or two in height, much branched, with rather slender, crooked ramifications. The whole shrub presents a singular and interesting appearance, and not unattractive for its beauty. It was found growing in sandy ravines, near the sea-shore, on the east side of the Bay of San Sebastian Biscayno, nearly opposite the guano island of Elide.

Leaves alternate, opposite the cymose-panicles, and sometimes soli-

tary peduncles ; the basilar branch leaves obcordate, or obovate-emarginate, sub-cuneate ; upper leaves mostly ovate on short petioles ; stipules deciduous. oblanceolate about twice the length of the petiole, or minute linear lanceolate ; one-sixteenth to one-fourth in length ; lamina dry and thin, pale yellowish green, margins entire, veins prominent, clothed with a dull, hoary, short pruinose pubesence above, and beneath, a few pellucid dots.

Flowers unknown.

Fruit, a membranaceous inflated, three to six-celled, (usually four to five) united capsule, in outline ovate-elliptic, pointed by the rigid styles more or less adjoined, as also are the capsules their whole length, readily and freely dehiscing along the ventral suture, separating from the central axis at the base first, and retained only by the attachment of a pair of fibres from the placental column adherent to the pistilate apex of each valve. Seeds two in each cell, centrally suspended, the upper ascending, black, ovate, pointed, arillate.

Capsules, solitary, in pairs, verticillate and in panicles on articulated peduncles or pedicels, about half an inch in length ; common peduncle stout, branch-like, about two inches long.

Our specimens agree in the most essential points with the description of the natural order *Staphylaceæ*, in Gray's Genera, but not with De Candolle's tribe. When carefully examined, this plant will probably, with some others, require new genera to be instituted. We regret not having complete specimens, in order to make the description more complete.

Teucrium glandulosum, (Kellogg,) or Glandular Bugle, or Germander.—Stem suffruticulose, many straight stolons from a knotty crown of the root ; branches whorled below, opposite above, erect, quadrangular, elevated angles truncate-planed ; stem striate minutely glandular, with glistening glands of a golden hue ; one to two feet in height.

Lower leaves opposite, sessile, narrow lanceolate, pinnatifid-lobed or remotely divaricate-toothnd, base cuneate three-nerved, triplinerved above. Upper branch and floral leaves lance-linear, sessile three-nerved, rarely a few remote cut divergent teeth, pitted glandular above, densely prominent glandular beneath.

Peduncles opposite, axillary, solitary, angular, scabrous backwards along the upper angles, declined and ascending, about a third shorter than the leaves.

Calyx campanulate ; tube somewhat turbinate, resting on a minute ten-nerved capitulum of the peduncle, membranaceous, reticulate,

glandular, scarcely scabrous, ten-nerved, five-cleft; segments subequal, lance-pointed sharply corneous acute, three-nerved; the two lateral nerves marginal, uniting into one at the bifurcations.

Flowers bilabiate; upper lip very short, emarginate, included; lower lip trifid, middle lobe elongated, expanded towards the apex, or somewhat oblong obovate, sub-entire; lateral lobes oblong divaricate, intermediate declined ascending; throat and lip villous within, glandular without, striate beneath. Below, at the base of the long stamens, a pubescent ring nearly encircles a little pit or cavity with a dark colored *mons* in front. Filaments bearded laterally at the base, especially the lower longest pair. Stamens exsert, ascending from the upper cleft, and recurved towards the lower lip. Anthers glandular, reniform, confluent. Style equal; stigma deeply bifid; lobes equal, subulate. Flowers blue.

Achenia four, naked, oblong, sub-triangular, outer angle rounded, inmost angle warted towards the slightly narrowed base; apex obtuse, hirsute, covered with glands.

Rhus veatchiana, (Kellogg,] Elephant Sumac.—Leaves alternate, oddly pinnate; if from the older branch buds, in the condensed fascicles of three to six; leaflets opposite in about six pairs, small [one-eighth to one-fourth of an inch in length]; these lateral leaflets sessile, ovate sub-acute, obsoletely serrate towards the apex [with relatively large rounded teeth], terminal odd leaflet obovate, cuneate, three or more cutlobed, or tridentate; velvety, hoary villous, with appressed hairs above, somewhat silvery hoary beneath [leaves about an inch long, the common petiole occupying about one-fourth its length.]

Flowers very numerous, in closely clustered, oblong, fasciculoid panicles occupying the terminal portion of the rigid branchlets; pedicils filiform, attenuate below, enlarging upwards to the continuous calyx; very villous, minute subulate bracts at the base of the pedicels [pedicels three-eighths to one-half an inch long]. Panicles bright red. Calyx five parted, membranous, bright scarlet, hirsute with white hairs, a few red glandular hairs intermixed; segments ovate acute [about one-third the length of the petals]; petals five-imbricate, membranous, paler red, a brighter line along the midrib, oblong-ovate acute, somewhat carinate, apex slightly incurved [texture translucent reticulate] hirsute mostly along the prominent midrib on the back.

Stamens ten [seldom eight] inserted upon the scarlet cupped disk under the ovary; introrse anthers two-celled, opening together; stamens very short, white; anther glabrous, fillets colored villous at base, shorter than anther. Disk deeply five-lobed, the five stamens opposite the lobes longest.

Pistils three to five, three [occasionally four fertile] capitate, hirsute, ovary very villous.

A very remarkable species, closely allied to the natural order *Sapindaceæ*.

The specific name we give in honor of Dr. J. A. Veatch's son, Mr. A. A. Veatch, a worthy gentleman, to whose ardent zeal and enterprise in the cause of natural science we have been frequently indebted.

October 17, 1859.

President in the Chair.

Dr. Wm. O. Ayres presented the following paper on new fishes of this coast:

Sebastes nigrocinctus, [Ayres].—This species is very closely allied to *S. fasciatus*, Grd. and is most readily defined by stating its points of difference from that type.

The supra-orbital spines are much less regular, the posterior being merely a thin, angular ridge, having, between it and the occipital spine, a thick, blunt tubercle. The intra-orbital space, which is free in *fasciatus*, is occupied by a pair of longitudinal, thin, angular-topped ridges, terminating in a pair of slender tubercles, on a line with the blunt post-orbital pair. The preopercular, opercular and scapular spines are very similar in the two species.

The extremity of the maxillary scarcely reaches the line of the anterior border of the orbit.

The length of the anal fin is less, being contained three times in the length of the side of the head.

The undivided rays of the pectorals are in *fasciatus* free for some distance at their tips; in *nigrocinctus* the same rays are very slightly free.

In color the two species are entirely unlike; *nigrocinctus* is of a plain reddish yellow, crossed by five to six strongly marked, well-defined, nearly vertical, broad black bands. The head has commonly a black band from the eye upward and backward, and another from the eye downward and backward.

The accessory scales are as in *fasciatus*.

D. XIII, 15, A. III, 7, P. 9, 10, V. 1, 5, C. 4, 1, 6, 6, 1.

This species is by no means common. I have seen but three in San Francisco in six years. The largest was not quite fourteen inches in length.

Sebastes helvomaculatus, [Ayres].—This species is readily distinguished by its colors. It is red, but the red is commonly paler than that of *S. rosaceus*, while each side is marked with three oblong pink spots; one near the end of the dorsal fin; another opposite the anterior part of the soft portion of the dorsal, and near the dorsal outline; and the third a little more remote from the dorsal outline, and about opposite the commencement of the last third of the spinous portion of the dorsal fin. These spots are quite constant, and furnish a good specific character. The length of each equals about half the diameter of the eye. In a few instances a fourth spot has been seen.

The accessory scales are not numerous.

In form, and in the spines of the head, this fish somewhat resembles *S. auriculatus*. The head constitutes one-third of the entire length, the length of the head being decidedly greater than the depth of the body. The length of the eye is a little more than one-fourth of the length of the head. The length of the anal fin is about two-thirds that of the soft portion of the dorsal. The termination of the caudal is nearly square.

D. XIII, 13, P. 8, 9, V. 1, 5, A. III, 6, C. 4, 1, 6, 6, 1, 4.

S. helvomaculatus is not very rare; within the last year it has been brought to the markets in San Francisco in considerable numbers. It rarely exceeds ten inches in length.

Sebastes elongatus, [Ayres].—This species is readily distinguished from the others of the genus occurring in our waters, by its much more slender form, the greatest depth being a very little more than one-fifth the total length. The length of the head is not quite one-third the length of the fish; the longitudinal diameter of the eye contained four times in the length of the side of the head.

The spines of the upper surface of the head are acute, but not strongly developed; those of the opercular pieces larger than in most of the species.

Dorsal fin arising a little in advance of the termination of the operculum; the length of the spinous portion double that of the soft; the greatest height of the spinous and soft rays about equal.

Anal terminating a little anteriorly to the line of termination of the dorsal, its length half that of the soft portion of the dorsal.

Pectorals in height equaling half the length of the dorsal; the undivided rays widely free at their tips.

Accessory scales not very numerous.

Maxillary reaching the line of the posterior border of the pupil.

In color this fish is of a light yellowish brown, with the back and upper portion of the sides marked with numerous blotches of blackish brown, so arranged as to form an irregular system of longitudinal

dark bands. The lateral line lies in a well marked band of the light ground color, formed by a dark border above and below.

D. XIII, 13 P. 9, 8, V. 1, 5, A. III, 6, C. 4, 1, 5, 5, 1, 4.

S. elongatus can be by no means common in this vicinity, being seldom seen in the markets. The largest have been but little over twelve inches in length.

Anoplopoma merlangus, (Ayres).—This fish, for which a new genus becomes necessary, presents a singular grouping of characters. It has the general appearance of the *Gadidæ*, in fact resembles the Pollock so closely as to suggest at once the specific name adopted, but it has really no relation whatever to that family. It has the soft, minute scales, and the smooth appearance of skin of the *Scombridæ*, but the vertical fins are scaly, and the air-bladder is well developed. It has the scaly vertical fins of the *Sciaenidæ*, but lacks their peculiar contour of head, and is provided with teeth on the palatines and vomer. It has the suborbital prolonged so as to reach the limb of the preoperculum, thus resembling the *Heterolepidæ*, but the dorsal fins, the form and structure of the anal, the position of the ventrals, and the nature of the teeth, exclude it from that family. It differs from the *Percidæ* in its general smoothness of appearance, the feebleness of the spines of the first dorsal and ventrals, and the scaling of the vertical fins. It belongs, however, to this family, and approaches perhaps more closely to *Stizostedion* than to any other genus. Its generic characters may be thus stated:

Anoplopoma, (Ayres).—Head and cheeks almost destitute of spines. Scales small, inconspicuous, ciliated, covering the entire body and head, and ascending upon the caudal, second dorsal, anal, and pectoral fins. Teeth even, numerous, small, on both jaws, palatines, and front of vomer. Branchial apertures not continuous under the throat. Two dorsal fins, remote; rays of first dorsal feebly spinous. Ventrals posterior to the pectorals.

A. merlangus presents the following features:

Form elongated, slender, slightly compressed. Head forming a little more than one-fourth of the entire length. Greatest depth equaling one-sixth of the length. Border of the preoperculum feebly crenated, sometimes quite smooth; operculum ending in a flat point, not spinous. Scales minute, ciliated, but feeling entirely smooth.

Dorsal fins equal in height, separated by an interval a little less than their height. The first is one-fourth as long as the fish; the second, three-fourths as long as the first.

Anal, opposite the second dorsal, entirely resembling it it in form and size.

Caudal crescentic; accessory rays very numerous.

Teeth of nearly uniform size in all parts, slender, acute, hooked, arranged in a double row on the sides of the jaws, more crowded in front, as they are also on the vomer and palatines.

Color plain greenish brown above, becoming lighter beneath; fins of corresponding hue.

D. XXIII, 17, P. 17, A. III, 14, V. I, 5, C. 10, 1, 7, 6, 1, 10.

A. merlangus appears to be quite rare, occurring in the markets of San Francisco only as stragglers. The largest specimen yet observed was eighteen inches in length.

Stereolepis gigas, (Ayres).—This fish, with the general appearance of the *Sciænidæ*, and especially their peculiar fins, is yet separated from that family by the teeth on the palatines and vomer. It is in fact a *Percoid*, and not very remotely related to *Dioplites*. It is of a new generic type, which may be called STEREOLEPIS, AYRES.

GENERIC CHARACTERS.—Scales small, very hard, ciliated, covering the body, the cheeks, and the lower parts of the second dorsal, anal, pectoral, and caudal fins. Two dorsals, remote; the first with very stout spinous rays, lower than the second; the second with thick, fleshy membrane. Anal similar to second dorsal. Ventrals beneath the pectorals. Teeth exceedingly numerous, crowded, very fine, in both jaws, and on the palatines and front of vomer. Operculum and preoperculum, without spines or serrations. Branchial apertures not continuous beneath.

The species on which this genus is founded, is remarkable for the great size which it attains. Two specimens have been brought into the market, having been taken in the Bay of San Francisco, one in 1857, the other in 1859. The former measured five feet, eight inches in length, with a weight of one hundred and eighty-seven pounds; the latter was seven feet long, and weighed three hundred and sixty pounds. They were evidently stragglers in our waters. There is reason to believe that below Point Conception they are found in some numbers, becoming perhaps common on the coast of Lower California.

Form compressed, robust; greatest depth about one-third the total length. Head large, forming one-fourth of the whole length. Mouth quite large, but oblique, the maxillary only reaching a line even with the anterior border of the orbit.

First dorsal of nine, very stout spines, its length equaling about one-fourth of the length of the fish, its height one-fourth its length.

Second dorsal not quite half so long as the first, from which it is distant half its own length. Fin trapezoidal, sloping backward, thickened at base; scales ascending, membrane so thick that the rays are enumerated with difficulty.

Caudal very large and strong; its breadth, when expanded, being one-third the length of the fish.

B. 7, D. IX, III, 8, P. 19, A. II, 7, V. 1, 5, C. 3, 1, 6, 6, 1, 3.

Squatina californica, (Ayres).—This species appears to be by no means common. But a single specimen has yet been observed, which was taken in the Bay of San Francisco, September 22, 1857. It measured thirty-nine inches in length.

The principal points in which it seems to differ from its congener of the Atlantic coast, *S. Dumerili*, are the form of the orbits, the form and number of the teeth, the size and form of the pectorals, the form of the ventrals and of the dorsals.

Breadth as compared with the entire length, across the pectorals, about three-fifths; across the widest portion of the ventrals, a little less than one-third; of the body at its junction with the head, one-fourth.

Eyes small, orbits not elevated, nor any tubercles manifest upon them.

Distance from the anterior border of the head to the point of attachment of the pectorals, equal to the breadth of the head at the line of the spiracles, but the free border of the pectorals extends forward about half this distance, forming the pectoral fissure in which are the branchial apertures. Posterior flap somewhat shorter, and not provided with a notch on its inner border. Entire length of the pectorals, a little more than one-fourth the length of the fish.

Ventrals arising on a line with the posterior border of the pectorals, increasing in width for rather more than a third of their length, and then tapering to a point a little posterior to the origin of the first dorsal. Their free flap comprises almost their entire posterior half.

Dorsals alike in size and shape; the first arising at the commencement of the posterior third of the fish; its length of attachment equal to the distance from the eyes to the anterior border of the head, its height equal to the distance between the eyes; the tip of the first not quite reaching the origin of the second.

Teeth small, acute, broad at base, rapidly narrowing; arranged in five to six rows, each row containing nine to ten teeth. Teeth in the two jaws very similar.

Color above greyish ash, marked more or less distinctly with small whitish spots; the membranous fringe bordering the head, white; all below, white.

Hippoglossus californicus, (Ayres).—Form elongated, greatest depth equal to one-third of the entire length. Head small, its length forming one-fifth of the length of the fish. Mouth large, the angle of the maxillary reaching a line posterior to the orbits. Teeth in a single

row in each jaw, slender, sharp, curved; about thirty in the upper jaw, and forty-six in the lower. Eyes on the left side; distance of the upper from the snout, equal to one-fourth the length of the head; distance between them, one-sixth the same length.

Dorsal commencing a little anterior to the upper eye, with its greatest height (which is one-third the length of the head), at about the middle of its length; the interval between it and the caudal, equal to the height of the fin.

Anal arising a little posterior to the line of the pectorals, and distant by a space equal to its own height from the origin of the ventrals. It reaches its greatest height, which equals that of the dorsal, at about the twelfth ray; it is coterminal with the dorsal.

Caudal concave posteriorly; its breadth when expanded equaling one-fourth the length of the fish.

D. 70, A. 55, P. 15, V. 6, C. 4, 1, 6, 7, 1, 4.

Color plain greyish brown above; white beneath.

This manifestly is a true *Hippoglossus*, though the eyes are on the left side. It is a very distinct species; the head and the fin-rays give of themselves sufficient distinguishing characters.

It appears to be by no means common in this vicinity. A few have been taken at intervals in the Bay of San Francisco. The largest were a little over four feet in length.

Another species, in which the eyes are on the right side, is occasionally taken near the Farallon Islands, opposite the mouth of the Bay, which I do not feel warranted in separating from *H. vulgaris*, without a direct comparison of the two. Its fin-rays are D. 102, A. 73, P. 16, V. 6, C. 4, 1, 7, 8, 1, 4.

It appears to be seldom quite as large as *H. californicus*.

Muraena mordax, (Ayres).—Form elongated, almost cylindric anteriorly, becoming very much compressed toward the tail. Greatest depth contained not quite fourteen times in the total length. Head pointed anteriorly; lower jaw a little the longer. Gape of the mouth backward equal to the depth of the body at the origin of the anal fin.

Teeth largest in front, sharp, slightly curved backward, arranged in a single row in each jaw and on the palatines, with one or two large ones on the anterior part of the vomer.

The eye is situated at the distance of twice its own longitudinal diameter from the snout, which distance equals half the gape of the mouth.

The opercular slit, whose length is about equal to the longitudinal diameter of the eye, is distant from the snout by a space twice as great as the gape of the mouth.

The dorsal and anal fins, which are continuous around the caudal extremity, are enveloped in so thick a membrane, and have so little

elevation as to seem not much more than fleshy ridges except at their extreme posterior portions. The origin of the dorsal is at about the commencement of the second third of the fish in length; that of the anal is directly behind the anus, very nearly at the median point in length. The fin-rays cannot be enumerated.

In color, this fish is almost throughout of a very dark greenish black, with fine linear short mottlings of a lighter shade.

M. mordax was brought from Cerros Island by Dr. Veatch, and is stated by him to be not at all uncommon there. Its very savage habits of biting and plunging at any object approaching it, have suggested the specific name. It grows to the length of four and a half feet.

Orthagoriscus analis, (Ayres).—Form much compressed, the greatest depth equaling about five-ninths of the entire length. Dorsal outline arching from the snout as far backward as the eye, and thence nearly straight to the dorsal fin. Abdominal outline nearly similar to the dorsal. Distance of the eye from the snout contained a little more than three times in the greatest depth.

The dorsal fin, situated at the posterior extremity of the body, has a length equal to the distance from the eye to the snout; the anterior and posterior borders of the fin are nearly parallel; its height a little greater than its depth.

The anal fin, opposite the dorsal, and with about an equal length of base, has a height a little less than one-third the length of the fish.

The caudal fin, continuous with both dorsal and anal, has its border rounded very evenly; its height at the middle about equaling the length of base of the dorsal.

The distance across the body from the tip of the dorsal to that of the anal, is a little greater than the length of the fish (thirty-two inches in a fish of twenty-eight and a half).

Color dark greenish brown above, lighter beneath; dorsal and anal fins blackish brown.

D. 19, A. 17, P. (?) C. 15.

This fish is quite closely allied to its Atlantic congener, *O. mola;* its chief points of difference appear to be in the form and proportions of the dorsal and anal fins, and in the numbers of fin-rays. The pectorals, in the only specimen which I have seen, are too imperfect for comparison.

The specimen, which is in the cabinet of the California Academy of Natural Sciences, was taken in the Santa Barbara Channel; it is twenty-eight and a half inches in length. The species is said to be not very uncommon from Point Conception southward along the coast of Lower California.

Julis semicinctus, (Ayres).—Body elongated, compressed; greatest depth contained in the entire length not quite four times. Length of the head equal to the greatest depth. Eye nearly circular; its diameter contained in the length of the side of the head about five and a half times. The branchial rays are six on each side, and are not covered by the sub and interoperculum.

The first ray of the ventrals is spinous though feeble.

In color the fish is of a dark greenish olive above, becoming lighter on the sides and beneath. The dorsal and anal fins are dusky. The caudal fin has numerous, narrow, vertical, waving bands of dark and light olive green. A broad, bright black band arising on the side, at about the middle of the body in height, passes down to join on the abdomen the corresponding band from the opposite side. This semi-belt is overlaid by the pectoral fin, whose tip extends a little beyond its posterior border.

D. IX, 11, P. 13, A. II, 12, C. 5, 1, 6, 6, 1, 5, V. I, 5.

This species is allied, not remotely, to *J. modestus*, *G.*, and in the above characters are given only the points in which it differs from that type. It inhabits the coast of Lower California, a single specimen (nine inches in length) having been obtained at Cerros Island by Dr. John A. Veatch, to whose kindness I am indebted for its possession.

October 24, 1859.

President in the Chair.

Dr. Kellogg read a description of a new and very remarkable species of *Œnothera*, brought from Cerros Island by Dr. John A. Veatch.

Œ. arborea, (Kellogg,) Tree Primrose.—Stem woody, erect, six to eight feet in height, seldom more than two or three inches in diameter; branches short, erect or ascending, twigs scarlet or madder purple, bark of the body whitish or leaden hued, wrinkled, wood yellowish, very brittle.

Floral portion of the branchlets minutely short villous, with glandular hairs, often puberulent below.

Leaves linear-lanceolate, entire, undulate, sessile, villous, alternate, solitary or in fascicles, small, apex glandular, tipped with scarlet.

Flowers in dense spikes, elongating as the fruit matures, floral branchlets purple, tube of the calyx long tubular-infundibuliform, the lower third attenuated, or somewhat suddenly contracted into a slender tube, ventricose above, about one inch in length, the acute reflexed segments about one-fourth the length of the tube, minutely hoary-vil-

lous externally, the lower third hirsute within—on pedicels one-fourth to half an inch in length, deep scarlet, segments purple, unchanged in drying.

Petals obovate roundish, shorter than the stamens and pistil or calyx segments; buds and flowers erect; style exsert beyond the stamens; capitate stigma, has a white frosty exudation or flocculose tomentum attached; purple-like color.

Stamens exsert—the four opposite the petals shortest, flattened filaments inserted a little lower down; anthers yellow, striped with a scarlet line along the back, tipped with a crimson mucro or exsert connective, oblong linear, fixed near the middle, versatile. Flowers diurnal.

Capsules erect, somewhat curved or ascending, from three-fourths to one inch in length, on stout pedicels from one-fourth to half an inch in length, persistent for years; linear, sub-quadrangular, four-celled, four-valved, opening at the apex; valves recurve-expanding, separating from the persistent central placenta, seeds compressed, with a thin membranous testa, linear-oblong appendiculate, ascending in a single row in each cell.

This singular and beautiful shrub is found from 600 to 2,000 feet above the level of the sea, growing on open sterile rocks and clayey soils.

November 14, 1859.

President in the Chair.

Dr. Kellogg read a description of a new species of *Mentzelia*, from Cerros Island, presented by Dr. J. A. Veatch.

M. cordata, (Kellogg,) Heartleafed Mentzelia.—Stem from eighteen inches to two feet in height, branches alternate, densely hirsute throughout, with short, white, stiff glochidiate hairs; few simple and barbed hairs intermixed.

Leaves alternate, cordate lobed, or rounded cordate palmate lobed, somewhat irregularly obtusely serrate, hoary hirsute, five to seven-nerved, on stout petioles about the length of the lamina; bracteoles lanceolate, about half the length of the pedicels.

Flowers in a somewhat condensed terminal panicle, on pedicels one-half of an inch or more in length; flowers numerous, whitish, petals oblanceolate cuneate, pubescent upon the back, erect-spreading, united at the base, (?) about one inch in length. Style simple; sixty or more stamens, all filiform, exsert, inserted into the base of corolla (?) calycine segments linear-lanceolate, one-half the length of petals.

Capsules turbinate, five-valved and five parietal placentas, each

attached by the back, projecting a three-winged seminal phlage, densely beset with innumerable minute horizontal ovules.

This is probably a vespertine species. The stem and leaves change to a dark brown in drying.

November 20, 1859.

President in the Chair.

Dr. Kellogg described a new species of *Fouquieraceæ*, brought from Lower California, by Dr. J. A. Veatch.

IDRIA, (Kellogg).—Sepals five, colored, two exterior roundish entire or emarginate; corolla cylindrical, tube straight, limb erect, five-parted, style included, very short, thick or slightly clavate, sub-three-angled, undivided.

I. columnaria, (Kellogg).—Calyx colored (light straw yellow) consisting of five sepals in two series—the two exterior orbicular emarginate, three interior rounded—obcordate, rigid, concave, closely imbricated about half the length of the tube. Corolla half an inch long, erect, segments of the limb rounded, subauricled at the base. Stamens ten, (rarely more) filaments thickened and somewhat flattened, free (or rarely slightly adherent in parcels) geniculated, papillose, pubescent below, naked and attenuated above, somewhat unequal. Anthers oblong-cordate, mucronate, fixed below the middle, introrse, mostly erect, versatile, opening laterally. Embryo triangular acute, three-valved, three-celled, loculicidal, a portion of the placenta parting and adhering to the center of each valve. Ovules ascending in a double row in each cell, about three in a row, or six in a cell, consisting of about eighteen. Ovules neither winged nor margined, subangular (?) with two flattish sides, somewhat rounded on the back, oblong-cuneate, warped, scarcely sub-acute at the apex. Mature fruit unknown. Panicles about a foot in length, without spines.

This singular columnar tree grows to the height of twelve to fifteen feet, and is about ten inches to a foot in diameter. Its appearance is quite unique, being almost entirely destitute of branches, save the terminal erect arms, sometimes present, which abruptly crown the top of the trunk and support the long panicles of flowers; these floral branches or panicles are usually from a foot to eighteen inches in length, and being annual they dry up, and persistently remain from year to year, stuck or imbedded in the body, as if placed in pits artificially; finally, from erect becoming horizontal, and at length refracted.

The tree is spineless and rather smooth, of a soft and spongy tex-

ture, like a cabbage tree, so that an ordinary blow with a hatchet or an axe, sinks the blade to the eye. The flowers are not so brilliant as the scarlet *Bronnia spinosa*, but its bright golden crown renders it an attractive object when seen in its glory.

Dr. Kellogg read a description of a new Composite, brought from Cerros Island, by Dr. J. A. Veatch; a plant of the natural order *Rudbeckiaæ*, closely allied to the genus *Echinacea*.

Baiiopsis, (Kellogg).—Heads many flowered, ray flowers in a single series, imperfectly pistillate, with rudiments of sterile filaments, those of the disk tubular and perfect. Involucral scales, lanceolate, rigid imbricate, appressed in about four series. Receptacle conical, alveolate, the alveolar margins irregularly lobed; carinate lanceolate chaff, mostly three-nerved, serrate, terminated by a somewhat rigid cusp, partially embracing the flowers; points purplish, shorter than the flowers. Corolla of the disk cylindrical, five-toothed; teeth glandularly villous, short, slightly expanding, the proper tube very short, villous within and without. Branches of the style barely exsert, subulate stigmatose, terminated by a short cone. Achenia of the ray three-sided, abortive, of the disk compressed, slightly margined, all densely hirsute; pappus of about six or more pectinate nerveless scales, two of which are awned, awns hirsute with ascending hairs. Flowers yellow.

B. lanata, (Kellogg).—A plant with a somewhat woody, perennial, thickened base, and simple, erect or ascending, attenuated and somewhat naked stem above; peduncle thickening upwards to the solitary terminal head, six to eighteen inches (perhaps more) in height. Mostly opposite, sub-entire, three nerved leaves. Flowers yellow.

Stem striate, lanuginous above, densely appressed lanate below, simple (or branching)?

Leaves mostly entire or slightly serrate, opposite; lower leaves cordate, three-nerved, on petioles thickened, amplexicaul at the base about half the length of the lamina, closely clustered below; upper cauline leaves rather remote, opposite or alternate, ovate on very short petioles, densely white appressed lanate.

Rays eighteen, punctate with a few pellucid dots, ligulate, three-toothed, tubular base, pubescent on the back and tube; imperfect style simple, glabrous, five-nerved, with five lesser intermediate nerves. Chaff of the disk mostly three-nerved, apex purplish and glandular on the back. Disk-florets five-nerved from the sinuses; the very short proper tube pubescent within and without. Corolla, stamens, and pistil yellow.

The general form of involucre campanulate; scales obscurely three-

nerved, loosely lanuginous on the back and the upper half within; one or two large metamorphosed leaf scales at the base.

The involucral scales in this, the only specimen we have seen, are successively transformed into chaff, with an abortive achenial cavity.

November 30, 1859.

President in the Chair.

Dr. Kellogg read a description of a new species of Oak, brought from Clear Lake by Mr. A. A. Veatch.

QUERCUS MOREHUS, (Kellogg,) ABRAM'S OAK.—Leaves oblong-lanceolate, somewhat narrowed towards the acute base; coarsely sinuate-toothed, or obliquely sinuate-toothed; teeth very sharply acute, with a broad base, cuspidate-awned; lamina thin, coriaceous, finely reticulate; veins prominent, glabrous, and varnished above and below; scarcely a little paler green beneath; on slender petioles, one-half to three-fourths of an inch long. Fruit axillary, solitary, on peduncles one-fourth to one-half of an inch in length. Cup hemispherical, tapering at the base, margin thin, scales ovate sub-acute, membranous margin, ciliate below, irregularly serrate above, closely appressed, glabrous.

Nut oblong, obtusely pointed, about one-third embraced by the cup.

A small tree, thirty feet in height, with wide spread straggling branches springing out at obtuse angles, or horizontally, from the trunk, within two or three feet of the ground. Bark black and rough below. Growing near the margin of Clear Lake, on a point above Dr. J. A. Veatch's Rancho.

A low shrubby species of little value. The leaves are from three to four inches in length, and one-half to two inches in breadth, resembling the leaf of the common chestnut, *Castanea edulis*.

Only one tree is known to us. The acorns are about one inch long, not very abundant.

December 2, 1859.

President in the Chair.

Dr. Kellogg exhibited a drawing of a new species of *Rhamnus*, to which the attention of the Academy was drawn nearly two years since; but the description was deferred, in hopes of obtaining the flowers. The long time which has elapsed since the first presentation of the drawing and specimens, is the apology offered for the present

incomplete public notice of it. The Academy are indebted to Dr. J. A. Veatch, for the former and present specimens, brought from the vicinity of Clear Lake.

R. ilicifolius, (Kellogg,) Holly-leaf Buckthorn.—Stem six to ten inches in diameter, twelve to fifteen feet in height, branches often four inches in diameter, spreading, subdivisions much branched, unarmed, smaller branches short, villous, and madder purple.

Leaves oval, cordate and sub-cordate, sub-acute, often emarginate, short, spinosely-dentate, closely pinnate-veined, smooth and shining above and below, dark green above, (a yellowish shade lighter below) evergreen, thick, very rigid and coriaceous lamina; recurved, undulate, finely reticulate, on short villous petioles, (about one-eighth of an inch long) alternate; stipules subulate, caducous.

The specimens of wood in our possession were obtained by Dr. Veatch, from an old dry tree; the color is dark, almost black, similar to rosewood; exceedingly compact, with a clear metallic ring when struck, and almost metallic weight.

For its general appearance, fine finishing qualities, and solid unbrokened texture, there is abundant reason to believe that the engraver, carver, carpenter, cabinet-maker and turner, will find in it a very valuable acquisition to the useful native timber trees of California.

Some experiments already made, induce us to believe that it warps less than rosewood. If the bark were removed, and the tree left standing to season before cutting, and the juices thoroughly abstracted, might we not anticipate its applicability to printing purposes?

Dr. Kellogg read a description of a new species of *Juniperus*, brought from Cerros Island, by Dr. J. A. Veatch.

J. cerrosianus, (Kellogg,) Cerros Island Juniper.—Leaves minute, ovate acute, appressed, imbricate in six rows; an oblong gland on the back; on the younger branches of recent growth, oblong subulate; on the older, intermediate; diamond shaped apex, short subulate incurved.

Berries somewhat oblong-ovoid, of six to eight oblong sub-peltate mucronate scales, cohering into a three-seeded berry; the flattish mucro eccentric on the back of the upper one-third, erect, or somewhat recurved; older mature fruit sub-three-angled, more or less tubercled, with oblong ridges or longitudinal ribs; clothed with a dense blue bloom.

Fruit very abundant, large, (about one-half of an inch long, and a little less in transverse diameter); ovules numerous in green state.

Male aments very minute, light cinnamon color.

A tree of slow growth, one to two feet in diameter, ten to fifteen feet in height; branches horizontal and spreading, dense.

The wood is heavy, close, fine grained timber, in texture and color resembling the apple tree, although far superior. Apparently the most suitable for engraving of any native timber we have known. We think it worthy of the attention of artists.

To the turner, carver, and cabinet maker, the wood is invaluable; suitable for the finest work, it takes a beautiful polish, and is probably equal, if not superior, in durability to many others of this almost indestructible family of forest trees. We have had in our possession, for the last two years, a specimen from the main land, from which we made an incomplete drawing; but as the fruit was in the green half-grown state, we had not deemed it proper to take public notice of it, until the reception of full and complete specimens from Cerros Island, from Dr. J. A. Veatch. The specimen alluded to was also furnished by Dr. Veatch from the vicinity of New Idria.

If the bark were removed, allowing the tree to stand and partially season, before cutting it, with other suitable precautions, perhaps it would work without warping. We hope those living in its vicinity will furnish us with the results of their experience.

Dr. J. B. Trask presented the following paper:

Earthquakes in California during 1858.—During the past year, we have had occasion to note the occurrence of eight shocks of earthquake in this State. This number is one-half less than that in 1857, and one-third less the number in 1856. The shocks, with one exception, have been unmarked by anything like violence, being little else than mere vibrations or tremors, not noticeable by the great majority of the people. They are as follows:

Feb. 10th.—A smart shock at Kanaka Flat, Sierra Co. No time noted.

Feb. 15th.—A light shock in San Francisco at $4^h\ 20^m$. Was observed in the county of San Mateo ten miles south of the city.

Aug. 19th.—A light shock in San Francisco at $22^h\ 10^m$. The motion was east to west and was undulatory.

Sept. 2d.—A smart shock at Santa Barbara, no time given.

Sept. 3d.—A smart shock in San José at $0^h\ 40^m$. This shock was felt at Santa Cruz, 25 miles west, and was evidently more marked in strength at that locality. No damage.

Sept. 12th.—A smart shock at San Francisco at $19^h\ 40^m$. The motion was from north to south. There were two vibrations with undulatory movements lasting about fifteen seconds.

Sept. 26th.—A light shock at San Francisco at $1^h\ 26^m$.

Nov. 26th.—A heavy shock at San Francisco at $0^h\ 34^m$. This shock was by far the heaviest during the year, it awoke most people from slumber and created no little alarm; persons left their beds and sought cooler situations with less attire than is usually worn. The iron

pillars in the second story of the custom house have separated from the ceiling above about half an inch, and are supposed to have settled from the effects of the shock ; I much doubt the alleged cause of this displacement, as the pillars below present no indication of similar disturbance. This shock was felt at Oakland ten miles east of the city, but was not felt at Stockton, Sacramento, or Marysville. It was evidently confined to an area of ten or twelve miles.

Earthquakes during 1859.

Jan. 25th, $20^h\ 20^m$.—A heavy shock of earthquake was felt in Trinity and Shasta Counties. It was felt at Weaverville, Shasta, and Horsetown.

April 4th, 13^h.—Quite a severe shock was felt at San José. There were several vibrations, apparently from north to south.

August 10th, $22^h\ 35^m$.—A smart shock was felt in this city, (San Francisco).

Sept. 26th, $6^h\ 10^m$.—A smart shock at San Francisco.

Oct. 5th, $12^h\ 18^m$.—A very smart shock at San Francisco.

Nov. 27th, $19^h\ 15^m$.—A light shock at San Francisco.

Dec. 1st, $0^h\ 50^m$.—A smart shock at San Francisco. Felt at Oakland and Benicia.

Dec. 2d, $14^h\ 10^m$.—Several successive shocks were felt at San Bernardino ; several of them were quite heavy, causing much alarm. No damage was done.

Whole number of shocks during this year was eight.

DONATIONS TO THE LIBRARY,

During 1858 and 1859.

Reports of the Smithsonian Institute for 1855 and 1856. S. Inst.
Contributions to Knowledge, of the Smithsonian Institute. S. Inst.
Terrestial Molluscs of the United States. By Dr. Binney.
Suite of the laws of the State of California, and Legislative Documents. State Department.
American Journal of Science and Art, Vols. XXVI and XXVII.
Cassin's Birds, Vol. I. From the Author.
Botany of Pacific R. R. Survey. From the Author, J. M. Bigelow.
Proceedings Boston Society Natural History, Vol. VI and Vol. VII, to p. 160.
Meteorological Register for 1857, at Penn Yan, N. Y. From Mr. H. P. Sartwell.
Contributions to the Natural History of the United States. By L. Agassiz. From J. N. Eckel. 4to.
Proceedings of the Elliott Society Natural History of S. C., pages 1–104.
Proceedings of the Linnean Society of London, 1857.
Chemistry of Plants. From Mr. Bloomer.
Proceedings of the Essex Institute of Salem.
Map of Basin of the La Plata. Navy Department.
Charts of the Parana River. Navy Department.
Prodomus Animalium Evertebratorum, Parts I to VI. From Mr. W. Stimpson.
Stansbury's Report and Maps. From Dr. Eckel.
Pacific Medical and Surgical Journal for 1858 and 1859.
Hutchings' California Magazine for 1858 and 1859.
Boston Journal of Natural History, Vol. VI, No. 4.
Pacific R. R. Reports, Vols. III and IV. From His Excellency, Hon. John B. Weller.
Pacific R. R. Reports, five Volumes. From Hon. Wm. M. Gwinn.
Pacific R. R. Reports, four Volumes. From Hon. D. C. Broderick.
First Annual Message of Hon. John B. Weller.
Review of Marcou's Geology of North America. From the Author, Professor J. D. Dana.
Washington Astronomical Observations, 1849, 1850.

Transactions of the Academy of Science of St. Louis, for 1858 and 1859.

Jahrbuch der Kaiserlich—Königlichen Geologischen Reichsanstalt, 1857 and 1858.

Kongelige Svenska Vetenskaps-Akad. Handlingar, Band I, 1855, Band I, 1856.

Academie Royale de Belgique. Observations des Phenomenes Periodiques.

Lettres sur les Roches du Jura. From the author, Jules Marcou.

Abhandlungen der Mathem-physic classe, der Koenligb Bayerischen, Akad. der Wissenchaften, Band 17, 1853 and 1857.

Verhandelingen der Koninklijke Akademie van Wetanschappen. Amsterdam, 1854–1858.

Memoires de l'Academie Imperiale des Sci. Arts et Belles-Lettres, de Dijon, 1852–1859.

Memoires de la Societe Imperiale des Sciences Naturalles, de Cherbourg, 1856–1858.

Geology of North America. By Jules Marcou. From the Author.

Kongliga Svenska Fregatten Eugenies, Resa Omkring jorden, under befal af C. A. Virginaren, 1851–1853.

Stundliche Barometer-Beobachtungen Zu Krakau, 1848–1856.

Zeitschrift fur die Gesammten Naturwisenchaften. Berlin, 1858.

Verhandlungen des Zool-Bot Vereins in Wien. Band. 7, 1857 and 1858.

Oversigt af Konigl Vetenskaps-Akademiens Forhandlinger, Stockholm, 1854–1857.

Annalen der Munchener Sternwarte, 1857–1858.

Magnetische Ertsbestimmungen in Bayern, 1856.

Monatsbericht der Konigl. Preuss. Akad. der Wissenschaften zu Berlin, 1856-1858.

Verslagen en Mededeelingen der Koninklijke Akademie von Wetenschapten, Amsterdam, 1853–1858.

Verhandlungen des Naturhistorischen Vereins der Preussischen Rheinlande und Westphaliens, 1858–1858.

Bericht der Oberhessischen Gesellschaft fur Natur, 1855–1859.

Jarboek van de Konink Akad. Wetenschaften, April, 1857, April, 1858.

Meteorologische Beobachtungen aut an der Konigl Sternwarte, 1825, 1837. Sup. Band.

DONATIONS TO THE CABINET,

During 1858 and 1859.

Two specimens of Birds from the Sandwich Islands. By L. Lanszweert.
Cretaceous Fossils, from Vancouver Island. By Mr. Pease.
Two specimens of Pteroglossus, (Toucan) from Panama. By Dr. Stillman.
Portion of Fossil Pelvis and Ribs, in sandstone, from vicinity of San Antonio. By Mr. A. S. Taylor.
Marine Shells, from Panama. By Dr. Stillman.
Minerals from Mexico.
Section of Wood, showing Surveyor's marks within the subsequent annual growths. By Col. L. Ransom.
A specimen of Hylodes, from Mission Dolores. By Dr. J. A. Veatch.
Skull of Enhydra Marina, from Santa Barbara. By Dr. Veatch.
Specimens of an Ore of Silver, from La Mina San Pedro, La Paz, L. C. By Mr. Uznay.
Galena, from San Bernardino, giving 20 oz. silver per ton. By Dr. Trask.
Ores of Copper, from La Mina Mozamique, Sinaloa, Mexico. By Mr. Walker.
Lithodes spinosissimus, (Brandt). Skin of a small species of Owl, Marine Fishes, and cast of Baculite, from vicinity of Vancouver Island. By Rev. Mr. Domville, of H. B. M. steamer Satellite.
A collection of plants, from Napa Valley and vicinity of Clear Lake. By Dr. Veatch.
Specimen of Crystallized Gold, from Nevada. By Dr. Trask and Mr. Schotte.
Specimens of Andalusite, from San Bernardino. By Col. Ransom.
Specimen of Crotalus. By Mr. E. Bosqui.
Specimens of Botany, from Santa Clara County. By Dr. Veatch.
Three species of Lilium from California, and one from Oregon. By Mr. Bloomer.
Fruit of the Marah muricata. By Dr. Kellogg.
Silico-Calcareous Rocks, from the Serpentine of Moccasin Creek, Tuolumne County, with gold. By Mr. Kemball.
Galena, from San Xavier, G. P., 40 oz. silver per ton. By R. G. Killaly.

Specimen of Native Copper, from Lake Superior. By Mr. Robert Simson.
Earths from the Artesian Well at Stockton. By Mr. Drew.
Auriferous Quartz, from Stockton Society of Natural History.
Specimen of a Crystal of Gold. By Dr. Trask.
A collection of Plants, from New Almaden. By Dr. Veatch.
Eighty specimens of Minerals, from the Brooklyn Collegiate Institute, by exchange with Dr. Trask.
Carbonate Soda, from Guaymas. By Mr. Wm. B. Little.
Skin of Crotalus. By L. Lanszweert.
A box of Minerals. By Mr. Theodore F. Moss, from Philadelphia.
Nest of Icterus bullockii, from Red Bluffs, Shasta County. By Mr. T. J. Butler.
Astacus nigricans, (Stimpson). By Dr. Trask.
Specimen of Gold, from South America. By Dr. Trask.
Cinnabar, in Crystals, from New Almaden. By Stockton Society of Natural History.
Cones and Foliage of Picea bracteata, from San Louis Obispo. By Mr. Wm. Murray.
One hundred specimens of Plants. By Dr. Kellogg.
Specimens of Herpetology, from Sydney, Australia. By Mr. Horace T. Moore.
Plants from Contra Costa. By L. Lanszweert.
Specimens of a Human Fœtus.
Collection of Plants, from vicinity of Clear Lake. By Dr. Veatch.
Specimens of Helix monodon and H. tridentatus. By Dr. Frick.
A large collection of Pressed Plants. By Dr. Kellogg.
Specimens of Botany, Radiata, etc., from Cornwallis Island. By L. Lanszweert.
A collection of Grasses, from Sonoma Valley. By Mr. Rowlandson.
A collection of twenty boxes of Pressed Plants. By Dr. Kellogg.
Specimen of Linum californicum, from Marysville. By Dr. Kellogg.
A collection of Plants, from the Island of Cerros, L. C. By Dr. Veatch.
A collection of Coniferæ. By Mr. Murray, of Edinburgh, Scotland.
Coniferæ of California. By Mr. Wm. Murray.

JANUARY 2, 1860.

ANNUAL MEETING.

President in the Chair.

The following Officers were elected for the year:

LEANDER RANSOM,.....PRESIDENT.
T. F. MOSS,
DR. J. N. ECKEL, } .....VICE PRESIDENTS.
DR. W. O. AYRES,.....COR. SECRETARY.
EDWARD BOSQUI,.....TREASURER.
DR. J. B. TRASK,.....REC. SECRETARY.
WM. HEFFLEY,.....LIBRARIAN.

CURATORS.

DR. J. B. TRASK,.....GEOLOGY AND MINERALOGY.
H. G. BLOOMER,.....BOTANY.
DR. J. A. VEATCH,.....CONCHOLOGY.
DR. W. O. AYRES,.....ZOOLOGY.

COMMITTEES.

DR. AYRES,
DR. TRASK } .....PUBLICATION.
COL. RANSOM,
DR. ECKEL,
MR. HEFFLEY, } .....LIBRARY.
DR. TRASK,
MR. HEFFLEY,
DR. KELLOGG, } .....FINANCE.

March 5, 1860.

President in the Chair.

Dr. Kellogg presented the following description of a new genus of plants:

LILIORHIZA (Kellogg).—Corolla inferior, six petalled, bell funnel-form, at length spreading; petals narrowed towards the base, sessile, somewhat oblanceolate, nectariferous cavity obsolete or at the base; stamens shorter than the corolla, inserted into the base of the petals; anthers extrorse, erect; filament inserted a little below the middle, at length versatile, pistil prismatic, deeply three-parted, longer than the stamens; each division grooved within; a stigmatic line on each side of the groove extending to the apex, which is slightly contracted, recurve spreading.

Roots consisting of numerous thickened bulboid scales; stem vernating from between the scales or at the base of the outer; capsule three celled and sub three-sided, angles obtuse, not winged and rarely a little produced at the base; oblong, or somewhat wheel-shaped. In other respects as in *Fritillaria.*

Bulbous plants with white or greenish white flowers, rarely variegated, not tessellated, in terminal, mostly secund racemes; the stem *not* springing from the top of a solid bulb, but growing up from below between the little thickened scales or bulbous scales.

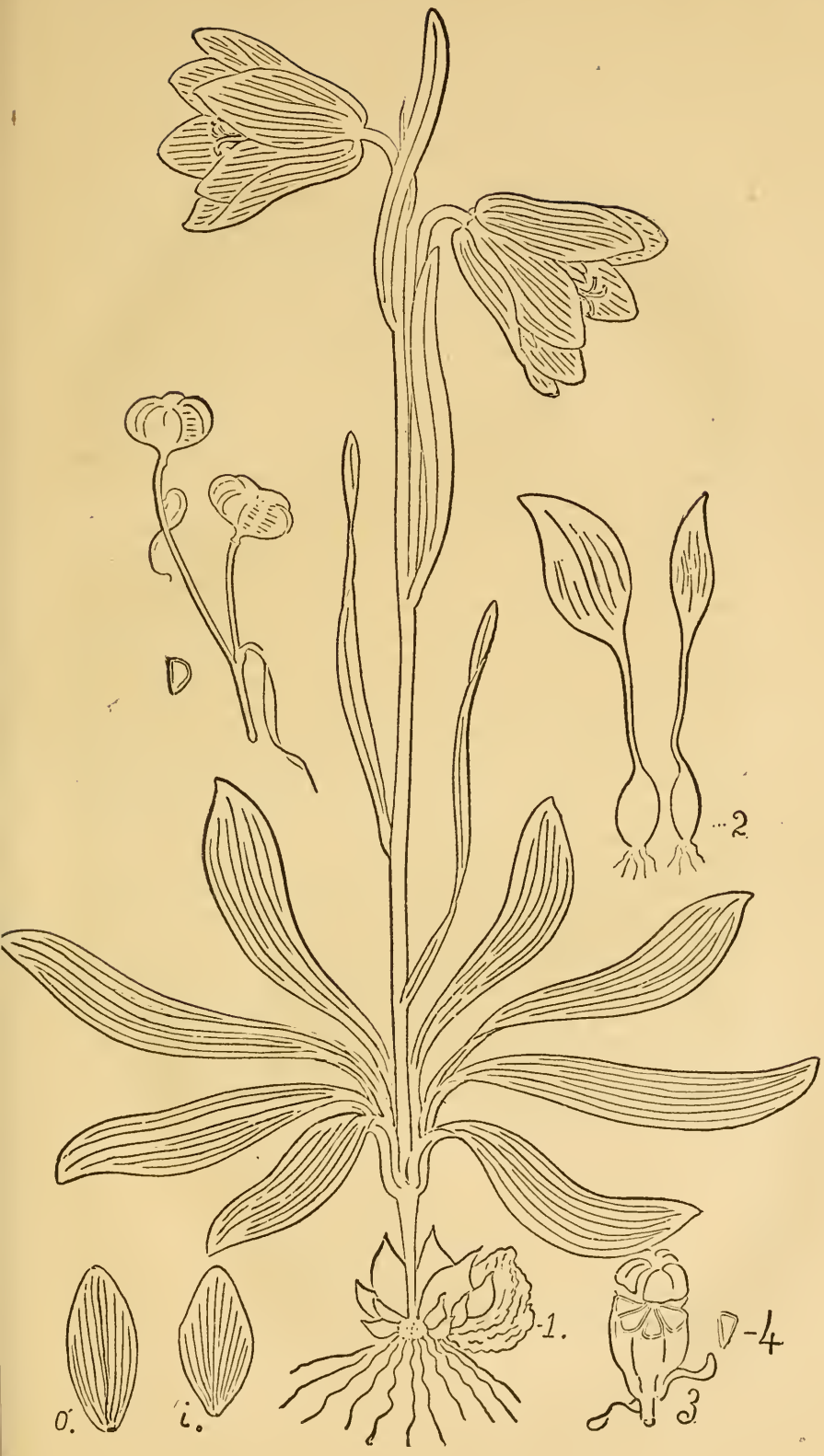
These remarkable plants are closely allied to *Lilium*, *Amblirion* and *Fritillaria.*

To *Lilium* in their clustered, thick-scaled root, usually in threes, with the flower stem springing from the base or between the scales; to *Amblirion* in its dwarf habit; and to *Fritillaria* in its deeply trifid style and six-angled capsule. It however differs from *Lilium* in its corolla, anthers and pistil, although in our Californian *L. superbum* the style is somewhat three-parted, and the capsule also similar; from *Amblirion* chiefly in the ovary and style; from *Fritillaria* more particularly in the origin of the stem, which, instead of growing out of the top of a solid bulb, starts from below, springing out of the base, between the thickened bulboid scales, in the anthers, different position, (when present) of the nectariferous cavity, form of the flower, and its never being tessellated, etc.

Liliorhiza lanceolata (Kellogg). Fig. 1. Stem eight inches to one foot in height, glaucous, obsoletely scabrulous, with minute frosty granules, very finely striate (under the glass) striae very minute.

Leaves alternate and remote above, clustered or rarely subwhorled below with the petaloid bases always subterranean in the

Fig. 1.



native or cultivated state; the lamina prostrate (upon the ground); sessile, narrow lanceolated, sub acute, rarely a little oblique, obscurely three to five nerved or more, (2) thick and fleshy, margins thin, translucent, somewhat varnished, about three inches long, one-quarter to one-half an inch wide.

Flowers are super axillary; peduncles adnate to the stem (giving it a double appearance) from one-half to one inch or more above the leaf, and running parallel with the stem, or gently diverging also decurrent below in a similar manner; peduncles one and one-half to three inches in length, raceme three to four flowered; flowers, in general outline, obconic bell-form, at length spreading, nodding before and shortly after blossoming, but becoming more and more elevated to the erect state of the fruit.

Petals broadly oblanceolated, sub acute, somewhat carinate; greenish veins regularly radiating from the base; the diffuse green along the mid rib heightening toward the base of the flower. The honey bearing cavity is at the base of the three outer petals, obsolete on the three inner; style longer than the stamens, deeply three parted, divisions grooved above, about half the length of pistil (or one-quarter of an inch) a stigmatic line running along on the ridge each side of the groove to the apex; divisions of the trifid style recurve spreading; stamens six sub-equal (or three opposite the inner petals, scarcely longer); filaments flattened and expanded below, inserted into the base of the petals, attenuated to the anther, and inserted a little (2) below the middle (2) by a very delicate point, at length recurve spreading, and the anther versatile, mucronate at the apex; base emarginate.

This is probably the *Fritillaria lanceolata* of Pursh; and *F. liliacea* of Lindley, who justly remarks, "It is a most remarkable plant, with the habit of the lily."

This genus also includes our *F. viridia* and probably some others.

We take pleasure in acknowledging our obligations to Mr. H. G. Bloomer, (Bot. Curator to the Academy) for his aid in the observations made, as well as for the very numerous specimens, both cultivated and from the native fields—over 100—which have been submitted to our examination; they all uniformly maintain the characteristics above designated.

May 7, 1860.

President in the Chair.

Dr. Kellogg presented the following description of a new species of Trillium, collected by Mr. Gibbs:

Fig. 2.

T. californicum (Kellogg). Fig. 2. Stem glabrous, slightly decurrent, angled, six to eight inches in height.

Peduncle erect, angular, two and a half to three inches long (light crimson).

Flowers, erect, spreading, petals greenish white, purple checked above, oval-lanceolate, acute, flat, distinctly five-nerved, (or obscurely nine-nerved) reticulate veined, about one-quarter longer than the sepals, (one and one-half to 2 inches long by one broad) stamens nearly one-half as long, stigmas recurved; sepals, broad lanceolate, one-half an inch wide, acuminate three-nerved, (two other outer nerves obscure) purplish spotted towards the apex; fruit, six-winged (in the one-half grown state); leaves rhombic-obovate, broadly cuneate at base, abruptly short acuminate, five-nerved; margin waved, reticulate, sessile, purple checked toward the upper third.

Leaves about three inches long, and nearly the same in breadth.

This specimen differs from *T. erectum*, in the flower not "nodding" nor at all "inclined;" petals not "acuminate," nor "equalling sepals;" nor are the leaves "three-nerved," etc.

It is near *T. grandiflorum*, but the petals are not "connivent," nor "obovate," nor "spatulate lanceolate," nor is the flower "inclined," neither is the leaf "acute," nor "rhombic-ovate."

June 4, 1860.

President in the Chair.

Dr. Kellogg presented the annexed description:

The following described plant is one very familiar to us for the last eight years. It is very abundant in damp and boggy localities in the vicinity of San Francisco. The seeds have been sold in the city of San Francisco for many years past under various names, as e. g. "yellow-eyed grass, "yellow Pigmy Lily," Star-grass Lily, etc. The frail, delicate flower is so ephemeral, and infolds so quickly, like a Morning Glory, that we have been fain to pass it by from time to time, hoping to succeed better the next opportunity. And besides, a plant so familiar to our walks, it seemed fair to presume must be known. We have examined all the accessible authorities, and find no description answering to it. We therefore give the subjoined description, and offer the provisional name of

Sisyrinchium flavidum (Kellogg). Fig. 3. Scape simple, erect, broadly winged or ancipital, six to seventeen inches in height, margin sparsely scabrous.

Fig. 3.

Leaves radical, broad, compressed, equitant, linear-ensiform, many nerved (about six to eight). Spathe about five to six flowered, pedicels unequal; valves usually sub-equal, rarely somewhat unequal, exterior one about equal to the flowers (variable); two or three extra membranaceous valves (bracts) included; perianth bright translucent yellow; segments broad lanceolate, acute; nerves tortuous; exterior divisions seven-nerved, interior five-nerved, widely spreading from the base; filaments free above, monadelphous at the base, (or barely united at the point of insertion into the ring or obsolete tube of the corolla) equal to the style, glabrous, apex attenuated.

Anthers (orange yellow) long, linear, somewhat spirally curved, forked or sagittate at the base, versatile, fixed by the middle; style deeply three-parted, filiform lobes spreading, each stigmatic, apex recurved; capsule oblong, triquetrous, the three sides slightly hollowed, and the angles more acute than usual in this genus; base and apex of equal diameter.

This species appears to be near to Dr. Torrey's *S. lineatum*, in Lieut. Whipple's Report, p. 143; but they are not "three-flowered" but five to six, nor divisions "obtuse," nor is the capsule of our specimens ovately pear-shaped;" the leaves are also less grassy, but quite Iris-leaved, with a sharp or somewhat acuminate sword-pointed appearance.

The seed vessel turns unusually black as it matures, or in drying. Its habitat is always in moist or marshy soils; we have never found it elsewhere.

July 2, 1860.

President in the Chair.

Dr. Ayres presented the following paper:

In October, 1854, (Proc. Cal. Acad. Nat. Sci. vol. 1, p. 13) a description was given of a species under the name *Brosmius marginatus*, though doubts were at the same time expressed of the propriety of the generic designation. Several specimens of the same species have since been obtained, and it is quite manifest that it should be separated from *Brosmius*. The new genus, with the following characters, may be called

HALIAS (Ayres):—*Teeth in both jaws, and on the vomer and palatines; dorsal and anal long, not united with the caudal; no barbules; ventrals slender, not fleshy.*

The species on which it is based is *Halias marginatus* (Ayres).

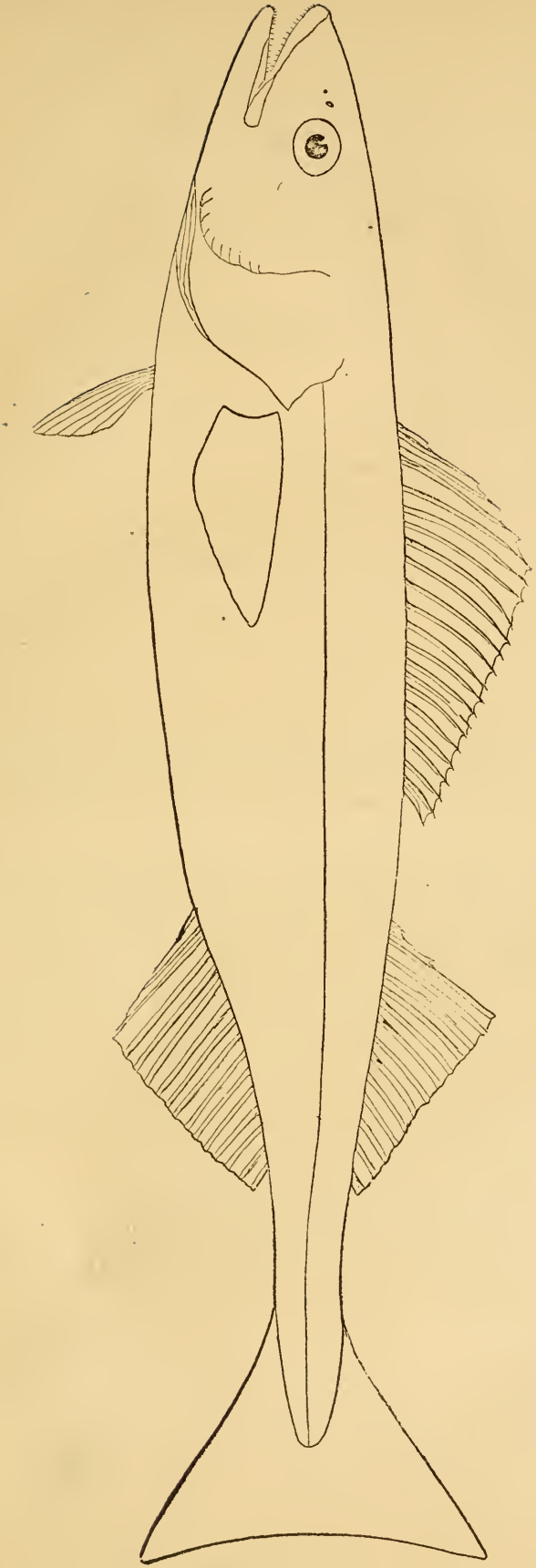
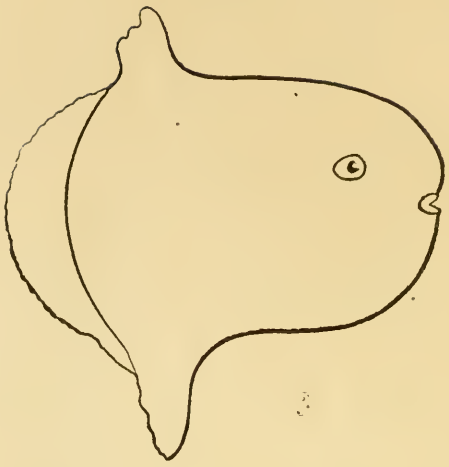


Fig. 4.

Fig. 5.



The accompanying outline figures represent species described by me, in a paper read before the Academy, October 17th, 1859:

Fig. 4. *Anoplopoma merlangus* (Proc. Cal. Acad. Nat. Sc. vol. 2, p. 27).

Fig. 5. *Orthagoriscus analis* (op. cit. p. 31).

Fig 6. *Stereolepis gigas* (op. cit. p. 28). Since the date of the original publication, I have had opportunity to examine a number of specimens of this species. They were all taken below Point Conception, where, as I ventured the statement of probability, they are by no means uncommon. They are known by the fishermen as "Jew fish." The inspection of these specimens has shown that in one point my generic diagnosis, and the figure, need correction; the two dorsals are not "remote" but contiguous, the membrane from the last spine of the first extending to the base of the commencing spine of the second.

Fig. 7. *Rhina californica* (*Squatina californica* op. cit. p. 29).

Fig. 8. *Sebastes helvomaculatus* (op. cit. p. 26).

Fig. 9. *Sebastes elongatus* (op. cit. p. 26).

Fig. 10. *Hippoglossus californicus* (op. cit. p. 29).

Torpedo californica, (Ayres) (op. cit. vol. 1, p. 70) called by Girard, *Narcine californica* (P. R. R. Report, vol. 10, p. 371) is to be included in *Narcacion*, (Klein) and becomes therefore *Narcacion californica*.

Fig. 6.

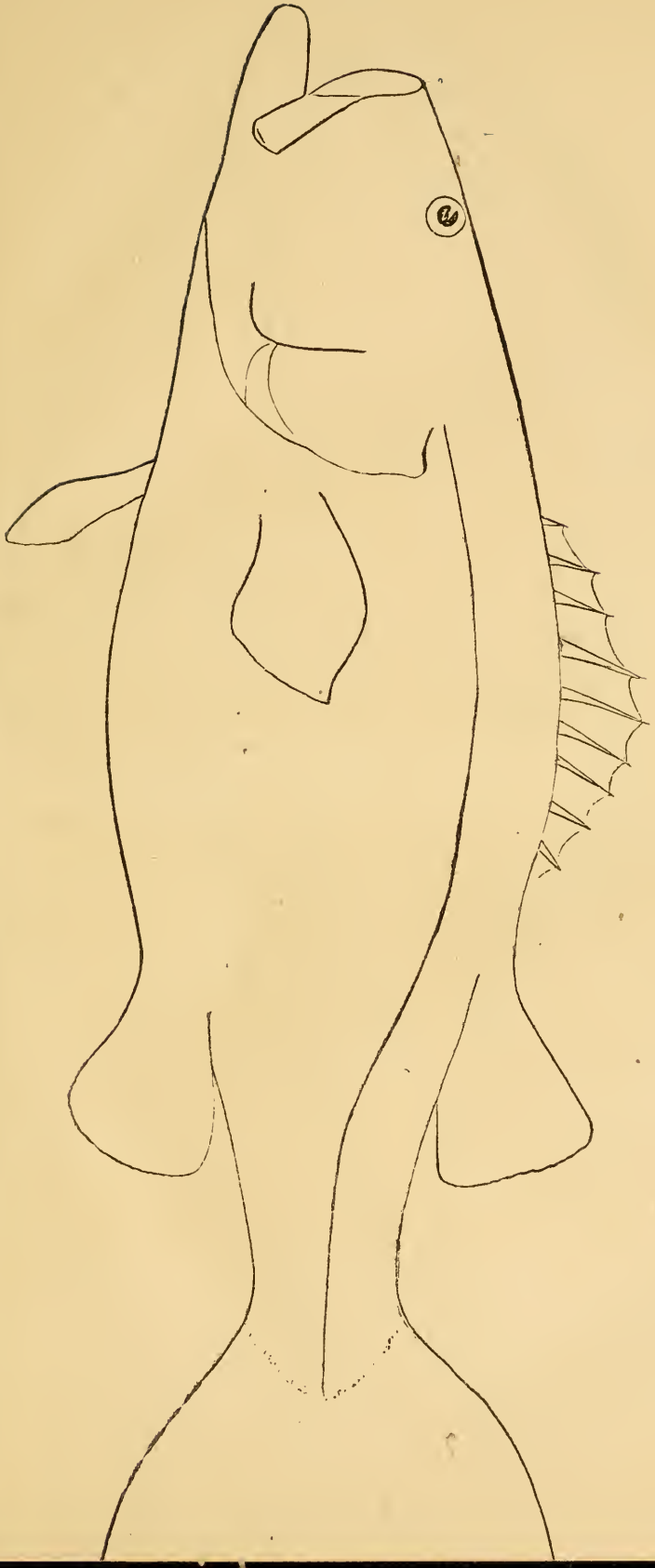


Fig. 7.

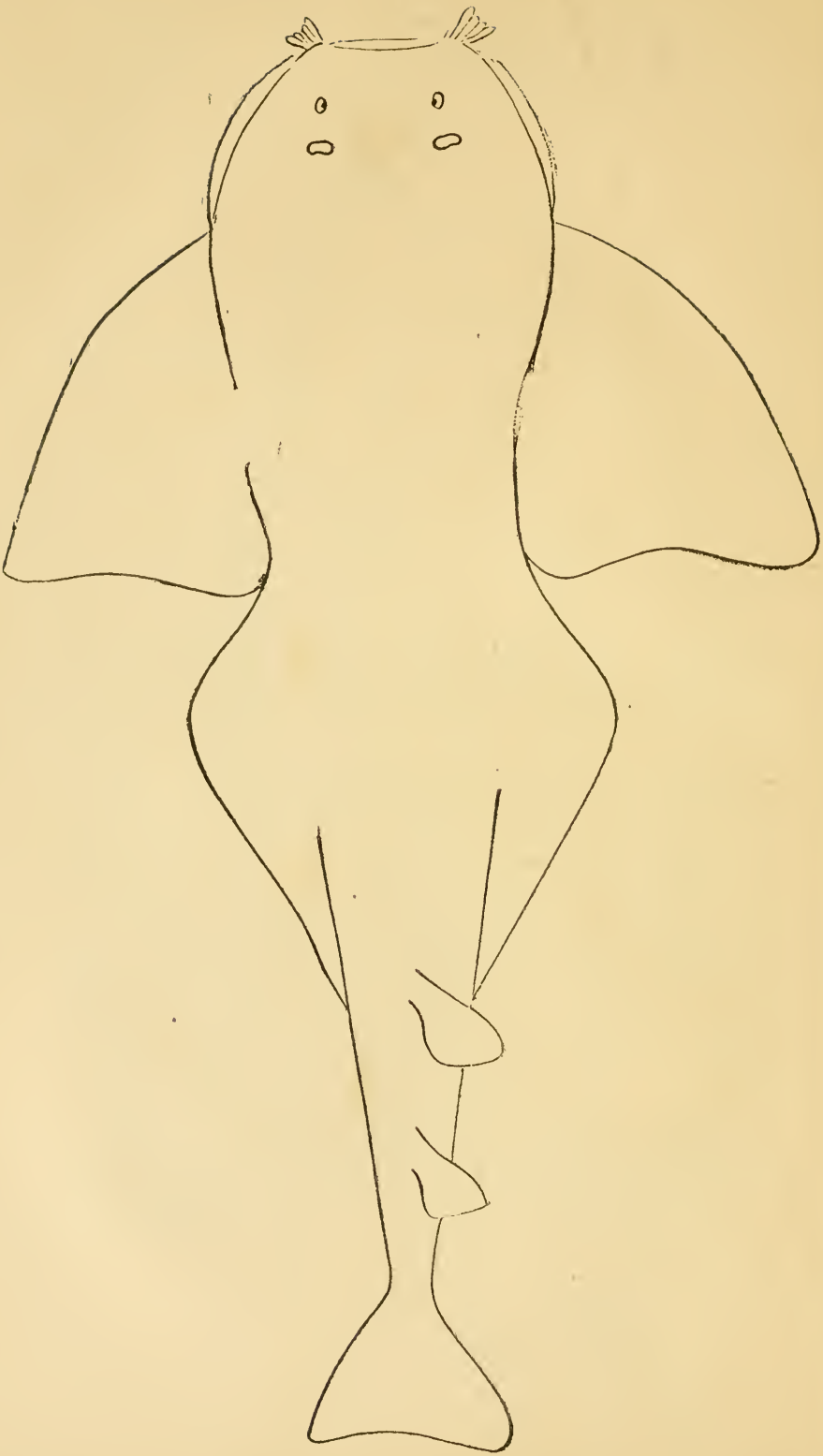


Fig. 8.

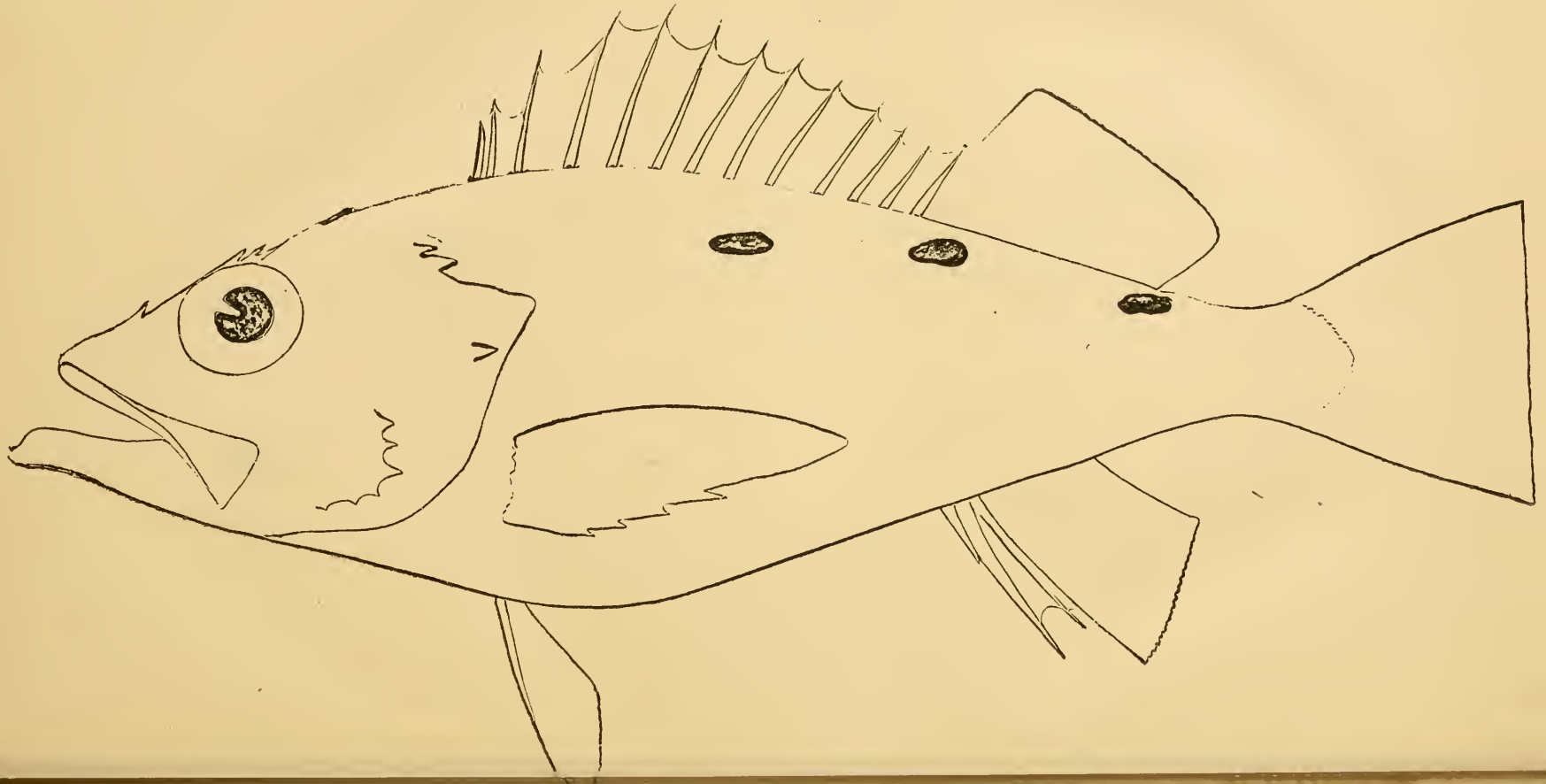


Fig. 9.

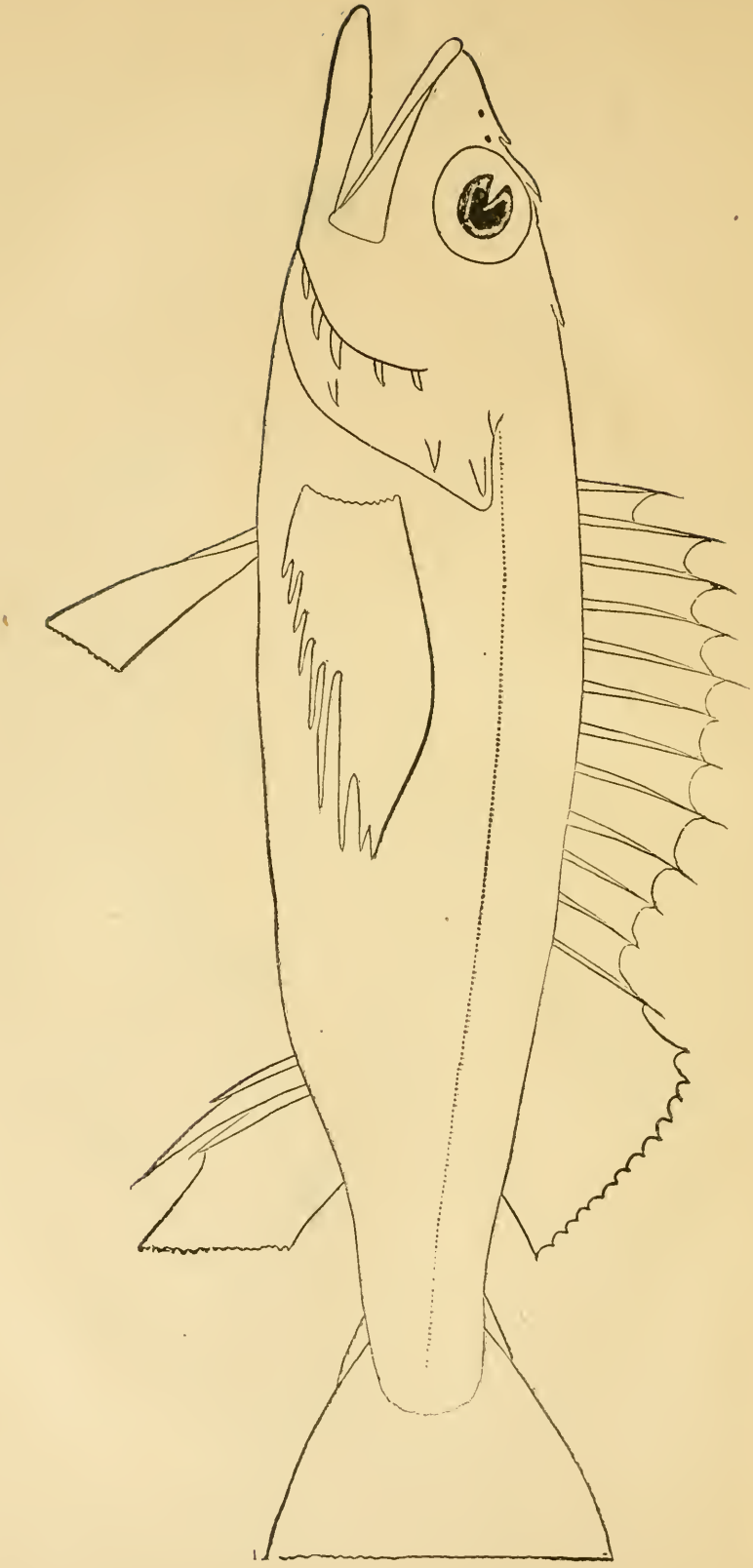
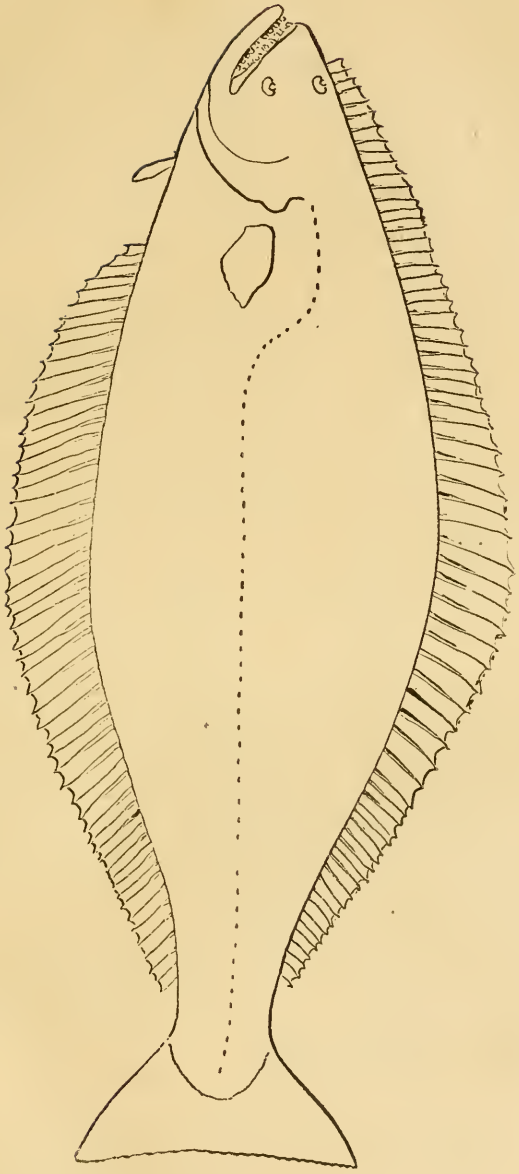


Fig. 10.



August 6, 1860.

President in the Chair.

Dr. Ayres presented the following descriptions of new fishes:

Trichodon lineatus (Ayres). Fig. 11. Form elongated, much compressed, broadest just behind the eyes, tapering in thickness thence gradually to the caudal fin; top of the head flattened; dorsal outline very slightly arched; abdominal outline strongly curved; greatest depth about equal to the length of the head, or one-fourth of the length of the fish; depth of the peduncle of the tail one-fourth of the greatest depth.

Mouth almost vertical; the tip of the lower jaw, when closed, rising above the level of the top of the head. The extent of the upper jaw to the tip of the maxillary, is more than half the greatest depth of the head; teeth numerous, slender, curved, sharp-pointed in both jaws and on the vomer; none on the palatines; the largest are on the front and sides of the lower jaw.

Operculum smooth. Preoperculum with five or six long rowel-like teeth (only four are shown on the plate) radiating from near its angle; anterior suborbital bone with two strong teeth directed forward and downward.

Eye near the top of the head, large; its diameter being a little less than one-third the length of the head.

Branchial apertures large, continuous beneath; branchial rays, four.

The distance of the origin of the first dorsal fin from the tip of the upper jaw, is about one-third the length of the fish excluding the caudal fin; its outline is arched above, diminishing from the fifth and sixth spines in both directions, but most gradually posteriorly; its length, which is three times its height, is a little less than one fourth the length of the fish; the spines are all slender.

The second dorsal is separated by a short interval from the first, which it slightly exceeds in both length and height; the rays are all articulated but scarcely branched.

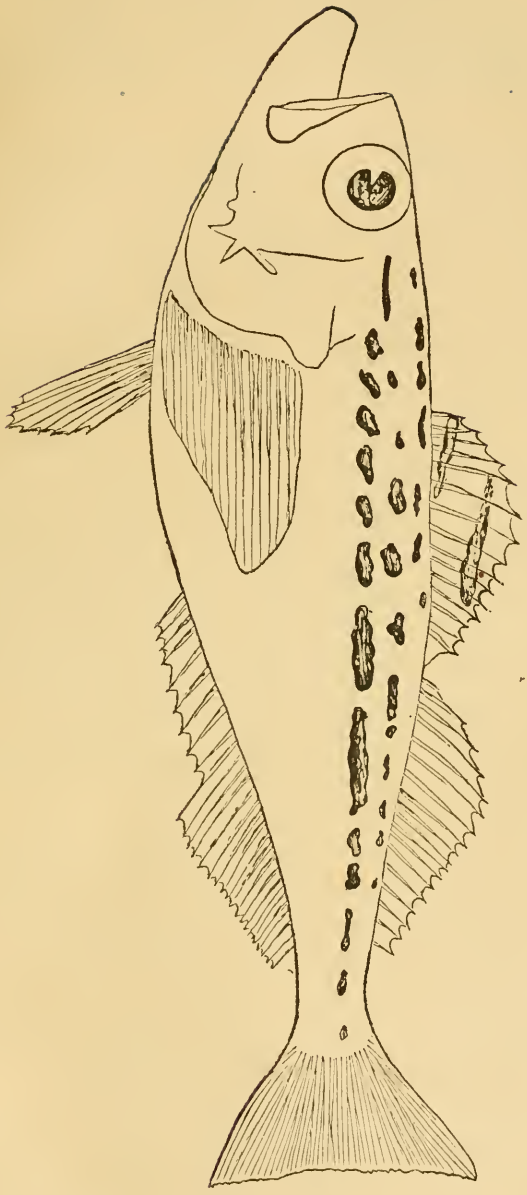
The anal, coterminal with the second dorsal, is one-third as long as the entire fish; the first two-fifths of the fin are low, of nearly uniform height; the height is then suddenly about doubled, and from that point diminishes gradually to its termination; the rays are like that of the second dorsal.

The caudal is nearly even posteriorly; the accessory rays very numerous.

D. XV. 18, A. 28, P. 23, V. 5, C. 14, 1, 5. 6, 1, 14.

Color above greenish olive, with two or three somewhat irregular rows of blackish blotches constituting interrupted longitudinal lines,

Fig. 11



extending the entire length of the fish; all below the lower ones of these lines of a bright silvery satin lustre.

This species is apparently quite rare, as but a single specimen has been obtained, which was found in the market in San Francisco. It is six inches in length.

Osmerus thaleichthys, (Ayres) Fig. 12.—Form elongated, compressed; head forming about one-fifth the total length; greatest depth one-sixth of the length; depth at the origin of the caudal fin a little more than one-third of the greatest depth; eyes large, distant about their own diameter from the lip of the upper jaw, forming one-fourth of the length of the head.

Gape of the mouth wide, the tips of the maxillary reaching a line nearly even with the posterior border of the orbit; teeth sharp, distinct, separate, in the lower jaw, and on the maxillary, premaxillary, vomer, palatine and pterygoid bones, and on the tongue. Those on the tongue are largest; those on the palatine bones are not numerous, and are chiefly on the anterior portion.

Operculum angular posteriorly, the curve continued by the suboperculum; branchial apertures wide; branchial rays, eight.

Scales rather large, soft; those of the back and upper part of the sides rendered somewhat conspicuous by a bordering of brown points which form decussating lines; lateral lines at first curving downward, and then running nearly straight to the caudal fin.

The first dorsal fin arises a little in advance of the middle of the length of the fish; it is quadrangular, its height anteriorly about equal to the depth of the fish; its length half its height; the height of the last rays one third of the height anteriorly.

The adipose fin is distant from the termination of the first dorsal by a space equal to the length of the head; it is nearly as high as the last rays of the first dorsal.

The anal fin, extending a little further backward than the line of the adipose fin, is equal in length to the depth of the body; its greatest height, at the fifth ray, is half the length of the head.

The ventral fins, situated in advance of the line of the first dorsal, are rounded, as high as the depth of the body.

The pectorals are rounded, as high as the length of the head, extending beyond the insertion of the ventrals.

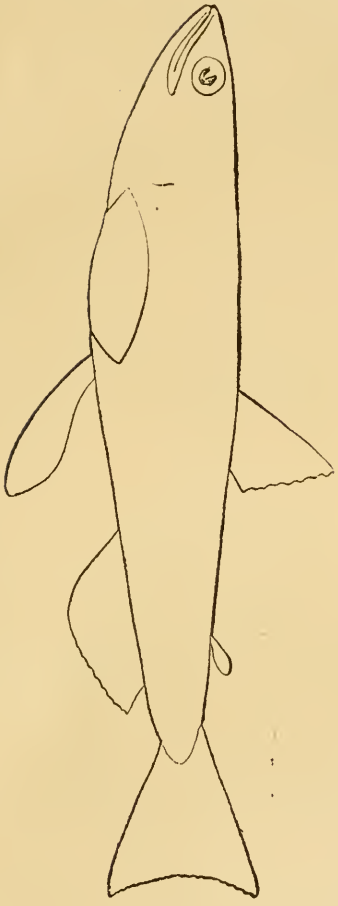
The caudal fin is somewhat concave on its margin; the height of the external rays equal to that of the ventrals.

D. 9; A. 19, P. 11, V. 8, C. 9. 1. 9. 8. 1. 10.

Color, greenish olive above, sprinkled with minute dark points; silvery on the sides and beneath.

This species is quite common in the bay of San Francisco, being brought in numbers into the market, and sold indiscriminately with

Fig. 12.



the other "smelt." I have never seen it exceed seven inches in length, and very few are over five.

O. thaleichthys presents an entire blending of the characters on which Girard proposed to separate the genus *Thaleichthys* from *Osmerus*. With the eight branchial rays, the large mouth, and the advanced position of the ventrals of *Thaleichthys*, it has the toothed jaws and palatine bones of *Osmerus;* and it may, by the way, be remarked, that the very species which the describer takes as the type of *Thaleichthys* has occasionally teeth on the palatines well developed; and one specimen in my possession shows even denticulations on the maxillaries. It cannot be doubted, therefore, that *Thaleichthys* will remain merely as a synonym of *Osmerus*, and that the species on which it was proposed will bear the name *Osmerus pacificus*. Nor does *Argentina* seem much better founded than *Thaleichthys*. The distinguishing characters are too insignificant and too little constant to be of value, and unless we adopt the custom which has been lamentably prevalent, of taking as generic features those which are only of specific rank, the genus *Osmerus* will include the species which have been referred to the three names.

September 3, 1860.

President in the Chair.

Dr. Kellogg read the following paper:

The plant, here figured and described, was raised from seed (probably brought with bulbs from the interior, and thus accidentally distributed) by Mr. H. G. Bloomer, Botanical Curator to the Academy.

We find no description answering to it fully, either generically or specifically, yet we think, with a little revision, it probably belongs to *Hemizonia*. We shall for the present offer it as

Hemizonia balsamifera, (Kellogg) Fig. 13.—Stem annual, one to two feet high (in cultivation); divaricately branching from the base; branches slender, hairy-pubescent, (white below) glandular and glandless hairs intermixed above; heads numerous, loosely paniculate-corymbose, inflorescence centrifugal, involucral bracts erect.

Lower leaves pinnatifid; the lamina decurrent into a winged three-nerved petiole, somewhat stem-clasping, the lobes in three to seven pairs; linear entire, clothed with glandular and glandless hairs intermixed, three to five inches long; the upper cauline and

Fig. 13.

branch leaves pinnate lobed, toothed or entire linear-lanceolate, sessile.

Rays, twenty-five or more, (all fertile) in two series, obovate, sub-cuneate three-cleft toothed, the middle tooth or lobe much narrower (rarely two or four-toothed); tube long, slender, inserted laterally at the obtuse summit of the achenia by a short, somewhat beaked ascending areola, stipitate glandular; branches of the style long, filiform, glandular.

Involucral scales at the rays, carinate-infolded, nearly enclosing the ray achenia, subtended by short linear foliaceous erect bracts; outer series more strongly carinated, hairy, and densely stipitate glandular.

Ray achenia, as seen in the figure; strongly incurved, stipe somewhat inflexed, back slightly rugose, glandular, laterally ridged or obscurely triangular (otherwise generically described).

Chaff in a single series of about twenty united scales between the disk and ray flowers, tips herbaceous, green and glandular, like the persistent involucre (even in the fully matured heads).

Corolla of the disk (yellow) five-toothed; teeth glandular-bearded above, funnel-form, with a slender stipitate glandular tube.

Disk achenia perfect but infertile, cylindrical, attenuate below, stipitate glandular; pappus obsolete, or only few very minute, transparent, laciniate squamellae; anthers dark brown, or nearly black; branches of the style exsert (yellow) very hispid, filiform; appendages also hirsute.

Receptacle convex, fimbrillate-hirsute.

A numerously branching California herb, of the class commonly known as "Rosin Weeds," from their densely viscid-glandular character so notorious during our autumnal season. This plant exhales a fragrant balsamic perfume, etherializing and enrapturing the senses into a state of sweet tranquility; hence the specific name, *balsamifera*.

It differs from the generic description of *Hemizonia* (T & G) in its receptacle, not being "flat;" but this also is the case with *H. pungens*, which, like our plant, has even a conico-convex receptacle; besides, the receptacle is fimbrillate hirsute. The involucral scales in our plant are in *two series*—not in a "single series"—consequently, also the rays. This biserial arrangement gives the rays the false appearance, as if each alternate petal were longer. Notwithstanding these and other minor discrepancies, we are unwilling to institute a new genus.

Dr. Kellogg exhibited sketches and specimens of a *Lonicera*, recently brought from Washoe by Dr. J. A. Veatch.

This plant appears to be very closely allied to *Lonicera cerulea*, but the peduncles are not "very short," but quite the opposite; it also in general habit quite resembles *L. oblongifolia* (Hook): but that species has "erect," *constantly erect* peduncles, whereas our Washoe specimen has them divaricate, and the peduncles are probably strongly *reflexed* (?) in fruit, judging from their tendency as they approach that state. The *L. oblongifolia* is said to have "greenish yellow" flowers, whereas these are deep madder purple internally and externally; our specimen has not "glabrous filaments," but they are quite strongly bearded below. It should be remarked that the corolla is not "hirsute." Hooker insists upon the "hairy corolla," as a distinct feature in *L. oblongifolia*, although Dr. Torrey omits the mention of it. There are other points, e. g.: the general expression, "peduncles much longer than the flowers," seems hardly appropriate where there exists so great a disproportion, if we suppose our plant to be the one described, and besides, afterwards specifying one inch as the length of the peduncle, and half that for the flower. The flowers are much smaller than in any species known to us, and the tube very much shorter; the angular stem, and the remarkably sharp quadrangular buds, it would seem proper to have noticed, if the plant had been described.

We therefore furnish the following description, and suggest the provisional name of

L. conjugialis, (Kellogg) Bridal Honeysuckle. Fig. 15. Stem erect, branching; branches four-angled, buds sharp and quadrangular, elongated.

Leaves occasionally oval-oblong, cordate and sub-cordate, short petioled, (petioles one-eighth to one-quarter of an inch long) *obtuse*, or sometimes somewhat sub-acute; lamina thin, reticulate, minutely soft velvety pubescent throughout, especially beneath, which is lighter green or somewhat glaucous; leaves varying from one-half to two inches long by one-half to one inch broad.

Peduncles filiform, very minutely pubescent, longer than the leaves (about two inches in length) divaricate or declined, ascending or incurved at the summit; two-flowered, united to form one berry; bracts exceedingly minute (2–3) or obsolete.

Calyx teeth ciliate, minute, subulate, unequal, hirsute; flowers dark purple, gibbous at the base on the outside, glabrous, deeply bilabiate, the lower linear lip-lobe more than twice the length of the very short tube; upper lip with four very short, somewhat unequal teeth; stamens and pistil equal, included; filaments glabrous and

Fig. 15.

purple above, quite hirsute below, at the insertion into the tube; anthers linear, versatile; style hirsute.

Dr. Kellogg offered some observations on the white-flowered Rosin Weed, common in the vicinity of San Francisco.

Hemizania luzulæfolia—Var fragarioides, (Kellogg). Fig 14. Stem annual, loosely much branched alternately; branchlets leafy, very numerous, slender and spreading; stipitate glandular and hirsute, with long, weak hairs.

Lower leaves opposite, spatulate-lanceolate, three to five-nerved, remotely cut-dentate; lamina tapering into the petiole, base clasping, arachnoid-tomentose, and feebly villous; margins scabrous, three to five inches long.

Upper cauline leaves oblong, lance-linear, cordate-clasping at the base; teeth few, remotely scabrous, obtuse or sub-acute tomentose; branch leaves ovate-lanceolate, sessile, entire, somewhat fascicled in the axils, densely stipitate-glandular, with numerous glandless hairs intermixed, especially on the upper surface, and tipped with an extra long stipe to the terminal apex gland; the nerves near the margin.

Involucre hemispherical; scales in two series, (about eleven in two series) the outer bracted nearly enclosing the achenia, densely stipitate, glandular.

Rays, five to twelve, broadly cuneiform, deeply three-lobed; middle lobe narrowest; tube short, thick and glandular; white, pink tinge on the back of the lamina; three-nerved; the ribs or nerves red and glandular (the two-parted style slightly flattened on the inside); rays persistent, closing up over the disk.

Disk florets translucent, white, bell funnel-form, border deeply five-toothed; teeth short, glandular, bearded; tube slender, very slightly swelled at the base, finely stipitate-glandular; five-nerved from the clefts of the limb through the achenia also, anthers black; styles white, acute appendages hirsute.

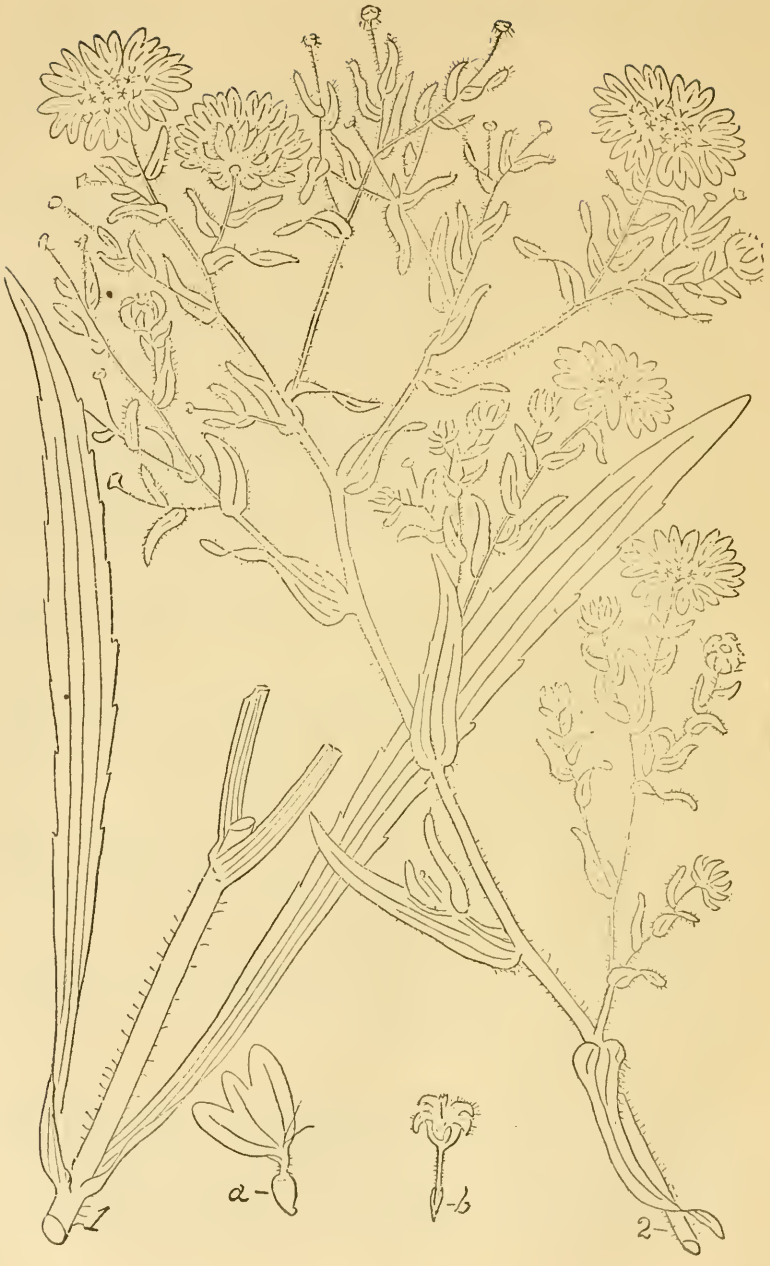
Chaff united into a cup, each three-nerved; apex greenish, stipitate-glandular; membrane foliaceous, somewhat hirsute, with long, viscid hairs; disk chaffy throughout, all united and separately each enclosing its own achenia.

Receptacle convex.

Ray achenia obovoid, sub-triangular, black and shining; stipe, a mere fleshy, elevated ring of a different color; somewhat slightly obcompressed; disk achenia infertile, smooth, attenuated below, six or seven-nerved, entirely destitute of a vestige of pappus.

This plant has the refreshing odor of strawberries. The pinkish

Fig. 14.



tinged white flowers are very pretty and pleasing to the eye. It is also worthy of note, that the fruit heads are early deciduous, leaving the terminal tackhead-like torus or base on which the flowers rested entirely naked, showing the conic elevated centre.

The conico-convex character of the receptacle in *H. pungens* is even more remarkable than in this species; at least, this is the character of specimens growing in this vicinity. The involucral scales are clearly in *two series*, instead of one as described. Our specimens are also densely glandular.

The arachnoid tomentum varies, in some being a strongly marked feature, while in others it is loosly deciduous and unimportant.

Dr. Kellogg presented the annexed paper:

The following new species of *Abronia* was recently brought from Carson Valley, Washoe, by Mr. Andrew A. Veatch:

A. crux-maltæ (Kellogg). Fig. 16. Stem a fleshy, creeping vine, with viscid and glandular pubescence.

Leaves ovate-oblong, somewhat obtuse; lamina unequal, acute at the base, glabrous, (and pitted under the glass) undulate, on long petioles.

Perianth salver-form, tube long and slender; the flattish limb broadly cuneate four-lobed, each lobe deeply subdivided; the lobelets spreading; mucronate at the bottom of each broad sinus; the entire limb, in general outline, bears a striking resemblance to a Maltese cross.

Flowers four-androus; stamens unequal, inserted in the tube at the swelled throat, which is closed by a few loosely-folded hairs; anthers oblong; filament very short.

A deep purplish rose pink; the swelled throat a bright emerald green; tube pink, or whitish flesh-colored, glandular.

Heads axillary on long peduncles, (about equal to the leaves?) ten to fifteen flowered.

Involucre united at the base into a shallow, broadly campanuloid cup, seven or eight parted above; the segments narrow, ovate-lanceolate, acuminate, nerved, membranous; margins ciliate, green.

It differs from *A. cycloptera* (Gray) in the perigonial form and subdivisions, insertion of anthers, involucre, and perhaps in the oblique character of the leaves, and greater length of the petioles.

Fig. 16.

October 1, 1860.

President in the Chair.

Dr. Ayres presented the following paper:

Atherinopsis affinis (Ayres).—Two species of *Atherinopsis* are constantly sold in the markets of San Francisco, under the general name of "Smelt." The specimens in the collection of the Smithsonian Institution, from which Girard drew his description of *A. californiensis*, probably comprise both species, though the description is not sufficiently definite to settle the point. But inasmuch as the figure which he gives represents without doubt the one which does truly attain the length of "seventeen inches," it is better to retain the name *californiensis* for the largest of the two species, which is at the same time the more slender. The smaller species may receive the name *A. affinis;* the diagnostic characters are here given side by side, for more ready comparison:

Atherinopsis affinis (Ayres). Fig. 18. Greatest depth, not quite one-fourth of the total length; length of the head, about one-fifth of the greatest depth.	*Atherinopsis californiensis* (Grd). Fig. 17. Greatest depth, a little more than one-sixth of the total length. Length of the head, fully equal to the greatest depth.
Gape of the mouth, extending back but about half the distance from the snout to the eye. (The size of the head relatively to that of the body, and the actual size of the mouth, are decidedly less in *affinis* than in *californiensis*.)	Gape of the mouth, extending back about half the distance from the snout to the middle of the pupil.
The first dorsal is nearly its own length further back, arising nearer to the tips of the central caudal rays than to the snout.	First dorsal arising nearer to the snout than to the tips of the central caudal rays.
The height of the second dorsal is equal to its length.	The height of the second dorsal is a little over two-thirds of its length.
The ventral fins are larger, their height being about one-tenth of the length of the fish.	The height of the ventral fins is only a little more than one-thirteenth of the total length.
The pectoral fins are larger, their height being about two-elevenths of the total length.	The height of the pectoral fins is a little more than two-thirteenths of the total length.
The flesh is firmer, and the scales larger and harder.	

The principal points, therefore, by which *A. affinis* may be distinguished are, the stouter body, relatively smaller head and smaller mouth, larger fins, larger scales, and firmer flesh. It is also a smaller fish, never exceeding eight inches, so far as I have observed, while *A. californiensis* is frequently fifteen inches long, and occasionally seventeen.

Both species are constantly in the markets in large numbers, and in common with *Osmerus pretiosus* (Grd.) and *Osmerus thaleichthys*, (Ayres) are sold indiscriminately as "smelt," though almost all the fishermen are able to recognize the four species, and for

Fig. 18.

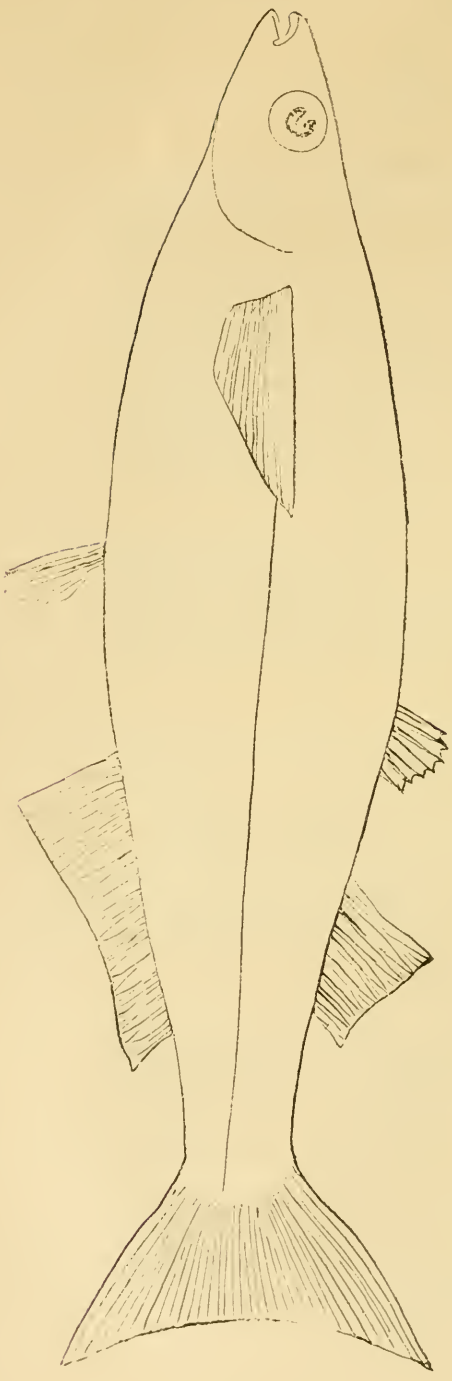
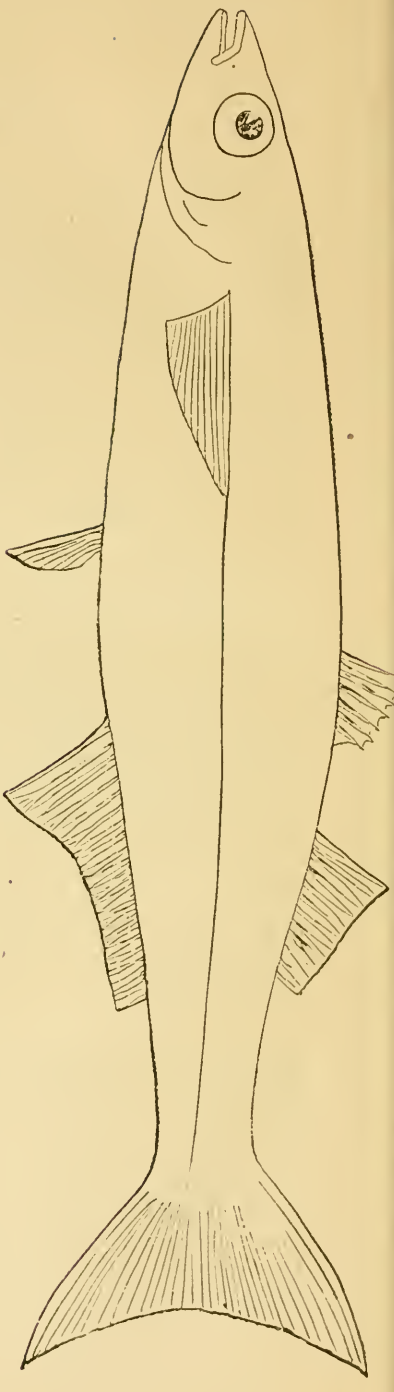


Fig. 17.



customers who are careful they readily select the two species of *Osmerus*, as being more delicate than those of *Atherinopsis*.

Atherinopsis tenuis, (Ayres). Fig. 19. Form elongated, somewhat compressed, very slender, the greatest depth being about one-seventh of the total length.

Head pointed anteriorly, its length constituting a little more than one-sixth of the length of the fish; mouth rather small, upper jaw projecting beyond the lower, its border formed as in the other species of the genus, by the intermaxillaries; teeth exceedingly minute; depth of the head across the middle of the eye about equal to half the greatest depth of the body; diameter of the eye one-fourth the length of the head; eye distant rather more than its own diameter from the tip of the upper jaw.

Scales firm and hard, like those of *Atherinopsis affinis*, abou twelve rows vertically; each scale beautifully crenate (not dentate) on its posterior border, appearing as though provided with a row of minute accessory scales; scales covering the body and head, excepting the space anterior to the eyes.

Branchial apertures continuous under the throat; branchial rays, six.

Colors similar to those of the other species of the genus on our coast, greenish brown above, silvery on the sides and beneath, with a bright silvery band occupying the middle of the side from the head to the caudal fin; pectorals, dorsals, and caudal fin blackish brown, ventrals and anal pale.

First dorsal very small; its length, which is a little less than its height, being only one-sixth of the length of the head; its origin is about equidistant between the tip of the caudal fin and the anterior border of the eye; it is separated from the second dorsal by a space equal to twice its own height.

Second dorsal trapezoidal in form, its posterior border being a little more than half as high as the anterior; its length, which is a little greater than its anterior height, equals half the length of the head; it is separated from the caudal by a space about equal to the depth of the fish.

Anal fin elongated, its length being a very little less than one-fourth the length of the fish; its origin is a little in advance of that of the first dorsal, being about on the middle line of the entire length; it is concave in its margin, its height anteriorly being about half the length of the head, while that posteriorly is somewhat less, and that of the mesial portion decidedly less still.

The pectorals are pointed; their height, which is not quite four times their length, being equal to the length of the head.

The ventrals, which are rounded, have their origin about even

Fig. 19.

with the tips of the pectorals; their height equals twice the length of the central rays of the anal.

Caudal fin somewhat deeply forked, the height of the central rays being but little over half that of the external, which latter is about equal to the length of the head.

D. V. 1–9, A 1–22, V. 1–5, P. 1–14, C. 10, 1, 8, 8, 1, 12.

Of this species but a single specimen, six and one-fourth inches in length, has yet been obtained. It was brought into the market in this city, in company with other "smelts." It is a strongly marked species, entirely distinct from the other two so common here—*A. californiensis* (Grd.) and *A. affinis* (Ayres). According to the divisions proposed by Girard, (Proc. Acad. Nat. Sci. VII. 1854) this would be a true *Basilichthys*, and would take the name *B. tenuis*, but I can see no propriety in such a separation. A trifling difference in the length of the upper and lower jaw, with no other distinguishing features whatever, is certainly a very slight basis for constituting three genera; and though there may perhaps be reason in dividing *Atherinopsis* from *Atherina*, (though even that is doubtful) there is, in my judgment, no question that *Basilichthys* and *Heterognathus* can have no generic rank. The entirely artificial nature of the arrangement is well shown in the fact that *A. tenuis* is much more nearly allied to *A. californiensis* than it is to *Basilichthys microlepidotus*, (Grd.) the Chilian species, on which the proposed division was based. The conical form of the head is as fully marked in *A. californiensis* and *A. affinis* as in *B. microlepidotus* or *A. tenuis*.

November 5, 1860.

President in the Chair.

Dr. Ayres read the following descriptions:

Johnius nobilis, (Ayres) Fig. 20.—Form elongated; dorsal and ventral outlines gracefully and nearly evenly arched; transverse section elliptical, somewhat compressed; head pointed, the lower jaw a little longer than the upper; head in the adult fish constituting a little less than one-fourth of the entire length, being about equal to the greatest depth; depth of the peduncle of the tail not quite one-third of the greatest depth.

Scales soft, rather small, not conspicuous, covering the body and head, and extending on the pectoral, ventral and caudal fins; scales quadrangular, deeper than long; those on the head smaller than those on the body.

Mouth of moderate dimensions, the tip of the maxillary reaching a vertical line about even with the posterior border of the orbit; teeth in both jaws somewhat numerous; none on the vomer or palatines; no canines; crowded on the front of both jaws, the larger ones being on the posterior portion of this patch, and those of the upper jaw larger than those of the lower; on the side of the lower jaw a row of teeth larger than any of those in front, with small ones intermixed; on the side of the upper jaw a double row of teeth smaller than those in front.

Nostrils anterior to the upper portion of the eye; anterior one the larger, vertically elliptical; eye distant about twice its own length from the anterior extremity of the head; its length in the adult being one-tenth of the length of the head; in a fish of twenty-four inches, one-seventh.

Lateral line following nearly the curve of the back.

Operculum ending in a flat, partially concealed spine; the other opercular pieces spineless; branchial apertures separated by an isthmus; branchial rays, seven.

The distance of the first dorsal fin from the tip of the upper jaw, is a little less than one-fourth the length of the fish; its length is not quite equal to that of the head; the third and fourth rays are the highest, their height nearly equalling half the length of the fin; from them the height diminishes to the last, which is about equal to the first, or one-third as high as the third and fourth. The spines are not very stout.

The second dorsal, continuous from the termination of the first, one-fourth as long as the fish, is highest in front, but not quite so long as the first dorsal, diminishing regularly backward to less than half the height. It is preceded by a spinous ray, higher than the last one of the first dorsal.

The length and anterior height of the anal fin are about equal, being a little more than one-third of the length of the head; its height posteriorly is not quite half that of the first soft rays. There are two spinous rays, the first very short, the second less than half the height of the first soft ray, rather slender.

The pectorals slender and pointed, have a height about equalling one-seventh the length of the fish.

The ventrals, arising posterior to the origin of the pectorals, have a height a little less than half the length of the head. The first ray is spinous, rather more than half as high as the first soft one.

The caudal, somewhat concave on the margin, is rather higher in the external rays than the pectoral fin.

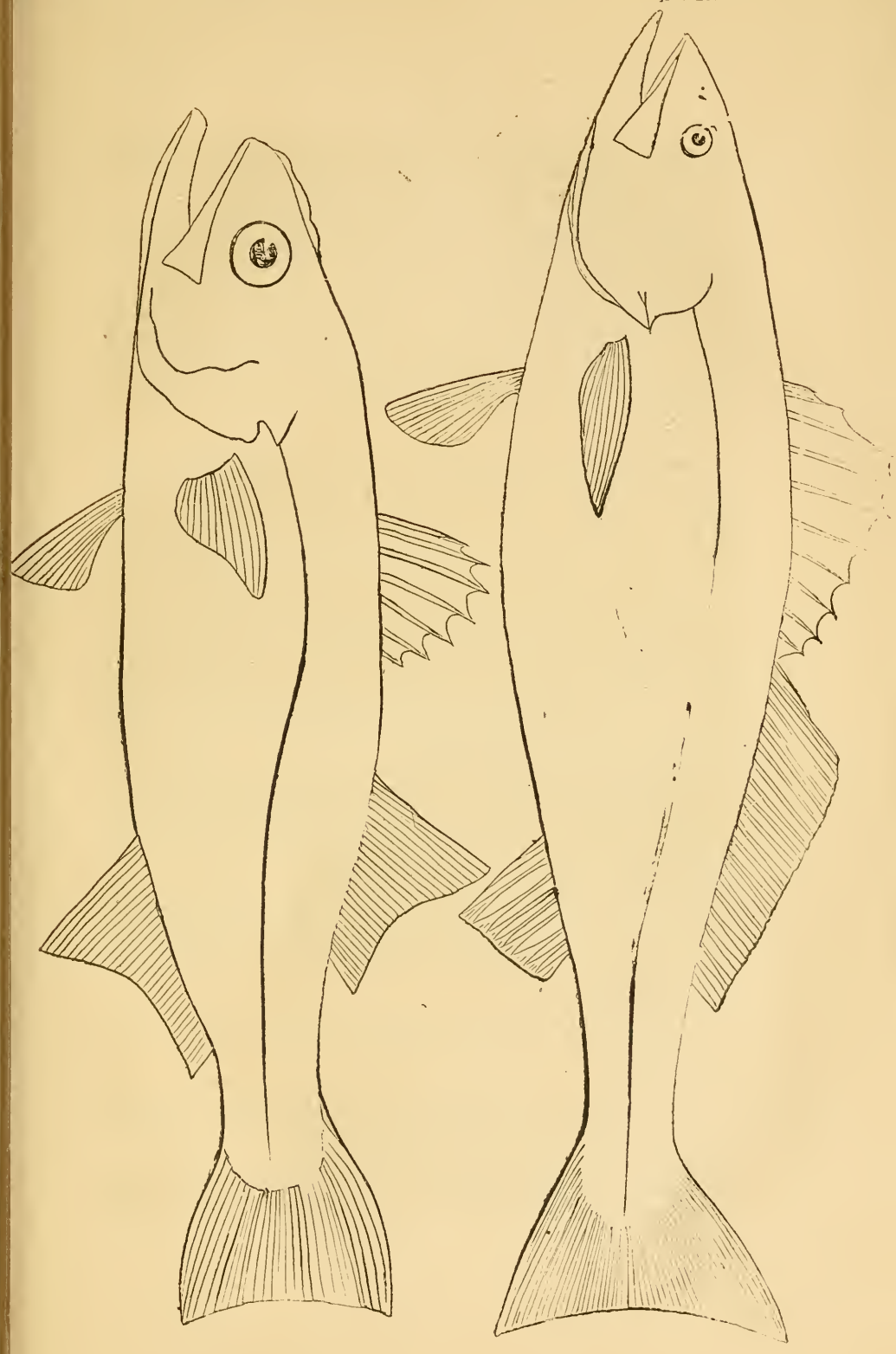
D. X. I. 22, A. II. 9, P. 17, V. I. 5, C. 5, 1, 9, 8. 1. 5.

Color grayish blue above, lighter on the sides, white beneath.

This species is one of the finest of all that are brought to the

FIG. 21

FIG. 20.



markets in San Francisco. It is universally known as the "Basse," and from its excellent flavor brings always a high price. It attains a length of five feet, and a weight of seventy pounds.

In its great size, relative to the other Scienoid fishes of this coast, it resembles the Red Drum among the Scienoids of the Atlantic States, though in no way closely allied to it. It is taken in the bay of San Francisco from October to March, though never in very great numbers. It is found as far south at least as the coast of Lower California; a specimen in my possession having been brought by Capt. Scammon from latitude twenty-seven degrees north, where it was abundant. Its range to the north I have as yet no means of determining.

Seriphus politus, (Ayres) Fig. 21.—Form elongated, compressed; greatest depth contained about four and half times in the total length; snout somewhat gibbous; back of the head and nape of the neck rising a little abruptly; the back thence very slightly arched to the origin of the second dorsal fin, whence it descends to the peduncle of the tail; length of the head a little more than one-fourth of the total length, lower jaw projecting slightly beyond the upper; gape of the mouth rather large, the tip of the maxillary reaching nearly even with the posterior border of the orbit; teeth distinct, sharp-pointed, not crowded, a double row on the front and sides of the upper jaw, the outer row slightly the larger, a double row in the front of the lower jaw, with a single row on the sides; no teeth on the vomer or palatines.

Eye large, its longitudinal diameter being a very little less than one-fourth of the length of the head, in a fish of seven inches; it is distant rather more than its own diameter from the tip of the upper jaw; nostrils anterior to the upper portion of the eye, the posterior one the larger, vertically elliptical.

The cavernous nature of the bones of the head is well shown in the suborbitals and the preoperculum; with this exception, the opercular pieces are smooth. A longitudinal crest or ridge extends from the tip of the nasal bone backward, about even with the middle of the orbit.

Branchial apertures large, continuous beneath the throat; branchial rays, six; two pores beneath the symphysis of the lower jaw; no cirrhi.

Scales covering the entire body and head, and extending on the anal, caudal and second dorsal fins; those on the sides large, soft, strongly ciliated, deeper than long; the skin, when the scales are removed, having a bright silvery satin lustre.

Lateral line nearly straight.

The distance of the origin of the first dorsal from the tip of the

upper jaw is one third the length of the fish; it is separated from the second dorsal by a space about equal to the height of the fifth ray; the spines are all slender; the height of the third spinal ray, which is the highest, the first being very short, is equal to the length of the fin, or a little less than half the length of the head.

The length of the second dorsal is about one-sixth of the length of the fish; its greatest height, which is at the second soft ray, is equal to that of the first dorsal, and three times its height posteriorly; its first two rays are spinous, short.

The anal fin equalling the second dorsal in height, and similar to it in form, but longer, has its first four rays spinous; its origin is a little anterior to the line of the middle of the second dorsal.

The pectorals are pointed, having a height equal to half the length of the head, their length being one-third their height.

The ventrals, situated a little posterior to the pectorals, do not quite equal them in height.

The caudal is slightly concave, the height of its external rays being about equal to the length of the second dorsal.

D. VIII, II. 19, A. IV. 20, P. 18, V. I. 6, C. 6, 1. 8, 8, 1, 6.

Color grayish brown above, silvery on the sides and beneath.

This species is by no means common, only two or three specimens having yet been observed, none of which exceeded eight inches in length. They were all obtained in the markets of San Francisco having undoubtedly been caught in the bay.

It is with much reluctance that I propose a new generic division in this family. The allied genera seem to me not well studied, and to need a careful revision. The arrangement of the teeth, however, in the present species, is such as to separate it from any genus now recognized. It may be thus characterized

SERIPHUS (Ayres).—*Dorsal fins, two, distinct; branchial apertures continuous; branchial rays, six; no cirrhi; teeth in both jaws, sharp, distinct, nearly even in size, in a double or single row, none on the vomer or palatines; anal spines feeble.*

The genus is very closely allied to *Johnius*.

December 3, 1860.

President in the Chair.

Dr. Ayres read the following descriptions:

Umamarina nigricans, (Ayres) Fig. 22.—Form oval, elongated, compact, compressed; snout blunt; dorsal and ventral outlines nearly evenly arched; greatest depth a little more than one-third of the total length; length of the head constituting not quite

one-fourth of the total length; eye nearly circular; its diameter in a fish of twelve and a half inches, is about one-fifth of the length of the head; in a fish of six and three-quarters inches, it is about one-fourth of the length of the head.

Mouth protractile, small; the tip of the maxillary reaching but little beyond half the distance to the eye; lower jaw shorter than the upper; the border of the upper jaw is formed entirely by the premaxillaries, which are stout and broad, the small maxillaries lying behind; teeth numerous in both jaws, none on the vomer or palatines; a doubly and sometimes triply ranked row of rather large, distinct, three-lobed teeth in the front of each jaw; behind these a dense patch of similar teeth, but very small, running into a small row on the side of the jaw; lips soft, free, thin; nostrils slightly tubular, situated in front of the upper portion of the eye, the posterior one a little the larger.

Scales firm, rather large, strongly ciliated, covering the whole body and head except the operculum, suborperculum, and intero perculum, and top of the head, and extending far up on each side of the fins; a deep groove extends the entire length of the dorsal fin, separating the scales of the body from the smaller ones covering the base and sides of the fin; lateral line following nearly the curve of the back.

Opercular pieces destitute of spines or serrations; operculum ending in a flat point.

The dorsal fin, arising very nearly even with the posterior portion of the base of the pectorals, is not quite half as long as the fish; the spinous part, which is lower than the soft, constitutes almost two-thirds of the length of the fin; the spines are strong, rigid, the height of the highest being a little more than one-fourth of the depth of the fish. The spinous and soft portions are directly continuous.

The anal fin, whose height and length are equal, is coterminal with the dorsal; its first three rays are spinous, much lower than the soft portion, of which the height is rather more than half the depth of the fish.

The pectorals are broad and rounded; their height equal to half the depth of the fish.

The ventrals, arising a little posterior to the pectorals, are equal to those fins in height.

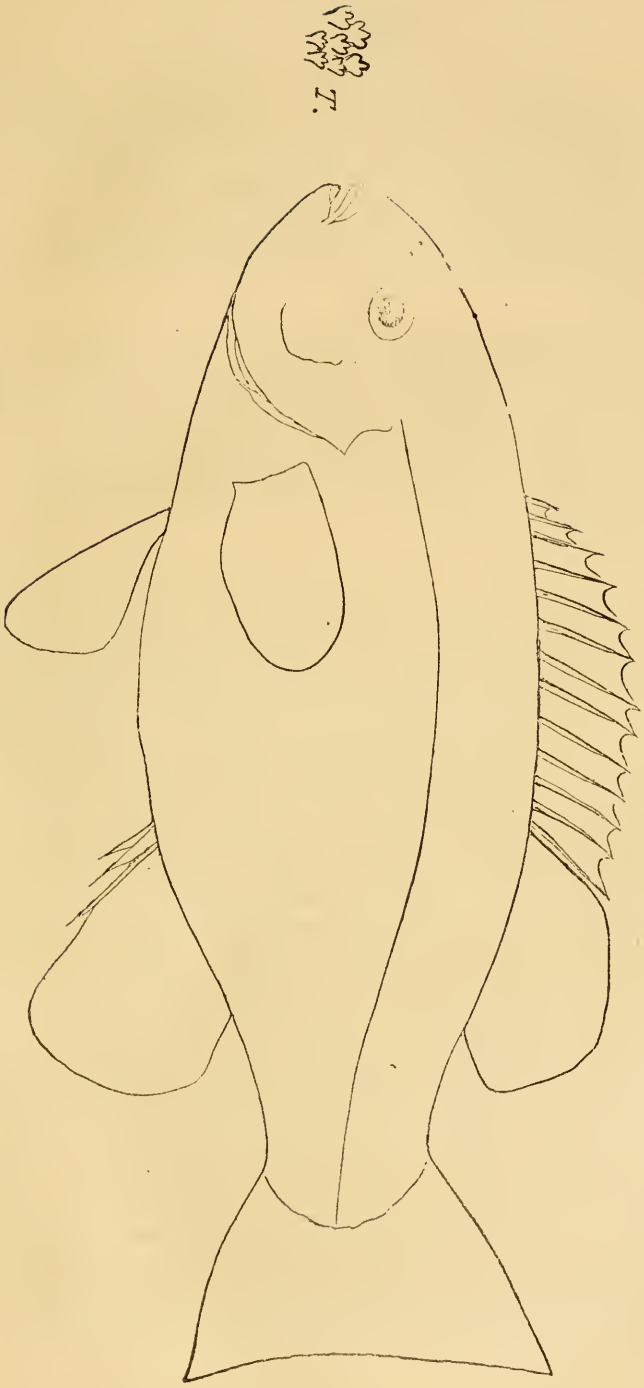
The caudal fin is broad, slightly concave on its margin, the height of the external rays nearly one-fifth of the length of the fish.

D. XIII. 13, A. III, 11, P. 18, V. I. 5, C. 6, 1, 7, 6, 1, 6.

Branchial apertures continuous beneath; branchial rays, four.

Color plain dark blackish brown throughout; a very little lighter beneath.

FIG. 22



This species appears to be quite rare in this vicinity; but a single specimen has been seen. It is perhaps more abundant below Point Conception, since it was brought by Capt. C. M. Scammon from the coast of Lower California, in a collection of fishes made by him there. The largest is a little over twelve inches in length.

This genus, though resembling in general features some species of *Pomocentrus*, presents a new grouping of generic characters. It may be called

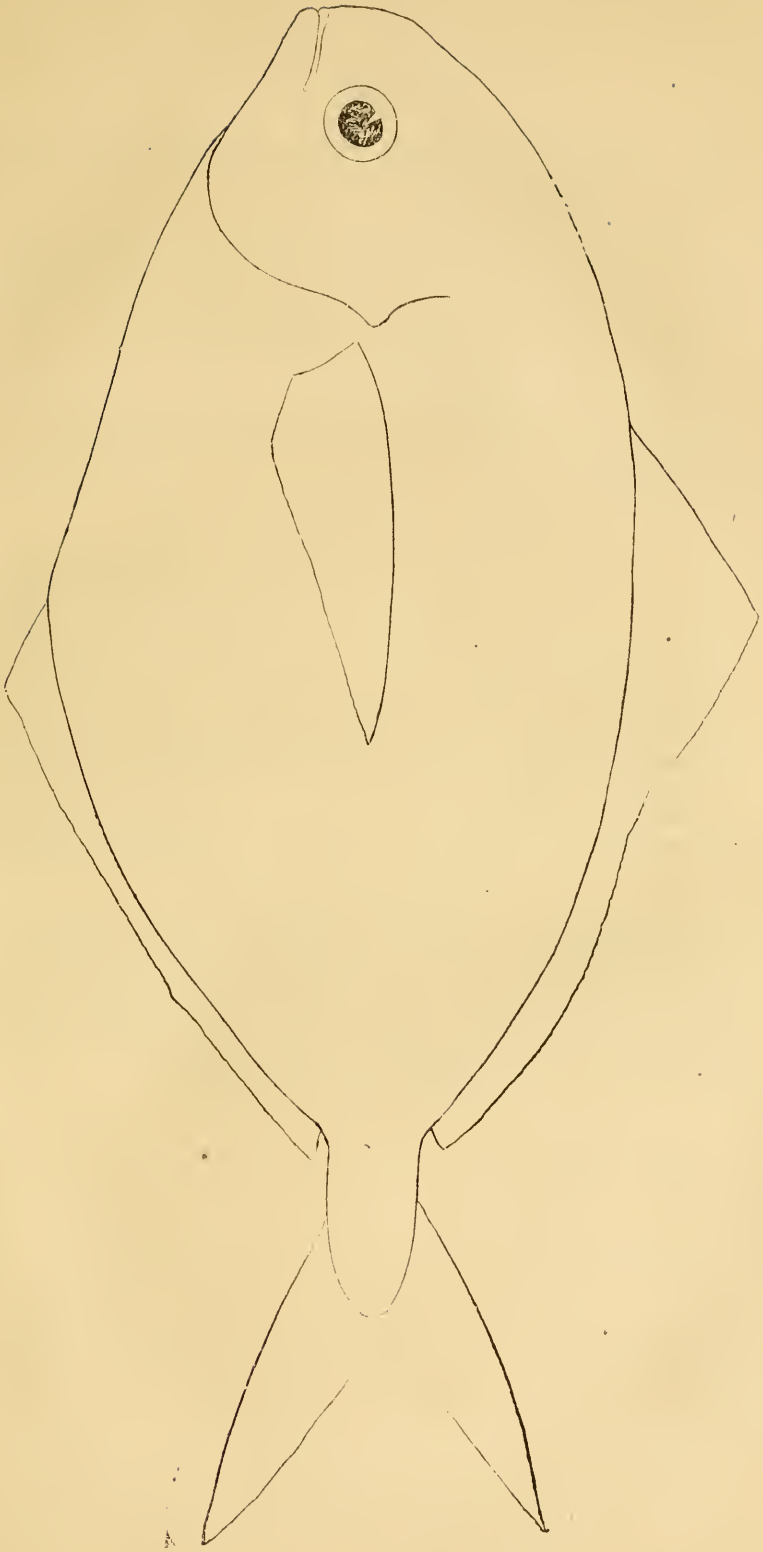
CAMARINA (Ayres).—*Scales conspicuous, ciliate, covering the entire body and the cheeks, and extending far up on all the fins; dorsal fin single, long, the anterior portion spinous; anal short, with three spinous rays; opercular apparatus without spines or serrations; branchial apparatus continuous; teeth numerous, crowded, in both jaws, those in the front of each jaw large, imbricated, lobed; behind these a crowded mass of similar teeth, smaller; none on the vomer or palatines.*

Poronotus simillimus, (Ayres) Fig. 23.—Form elongated, oval, much compressed; dorsal and ventral outlines nearly evenly curved to the peduncle of the tail, which is short, with its sides parallel; greatest depth a little more than two-fifths of the total length; depth of the peduncle of the tail not quite one-sixth of the greatest depth; head constituting about one-fifth of the entire length; eye nearly circular, distant from the front of the head about its own diameter, which equals one-fourth the length of the head; nostrils near the front of the head, each aperture vertically elliptical, the posterior a little the larger; snout blunt, almost vertical; mouth rather small, the tip of the maxillary but just passing the line of the front of the orbit; teeth small, straight, rather blunt, somewhat numerous, in a single close set row in each jaw; none on the palatines or vomer; operculum ending in a blunt rounded angle; preoperculum very finely denticulated, almost smooth.

Scales rather small, soft, not conspicuous, smooth, rounded, elliptical; lateral lines following nearly the curve of the back.

A short distance anterior to the dorsal fin is a concealed horizontal spine directed forward, merely its very tip projecting; close behind the anus is another, also directed forward; while a short distance anterior to it is still another directed backward. These spines are similar to those of *P. triacanthus*, but seem to be less prominent. The dorsal fin, arising a little anterior to the close of the first fourth of the fish in length, and extending to the commencement of the slender peduncle of the tail, has its greatest height (which is not quite equal to one-fourth its length) at about the fifth ray. The height of the last ray is less than one-fifth of

Fig. 23.



that of the highest. This fin, like the anal, is enveloped in a membrane so thick as to render the enumeration of the rays difficult; the tips of the rays are free.

The anal, coterminal with the dorsal, is in length equal to half the distance from the front of the head to the fork of the caudal fin. The height anteriorly, is not quite half that of the dorsal; the height posteriorly is about equal to that of the dorsal.

Pectorals long and pointed, their height being a little more than one-fourth the length of the fish.

Caudal deeply forked, the central rays being very short, the height of the external ones equal to the length of the head.

The scales extend up on the membrane, covering the dorsal, anal and caudal fins.

D. 45, P. 21, A. 31, C. 5, 1, 9, 8, 1, 5.

This species is by no means common in this vicinity, only three or four specimens having been obtained in the course of seven years. It is allied very closely indeed to *P. triacanthus* of the Atlantic coast, which species it represents in our waters. Slight differences in the form of the front of the head, in the proportions of the dorsal and anal fins, and in the development of the horizontal spines, and the absence of the black points on each side of the dorsal fin, appear to be the only distinguishing features. It certainly approaches more closely to its eastern ally than almost any other fish of our waters.

The figure does not give the outline of the abdomen correctly; it should follow the regular curve of the remainder of the lower border.

This species is evidently of the same genus as the Atlantic *P. triacanthus*, and I have accordingly called it *Poronotus*; but as I have been unable to examine any diagnosis of that genus, I do so with doubt, inasmuch as the name indicates a character which I do not find in my specimens. Until the reception of Mr. Gill's "Catalogue of the Fishes of the Eastern Coast of North America," my manuscript notes recorded it as *Peprilus simillimus*.

JANUARY 7, 1861.

ANNUAL MEETING.

President in the Chair.

The following Officers were elected for the year:

LEANDER RANSOM.....President.
T. F. MOSS,
Dr. J. N. ECKEL, } .....Vice Presidents.
Dr. W. O. AYRES,.....Cor. Secretary.
EDWARD BOSQUI,.....Treasurer.
Dr. J. B. TRASK,.....Rec. Secretary.
WM. HEFFLEY,.....Librarian.

CURATORS.

R. J. B. TRASK,.....Geology and Mineralogy.
H. G. BLOOMER,.....Botany.
Dr. J. A. VEATCH,.....Conchology.
Dr. W. O. AYRES,.....Zoology.

COMMITTEES.

Dr. AYRES,
Dr. TRASK,
Col. RANSOM, } .....Publication.
Dr. ECKEL,
Mr. HEFFLEY,
Dr. TRASK, } .....Library.
Mr. HEFFLEY,
Dr. KELLOGG, } .....Finance.

January 21, 1861.

President in the Chair.

Dr. W. Newcomb, of Oakland, was elected a Corresponding Member.

Dr. Kellogg presented the following description of a species of *Polypodium* found in the vicinity of San Francisco, springing from the crevices of rocks.

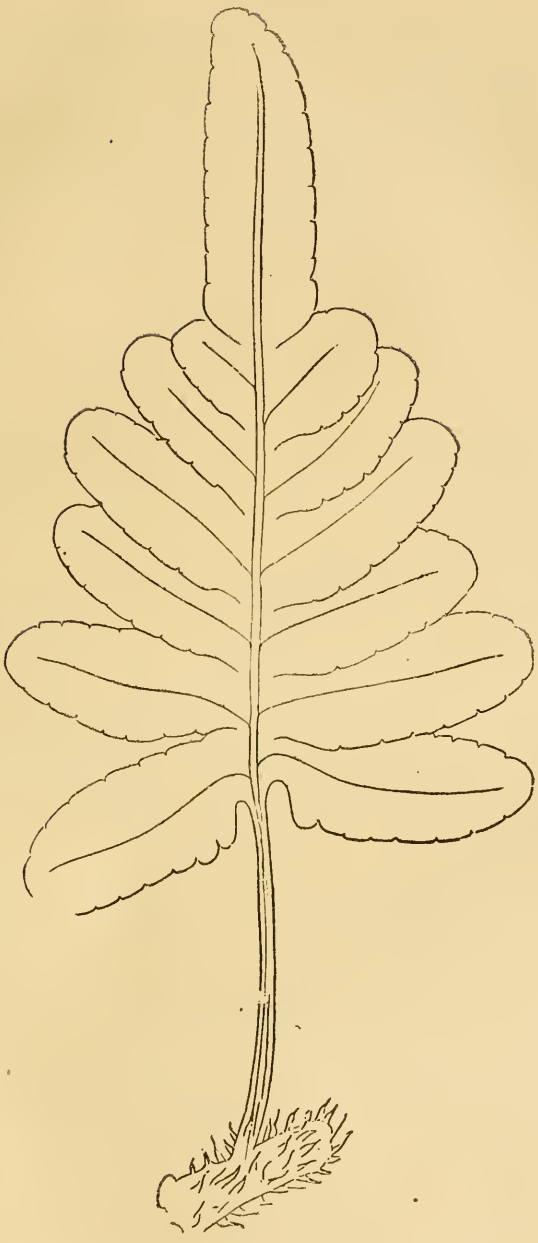
P. carnosum, (Kellogg) Fig. 24.—Fronds deltoid-ovate (the terminal odd pinna elongated) pinnately divided to the rachis, segments alternate or sub-opposite, oblong, obtuse, crenate-serrate, teeth ? broad, truncate ; lamina thick, fleshy, brittle, opaque, (the pellucid veins only obscurely discerned ; the three lower and outer veinlets clavate at the extremity, lying near the margin—the upper longer basilar veins bearing the torus) veins dichotomous, the adnate base of junction of the pinnæ with the rachis descending above and decurrent below the lower (longer) pair, slightly decurrent along the stipe to its articulation at the elevated base of the rhizoma, a dark areola marking the point of junction ; rachis and veins large and prominent above and below, stipe and rachis equal ; scales upon the stipe and back of the frond ovate-cordate, acuminate, erose-dentate, amber brown, scarious transparent, reticulate, often deciduous.

Sori very large, oval or oblong in two rows on the back of the segments, somewhat approximating the mid-vein at the terminus of the upper or first lateral veinlet ; cinnamon brown, and when fully developed becoming contiguous, but not confluent.

Rhizoma creeping, clothed with membranous ovate peltate acuminate tawny scales, irregularly repand-dentate—when denuded or cut it exhibits a pale greenish white hue—flavor, that of liquorice, but rather nauseous if much is eaten.

Fronds six inches to a foot in height. Of the same group as *Polypodium vulgare var. occidentale*, but in all respects more robust than the common species. The fleshy pinnæ as readily break asunder upon being bent as the common House Leek. The venation is the same as in *P. pellucidum* of Oahu and Sandwich Islands; but that is naked and has intermediate translucent striæ from the marginal crenatures, etc. The Sori in all our specimens are three or four times as large as in either this or the Peruvian *P. macrocarpum*, the lamina of the pinnæ is from half an inch to an inch in width ; and the general outline quite uniform, and very unlike those referred to. As these differ as much from the one before us as they do from other acknowledged species, we submit the facts to those of more ample means for comparison. The figure should have represented the lacineæ extending to the mid-rib.

Fig. 24.



Dr. J. B. Trask presented the following account of Earthquakes in California in 1860.

During the year last passed this portion of the Pacific coast has been but little disturbed by earthquakes. There have been but three during this period that can be well authenticated, and one, viz: Dec. 21st, whose character is somewhat doubtful.

The shocks that have occurred are as follows:

January 27th.—A severe shock was experienced at Los Angeles and vicinity, which was not productive of any damage to person or property. No time is given in the account.

March 15th.—A violent shock was experienced at 11 h. 0 m. at Sacramento; the wave passed through the counties of Placer, Nevada, El Dorado and Plumas. At Iowa Hill the church bells were rung, also in Sacramento. At the latter place and at Forest City, clocks, in many of the buildings, were stopped. This earthquake extended to the eastern base of the Sierra Nevada. At Carson City it occurred at 10 h. 45 m. and very violent; goods were shaken off the shelves in many of the stores, and a general panic and stampede prevailed.

November 12th.—A smart shock was felt at Humboldt Bay and its vicinity, but no damage was done.

December 21st.—At 16 h. 30 m. at San Francisco a series of light vibrations of the earth occurred, which continued with but two remissions for the space of half an hour. These vibrations were not perceptible to persons in the building otherwise than by the oscillation of a mercurial column, which was equal to seven inches of the barometer, and which was the mercury gauge of an air pump that had remained stationary at 24 inches for the space of four hours. At this time the column in the gauge began to show much disturbance by oscillating up and down in a very rapid manner without any apparent cause; the stop screws (Farraday's) were all tried at the moment and found perfectly tight, as they had remained for hours previous.

The oscillations were watched carefully by Mr. J. Roach and myself for half an hour, at which time they ceased. The maximum displacement of the column was a fraction over one inch, which was attained through vibrations of one-fourth to one-eighth of an inch rapidly repeated and continuous, and as gradually through a series of lighter vibrations the displacement would diminish and the column subside to its former level; this was three times repeated, the column at no time being at rest. The period of time occupied by the column in reaching its maximum of disturbance each time was from eight to twelve minutes. There was no apparent cause for this disturbance, unless it be attributable to a series of light vibrations of the earth occurring in a vertical direction, and to that cause I am disposed to assign it.

The passing of carriages on the street below did not affect these vibrations of the column, for they continued in the same manner when those vehicles were not passing. While the oscillations were going on, I took a sledge and struck some half dozen blows on an anvil block in the workshop, which did not make any perceptible difference in the movements of the column; after it had come to rest, the same experiment was repeated, but the column did not in any manner react to the concussion thus produced.

February 4th, 1861.

President in the Chair.

Dr. Newcomb presented the following descriptions of new shells.

Helix Bridgesii.—H. testâ profundé umbilicata, deprésso globosa, plicato-striata et undique minute granulata, sub-diaphana, corneo-grisea intus purpurascenti tincta, centrale linea tenue fuscescenti cincta; spira sub-conoidea; anfr. 6. convexis, ultimus antice paullum descendens; sutura bene impressa; apertura rotundato-lunaris; labro expanso, reflexo, pallide lilacino.

Hab. "San Pablo," Cal.

Diam. 27 mill.
Alt. 19 "
Aperturæ Diam. 13 "
Alt. 11 "

Shell deeply umbilicate, depressly globose, plicately striate and covered with minute granulations, translucent grayish horn color; within tinted with purple, with a narrow, encircling central brownish band, spire conical, whorls 6 convex; suture well impressed, aperture roundly lunar; lip expanded and reflected of a pale, lilac color.

Remarks.—But a solitary specimen of this shell has been obtained; but it differs essentially from any described species. In its lightness of structure and general aspect it resembles *H. Bonplandii*, from which it is widely separated in most of the details of character. It nearest approach to any described California species is to *H. ramentosa*, (Gould) which is much smaller in size, more solid in structure, with a more depressed spire, lighter color and more scaly granulations. From *H. Nickliniana*, Lea it is readily distinguished by its large umbilicus and difference in form.

It is with pleasure I dedicate this fine species to Thomas Bridges, Esq., of Oakland, an ardent and accomplished naturalist.

Helix Traskii.—H. testa H. Dupetit Thouarsi Desh. persimilis; discrepat in eo quod anfr. ultimis non descendit supra; strias microscopicas numerosas intertextas ostentat. Testa pallido-cornea,

sub-pellucida; fusco-cincta; supra sub-discoidea, infra cinctura rapida decliva; perissimplex breviter expansa; columella et fauces purpureo-tinctæ. Diam. 26 mill.
Axis. 16 "

Shell very near to *H. Dupetit Thouarsi Desh.* but differs in the last whorl not descending above, less thickened lip, in having numerous microscopical interwoven striæ. Shell pale corneous, somewhat pellucid, brown-banded; sub-planulate above, (or but little elevated) below the band shelving down rapidly; lip simple, scarcely expanded; columella and fauces tinged with purple.

Hab. Los Angeles, Cal.

Remarks.—To distinguish this from its nearly allied species, we may again notice the minutely impressed, revolving and somewhat undulating striæ, giving the shell under the glass a texturate appearance.

The absence of the deflection of the outer lip found in all specimens of the *Dupetit Thouarsi*, and the want of the dark color in this species, will be sufficient to enable us to distinguish them at a glance.

No apology is required for my associating the name of Dr. Trask with this beautiful species.

Vitrina Pfeifferi.—V. testa sub-deprĕssa, lævigata, nitida, pellucida, virenti-albida; anfr. 3, ultimus permagnis; sutura subtillissima marginata; apertura ampla, obliqua rotundato-ovata; peristenue; columella arcuata. Diam. 5 mill.
Axis. 2 "

Shell moderately depressed, smooth, shining pellucid, greenish white; whorls 3, the last composing most of the shell; suture very finely margined; aperture large, obliquely and roundly ovate; lip thin, columella arched.

Hab. Carson Valley.

Remarks.—This species, about the size of *V. diaphana*, (Drap.) but much more rounded, can be confounded only with the following, viz: *V. angelicæ* (Beck) from Greenland, which has "anfractus maximus verticaliter plures strias subtiles subeminentes; ad suturam notabiliores," not applicable to this species;. with *V. limpida* (Gould) [*Americana* Pfr.] which is smaller, with a lighter texture and two and one-half whorls only; finally, with *V. mexicana* (Beck) of which I can find no description. Dr. Pfeiffer in his great work, "Mon. Hel. Viv." vol. 4, part 2, page 798, refers back to vol. 2, page 510, where the following observation occurs: "Praeterea nulla Vitrinarum genuinarum species ex America mihi innotuit excepta *V. mexicana* (Beck) [ined]."

The probability is, that *V. mexicana* is from Southern Mexico, consequently, from a tropical region, and from a distinct zoölogical province.

Tornatellina striata.—T. testa acute-turrita, rufo-cornea, minute et impresso transverso striata; apice acuto; sutura mediocriter impressa; anfr. 6 ad 8, ultimus 2-5 longitudinis æquans; apertura elongato sub-ovata; columella truncata, excavata, contorta inferiori parte in plicam.

Hab. Kauai. Insula Sandwichensis. Long. 5 mill.
Diam. 2 "

Shell acutely turretted, reddish horn color, minutely and impressly striated transversely; apex acute; suture moderate; whorls six to eight, the last two-fifths of the whole length; aperture produced sub-ovate; columella excavated, truncated, twisted below into a fold.

Remarks.—This species makes a nearer approach in its general appearance to the Genus *Tornatellina* than to any other yet constituted. Though not answering fully the generic description in the want of a fold or lamellar tooth on the parietal wall, we find it tranferred as in some of the species of the section of *Leptachatina* (Gould) to the termination of the columella. Two other species have been given from the Sandwich Islands, viz: *Tornatellina peponum* (Gould) and *T. Newcombi Pfr.*, both of which are of different form from the one now described, and are without the transverse striæ characteristic of this last named species.

Achatinella Anthonii.—A. testa conoideo-ovata, solida, nigrito-brunnea, longitudine striata; anfr. 6 inflati; sutura modice impressa; apice obtuso; apertura oblique ovata, infra sub-angulata; labium simplex intus crassum; columella brevis, recta, plica paululum callosa sub media; infra suturam fascia alba, et regione umbilicare sordido-alba.

Hab. Kauai. Long. 15 mill.
Lat. 10 "
Aperturæ Long. 6 "
Lat. 4½ "

Shell conically ovate, solid, blackish brown, longitudinally striate; whorls six inflated; suture moderately impressed; apex obtuse; aperture obliquely ovate, sub-angulate below; lip simple, thickened within; columella short, straight, with a somewhat callous plication below the middle; white-banded below the suture, and of a dirty white in the umbilical region.

Remarks.—Excepting in size, and in being more ventricose, this species makes a near approach to *A. nucleola* (Gould). It is more than quadruple the size of *nucleola*, and not acute at the summit, by which it can be at once distinguished from that species. For this and the preceding species I am indebted to the Rev. Mr. Johnson, of Koloa. It is named after the eminent Naturalist, John G. Anthony, Esq., of Cincinnati, Ohio.

Pisidium occidentale.—P. testa P. variabilis (Prime) affinis; rotundato-ovata, obliqua, inequilatera, hyalina vel fusco-cornea; natibus approximatis vix prominentibus; striæ minutissimæ.

Long. 4 mill.
Alt. $3\frac{3}{4}$ "

Hab. "Ocean House," San Francisco.

Shell near *P. variabile* (Prime) roundly ovate, oblique, inequilateral, transparent or brown horn color; umbones approximate but slightly prominent; striæ extremely minute.

We are indebted for the discovery of this, and many other species, to the researches of the Rev. Mr. Rowell, of San Francisco.

This is the first species of the genus *Pisidium* found in our country west of the Rocky mountains.

February 18*th*, 1861.

President in the Chair.

Dr. Kellogg presented the annexed description:

Ribes balsamifera (Kellogg). Fig. 25. Glandularly villous and viscid or resinous throughout; stem and older branches smooth; shining mottled greyish and cherry colored bark.

Leaves plicate in vernation, sub-reniform-cordate, slightly three to eight-lobed, incisely many toothed, lamina thin, pale glaucous hue; translucent nerves numerous, radiating.

Flowers bright yellow (from the same buds as the leaves) about five, in a condensed raceme (rachis rarely one-half an inch long) nodding, (?) tubular calyx long, slender below, slightly inflated and expanding above, segment of the border very short, ovate acute, apex apiculate, recurved, villous externally.

Petals minute, entire, (rarely a little crenate) broadly obovate on a slender cuneate claw; stamens included, filaments shorter than the glabrous anthers; pistil exsert, glandularly villous, stigma doubly capitate.

Bracts foliaceous, obovate, nerved, cut dentate at the broad somewhat truncate summit, entire at the base, about five or six times the length of the very short pedicels, a subulate bractiole opposite at the base.

Fruit (in the half-grown state) round ten-nerved, viscid villous.

This plant was brought to us by Dr. J. A. Veatch from Washoe. We are aware that the *habitat* causes much variation in the genus Ribes; but this appears to be quite distinct. The plant exhales the refreshing odor of *Populus balsamifera*, hence the specific name.

Fig. 25.

February 25, 1861.

President in the Chair.

Dr. Kellogg presented the following descriptions:

Galium stellatum, (Kellogg) STARRY-HAIRED CLEAVERS. Fig. 26. This and the following species belong to the Trichogaliums. Stem suffruticose at the base (with a light, loose, cream colored bark); branches mostly simple, erect, with a few short axillary fruiting branchlets, quadrangular, angles obtuse; hoary stellate pubescent; leaves in whorls of four, sessile or subsessile, ovate-acute and acuminate, apex subulate; lamina thick, rigid, very scabrous throughout; margins revolute, pale green above, lighter hoary beneath; the mid-rib stout and prominent below, (slightly keeled at the base, one nerved rarely two-nerved). Flowers unknown; fruit axillary and terminal, solitary? (or only few flowered); very densely hirsute with straight white bristles, longer than the fruit; one or more bracts closely set beneath the fruit, pedicels very short. This species approaches *G. trichocarpum*, but the stem in that is said to be "glabrous;" the long hairs of the fruit bring it near *G. eriocarpum*.

It is allied to *G. Wrightii*, but that has "obtuse leaves; these are sharp, cuspidately spinose, and the simply "hirsute" stems "very much branched," does not accord with the above characteristics.

This species of *Galium* was brought from Cerros Island by Dr. J. A. Veatch. The plant seldom exceeds a foot in height. Fig. 26 exhibits the general outline and natural size of a portion of the stem. We have not endeavored to represent the peculiar stellate pubescence.

Galium multiflorum, (Kellogg) MANY FLOWERED CLEAVERS. Fig. 27. Stem somewhat decumbent at the suffruticose base, glabrous, (the bark exfoliates from the perennial base in thin, shining, hemp-like shreds); branches sharply quadrangular, angles scabrous, branchlets numerous.

Leaves, four in a whorl, roundish-ovate, (about as broad as long) abruptly short, acuminate, mucronate, with the apex recurved, three-nerved, sessile, membraneous; margins scabrous, (not revolute) surfaces naked, minutely granular, three or four times shorter than the internodes, the ultimate leaves often opposite.

Peduncles axillary and terminal in trichotomous cymules, pedicels erect, short, scarcely longer than the ultimate leaves.

Fig. 26.

Fig. 27.

Flowers numerous, white ; segments of the corolla ovate-acute, villous externally, rotate-campanulate.

Fruit globose, very hirsute, with long, slender, soft, white hairs somewhat flattened and twisted (but not hooked at the apex) ; fruit subtended by a single ovate-acute or acuminate floral leaf or bract.

This species seems to be nearly allied to *G. chamissonis* of Chili, but in that the angles are said to be " smooth," and leaves " oblong," " deflexed," etc. Recently brought from Washoe by Dr. J. A. Veatch. In several instances we observe the leaves five-nerved, and the cusp occasionally bifid.

Mentzelia veatchiana (Kellogg). Fig. 28. The new species of *Mentzelia*, herewith presented, figured and described, was recently brought by Mr. Andrew A. Veatch, from the vicinity of Virginia City, Washoe.

Stem low, (about one foot) branching from the base, lustrous, light flesh-colored, branches alternate, short villous, root annual.

Leaves remote, sessile, lower leaves linear-lanceolate, entire, or pinnatifid, dentate above the middle ; hispid and scabrous throughout, with minute barbate hairs ; the white hairs springing from an indurated corneous base, or submuricate hirsute ; the hairs with hooked prickles, in whorls, or sometimes scattered, of diamond-like brilliancy ; upper leaves subcordate, coarsely dentate at the expanded base; apex (terminal lobe) long, attenuated and entire (about twice the length of the expanded subclasping lower lamina) ; scabrous margins, and mid-ribs hirsute. (N. B Upper leaves sometimes lanceolate pinnatifid.)

Bracts leafy, subpinnatifid, lobed or coarsely (mostly) tridentate, scarcely as long as the capsule. Two other smaller bracteoles opposite at the base of the capsule, (usually rather more than one-half the length of the capsule) three-lobed or tridentate ; the middle lobe a little prolonged, cuneate at base.

Flowers small, (petals scarcely three lines in length) bright golden yellow deepening to rich orange at the claws or towards the center ; petals ovate-oblong unguiculate, five in number, twice the length of calyx segments, emarginate, apex slightly bristly.

Stamens and pistil equal, shorter than the petals, about twenty, filaments filiform ; pistils connate, apparently simple, included.

Capsules cylindraceous, slightly narrower towards the base, about half an inch long, hirsute calyx segments, crowning the capsule, subulate one-half the length of the petals ; tuberculate scabrous seeds somewhat cubical, in three series, six to eight or more in each row.

Fig. 28.

In condensed clusters of two to five (scarcely axillary and solitary) terminating the branches.

This species seems to be near *M. congesta*, (Nutt. Mss., under *Trachyphytum*) but the stem is not "dichotomous" nor "polished," nor leaves "short ovate," nor bracts "membranaceous."

Sisymbrium reflexum (Kellogg). Fig. 29. The figure here given, and the accompanying specimen recently brought from Washoe by Mr. Andrew A. Veatch, show quite a distinct *variety*, if not a new species of *Sisymbrium*. The reasons which lead us to consider it distinct from *S. pauciflorum* of Nutt. are, that this specimen has not "white" flowers but deep rose purple; nor are the siliques "pendulous" in any strict sense, but strongly *reflexed* against the stem; nor are they three times the length of the pedicel, but four or five times. The expressions, "radical leaves," "narrowly *oblong*-spatulate," seems hardly allowable where they are so strictly spatulate; "nearly smooth above," does not at all apply to our specimen. But notwithstanding these objections, from the meagre description given and with no figure to aid us, we candidly confess to some misgivings whether it may not prove the same when well authenticated specimens can be compared.

Stem biennial, (perennial?) light greenish gray, with short white forked or branching hairs throughout; slender, erect branches.

Leaves all entire, (?) sessile; radical ones narrowly spatulate, acute; cauline ones spatulate-lanceolate, (obscurely five-nerved) the uppermost lance-linear upon the slender branches (size from one-half to two inches long, one-sixteenth to one-quarter of an inch wide.)

Calyx erect, at length recurve spreading, purplish green, (slightly purplish at the base) sepals somewhat spatulate, subacute, half shorter than the petals, equal at the base or not saccate.

Petals beautiful deep rose purple on the lamina, the claws white; cuneiform-spatulate, unguiculate, claw scarcely a little longer than sepals, five to seven-nerved; pistil none, stigmas connate, stamens subequal included, flowers few and nodding, (or sinister).

Siliques compressed, one-nerved along the center of the valves, straight or a little curved, strongly reflexed against the stem; pedicels scarcely three-eighths of an inch long, siliques about two inches, somewhat linear-clavate in outline, or tapering back toward the pedicel. Seeds in a double series; septum a very thin, translucent membrane.

The mature fruit not seen. The rudimental ovules with the radical obliquely incumbent, seeds in two series.

Fig. 29.

March 18, 1861.

President in the Chair.

The accompanying descriptions were presented by Dr. W. Newcomb, of Oakland:

Helix Carpenteri.—H. testa umbilicata, rotundato-conoidea, apice obtusa, albida, obscure fusca una-cinctura, oblique valde striata, et striæ sub-lente spiralibus numerosis impressæ; anfr. 5½ rotundatis; sutura benê signata; apertura circulare cum marginibus approximatis; labium mediocriter expansum ad columellam latam non adnatum.

Diam. 23 mill.

Hab. "Tulare Valley." Alt. 16½ "

Shell umbilicate, roundly conical; apex obtuse, obscurely marked with one brown band; well striated; under the lens numerous very minute spiral striations; whorls five and one-half rounded; suture well marked; aperture circular, with margins approximating; lip moderately expanded, at the columella broadly so, but not adherent.

Mus. Cal. Acad. Nat. Sci.

My cabinet.

Remarks.—This shell, about the size of *H. ramentosa*, (Gould) can scarcely be confounded with any known species. It belongs to the Cyclostomoid groupe of Helices, and has the aspect of a desert species. Dedicated to Philip P. Carpenter, L. L. D., of Warrington, England.

Helix Ayresiana.—H. testa sub-obtecte umbilicata, rotundato-trochiformis, luteo-alba cum cinctura lata nigra ornata; anfr. 7 lénte accrescentibus, sub-convexis, supra crèberrime costulato-striata et lineis numerosis spiralibus valde impressis, infra pallidior et minute decussato-striata; sutura valde impressa; apertura orbiculari-ovata; peristomate reflexiusculo; columélla modice expansa. Diam. 22 mill.

Hab. "Northern Oregon." Alt. 15 mill.

Shell with umbilicus partially closed, roundly trochiform, yellowish white, (above) furnished with a broad black band; whorls seven, slowly increasing, moderately convex, superiorly with many rib-like striæ and numerous spiral lines deeply impressed, inferiorly pale and with minute decussating striations; suture well marked; aperture roundly ovate; lip slightly reflected; columella moderately expanded.

Mus. Society.

My collection.

Dedicated to Dr. W. O. Ayres, Cor. Sec. of Cal. Acad. Nat. Sciences.

Remarks.—The surface of this beautiful shell is cut up by the striæ into reticulations, which suggested that the *Helix reticulata* Pfr. was before me. This last named is a California species, which I have not yet seen. The description of that shell proves them quite distinct, *H. reticulata* having only five and one-half whorls and the umbilicus being impervious.

Physa costata.—P. testa ovato-globosa, cornea vel rufo-cornea; anfr. 4, ultimus inflatus et supra obtuso-angulatus cum costis 10 ad 14 prominentibus munitus; apex acūtus; spira brevis; apertura ovata.

Long. 9 mill.
Hab. " Clear Lake, California," Lat. 6 "

Shell ovate globular, horn colored or reddish corneous; whorls four, the last inflated and roundly angulated above, armed with ten to fourteen prominent longitudinal ribs; apex acute; spire short; aperture ovate.

Museum Cal. Acad. Nat. Sci.

My cabinet.

For this curious species of *Physa* we are indebted to Dr. Veatch, who collected several specimens at Clear Lake, most of them, however, immature. This is the only species provided with regularly arranged costæ that I have seen, and this character alone will be sufficient to separate it from all other described species of the genus.

April 1, 1861.

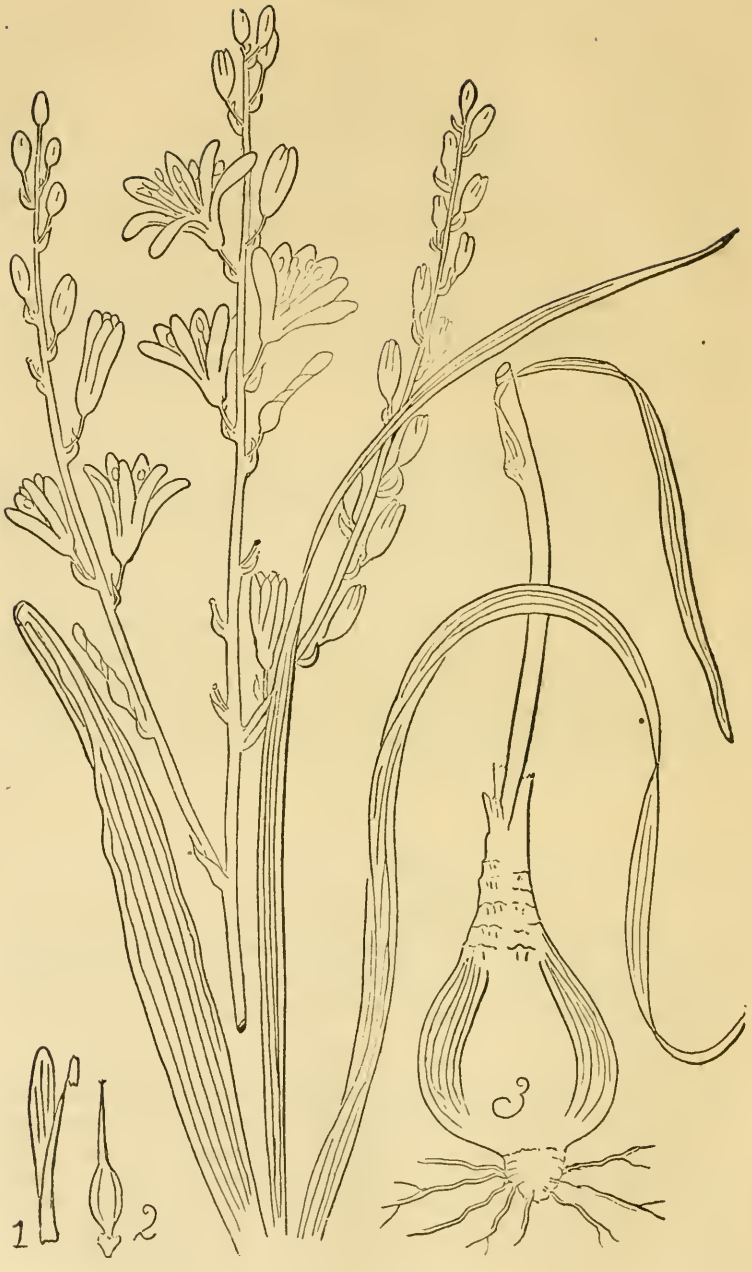
President in the Chair.

Dr. Kellogg read a description of a new species of *Chlorogalum*, (Soap Plant) brought from Shasta by Mr. Andrew A. Veatch, and cultivated by Mr. H. G. Bloomer.

Chlorogalum angustifolium (Kellogg). Fig. 30. Bulb short-ovoid with a conic apex slightly ribbed below. Outer covering a smooth thin brownish membranaceous coat, closely attached.

The paniculate-scape slender, erect, branching, smooth, light green, two to three feet in height; flowers small, abundant, approximated on attenuated racemose branches; white, with a light yellowish green line (or three parallel lines under the glass) along the back of the petals; pedicels short (one to three lines long) and with the subulate bracts incurved.

Fig. 30.



Bracts about as long as the pedicels, or a little longer in flower, and less in fruit; petals erect and recurve spreading (not revolute); three outer sepals more linear, acute, villous apex incurved; three inner often slightly emarginate (marginal nerves obscure); petals and sepals united into a tube one line long, persistent.

Stamens included, filaments subulate, anthers yellow, fixed by the back, at length versatile, linear oblong, style longer than the stamens, attenuated upwards, stigma three-parted, a seen in fig. 2.

Radical leaves narrow, linear-lanceolate, rather flat, striate-nerved, rather slightly undulated, subglabrous along the translucent margin, (two rows of cells not depositing chlorophyl) green alike above and below, four to eight inches long and about one-quarter broad; lower cauline leaves linear; at the axils expanded near the base and attenuated upwards, one to four inches in length.

This species differs from *C. pomeridianum* in the form of the root, which instead of being long-ovate, with a thick cylindroid trunk above, has a short ovo-conic shape; the bulbs are also destitute of the loose fibrous texture which distinguishes the coatings of the former.

C. pomeridianum is known by its remarkably undulate leaves, dark brown stems and spreading branches, larger revolute flowers with dark lines, dull purple anthers, longer pedicels and green torus, most conspicuous in fruit.

In *C. angustifolium* the leaves are plain and as above described; the brown membranous coating is more like the Roman Narcissus; the insertion of the petals, as indicated, is quite different, and the base does not remain green, forming a kind of distinct torus, on which the capsule rests, as in *C. pomeridianum*.

These comparative observations are from cultivated specimens, both blooming in June and July, and growing side by side.

We are indebted to Dr. J. A. Veatch for the following interesting shrub form Cerros Island:

Lipochæta hastata (Kellogg). Fig. 31. Stem shrubbery two to three feet in height; branches opposite, striate, slightly decurrent angled from the leaves; leaves opposite, often alternate above, oblong-hastate-triangular, acute or somewhat acuminate, entire, repand mucronate-dentate below, with one or more large salient teeth, at the angles; lamina rigid coriaceous, (very brittle in the dry state) triplinerved, veins prominent, (often sub-reti-

Fig. 31.

culate) decurrent from the broadly cuneate base along the petiole and slightly down the stem ; petioles about half an inch in length or one-third the lamina, scabrous above and below, with short slightly appressed aculeate hairs springing from minutely elevated or tuburcular bases ; peduncles long, mostly naked, terminated by a single head, arranged in umbeloid-corymbs, consisting of three, four or more ; involucre in outline broadly campanulate, loosely imbricated in three unequal series, the two exterior foliaceous, subspatulate, obtuse, recurved, five to nine nerved, the lowest series short and almost entirely herbaceous, the inner series similar to the disk chaff, lance-linear, mostly with sparsely ciliate margins at the base.

Flowers orange yellow ; rays, five to thirteen, narrowly ligulate, two to three-toothed (under the glass) claw-sparsely hirsute, (subglabrous ?) neutral, seven to nine-nerved ; achenia a mere rudiment, linear, glabrous, subthree-sided, awnless, umbilicus peltate ; disk florets yellowish, short proper tube, filiform with a bulboid expansion at the base, limb five-toothed, teeth somewhat erect, acute, glabrous, externally minutely pappillose, bearded within.

Style tortuous or somewhat twining, glabrous with a smooth bulbous base ; branches of the style exsert linear, recurved, minutely aculeate scabrous on the back, appendages short, subulate, hirsute.

Anthers dark brown, appendages lanceolate (see fig. 5).


7

Fertile achenia turbinate, compressed, four-angled, subwinged above, chiefly on the outer angle or margin, contracted at the incurved base as if shortly stipitate, (as seen at fig. 4, but which does not represent its true winged character as well as the more accurate marginal fig. 7). The point of attachment peltate, or point of articulation raised above the ovary ; the stout persistent awns upwardly scabrous ; middle or intermediate ridge prominent, very hirsute along the angles and separately so throughout. The numerous sterile disk achenia flat, linear, cuniform, margined by the decurrent awns, which are somewhat longer, equal, scarcely shorter than the florets.

Receptacle convex, alveolate, alveoli hispid, disk chaffy, chaff membranaceous, three to five-nerved, conduplicate, nearly clasping the floret and achenia, linear-lanceolate slenderly acute, very minutely mucronulate-serrulate on the waved margins of the apex, sparsely hirsute, on the back rigid and brittle.

April 15, 1861.

President in the Chair.

Dr. Kellogg read the following descriptions of new plants:

Allium anceps (Kellogg).—Bulb broadly ovate, half to one inch in diameter.

Scape short, (four to six inches, or about half the length of the leaves) naked, ancipital, somewhat attenuate below, translucent margins scabrulose (often horizontally cleft by the thin edges contracting in arid states of the atmosphere as it approaches maturity).

Leaves two radical, plain, somewhat ancipital nearly the whole length or very slightly convex beneath at the attenuated base, which is not sheathing. striate, margins scabrous, lamina tortuously undulate, sometimes falciform, about twice the length of the scape, apex subacute.

Spathe two-leaved, equal ovate, acute, seven to nine-nerved, membranaceous, persistent, base connate.

Heads in general outline obconic convex, twenty to thirty-flowered; in this specimen the umbel is loose; seven to nine-flowered, on slender, glabrous, slightly compressed pedicels, subturbinately enlarged at the base of the perianth, half to three-quarters of an inch in length (twelve or more rudimentary pedicels occupying the center of the umbel.

Perianth pale pinkish, segments linear-lanceolate acute, carinate, margins scariose, a diffuse green line along the center, most conspicuous on the back of the three exterior divisions, curved spreading (base connate.)

Stamens subequal (the three exterior at first shorter, at length equal; nearly as long as the segments).

Filaments subulate, base extended, attenuate above, the upper third bright lilac, anthers verditer blue.

Style about half the length of the stamens, simple (sharply pointed stigma, scarcely three-lobed under a strong glass).

Fruit capsular, obovate, three-celled, each cell two-seeded, seeds compressed; cells minutely six-toothed, crested.

A Washoe species collected by Andrew A. Veatch and cultivated by Mr. H. G. Bloomer, Botanical Curator to the Academy. We have also specimens from Onion Valley.

FIG. 32.

May 5, 1861.

President in the Chair.

Dr. Kellogg read the following descriptions of plants:

The following described Onion appears to be new. It was brought from Shasta by Mr. Andrew A. Veatch, and cultivated by Mr. H. G. Bloomer:

Allium attenuifolium (Kellogg).—Fig. 33.—Scape terete, solid, glaucous, smooth, (minutely speckled) springing from the base of a small, roundish, truncated bulb. In other specimens we have seen, from the top of the bulb as usual.

Leaves two, radical, stem sheathing at the broad membranous base, striate and channeled below, closely canaliculate above, very narrow and slenderly attenuated toward the filiform apex; margins slightly scabrous.

Bracts three; outermost larger, broad-ovate or oblong-ovate, short acuminate, sessile, membranous, four to nine-nerved or more; somewhat unequal.

Umbel globose, many-flowered (fifty to eighty or more), whitish (scarcely a pinkish tinge?) on pedicels half to three-fourths of an inch long. Flowers (not gibbous at the base) campanulate-rotate.

Petals ovoid-diamond-acute, slightly inflexed from the middle, mid-nerve pinkish (the three inner a little narrower).

Stamens as long as the perianth, filaments inserted at the base, subulate, white, anthers cream-colored, at length becoming blueish. Style as long as the stamens. Stigma simple.

Germ, color lively, pinkish capsule, turbinate, sub-three angled or three rounded cells, each cell slightly or obsoletely two-crested, central axis at the pistil depressed.

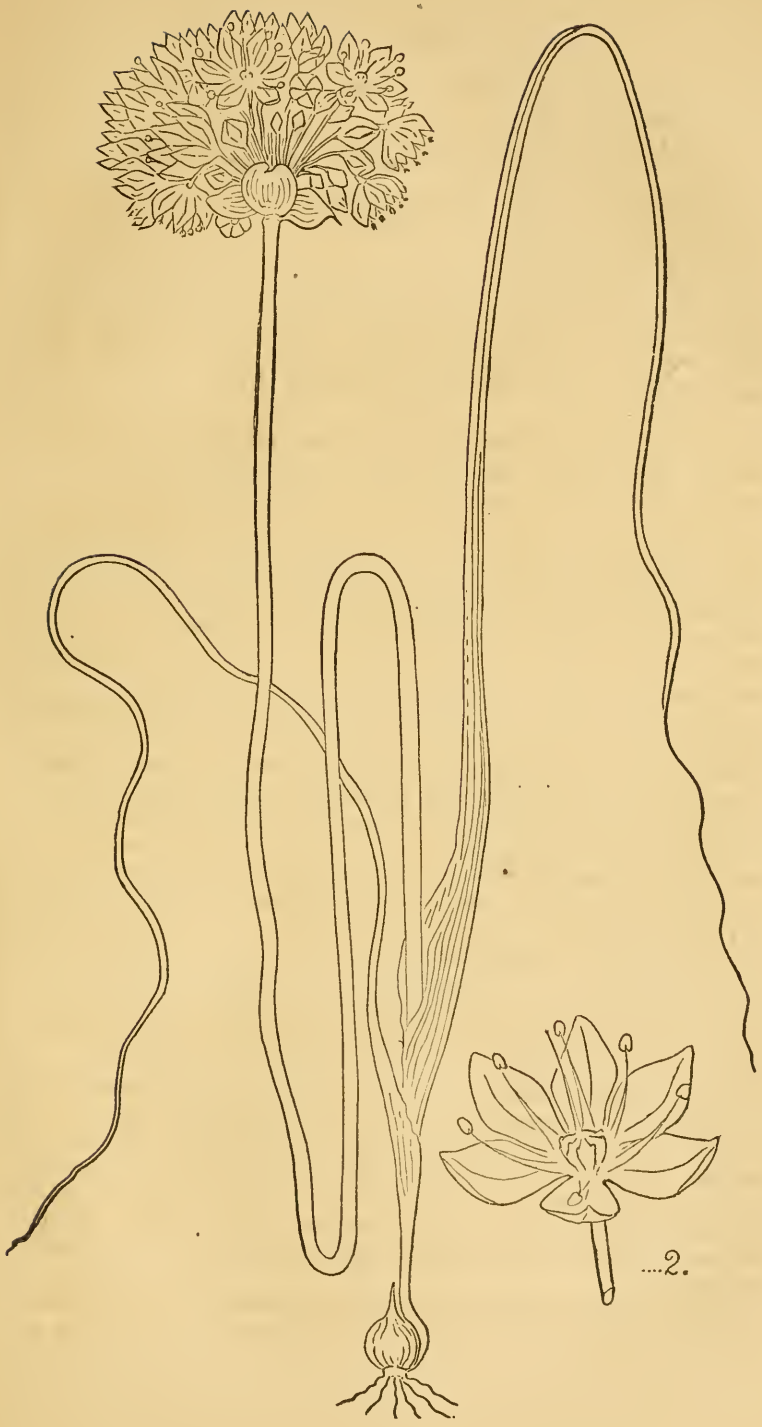
Cells two-seeded, rarely more than one perfected; seeds roundish, black, minutely pitted.

Collinsia hirsuta (Kellogg).—Fig. 34.—Stem purplish, branching, eight inches to a foot in height, short, scabrulose, whitish pubescent.

Leaves oblong ovate, somewhat obtuse, serrate, teeth rounded or obtuse, each tipped with a red gland; lamina thick, fleshy and brittle; margins scabrous, often revolute, short villous above; pitted below and villous along the midrib; five-nerved at the base and triple-nerved above, *i. e.*, the principal cauline leaves. Lower leaves oblong, short petioled. Cauline leaves sub-sessile, the short membranous petiole stem-clasping and connate.

(The uppermost lesser bractoid leaves oblong, linear, obtuse, entire on short petioles verticellate by threes, six to nine in a

Fig. 33.



whorl corresponding with the flowers; hirsute, with long white hairs, ciliate.)

Flowers whitish with a pink tinge, six to nine in a whorl.

Calyx campanulate, wooly, hirsute; segments oblong or subspatulate, obtuse, tipped by a red gland.

Upper lip of corolla deeply bifid, each segment emarginate, nearly equal the lower.

Corolla tube curved very slightly, gibbous at the base above. (See No. 1 in the figure.) No. 2 represents the corolla of *C. bicolor*, with its abrupt gibbosity to facilitate comparison. Keel villous externally, tube villous within, also along the upper surface of the filaments (chiefly the shorter pair.)

This species of *Collinsia* is frequently met with in this vicinity. The Society are under obligations to Mr. Dunn for the specimens herewith presented.

The following *Allium* is found in the vicinity of Oakland and about the Bay of San Francisco. We are indebted to Mr. Dunn for the specimen here figured and described:

Allium unifolium (Kellogg).—Fig. 35.—Scape long (a foot ormore in length), robust, terete, ascending from an oblique bulb; rhizoma repent.

Solitary leaf, radical, sheathing beneath the soil, shorter than the scape, falcate, plane or slightly convex above; midrib somewhat prominent below, obsoletely seven-nerved, ancipital, margins entire, subacute.

Spathe connate at the base, two-leaved, very thin, scariously transparent, three to seven-nerved, broadly ovate, acuminate, or ovate-oblong acuminate.

Umbel convex, fifteen to twenty-flowered, capsuliferous, pedicels an inch to an inch and a half long, somewhat obconically thickened at the base of the flower.

Flowers large, pink (of cheerful, lively hue) petaloid divisions rather thick and fleshy, spreading, rotate-campanulate, slightly gibbous at the greenish base; midrib also green below on the back, red above; three outer sepals oblong-ovate, subacute (or subemarginate) plane, entire, three inner narrower, apex emarginate; perianth about one-third longer than the stamens and pistil.

Filaments simple, subulate, the outer slightly narrower, filaments at first shorter, at length equal, the inner a little dilated at the base.

Style simple, subulate, as long as the stamens.

Fig. 34.

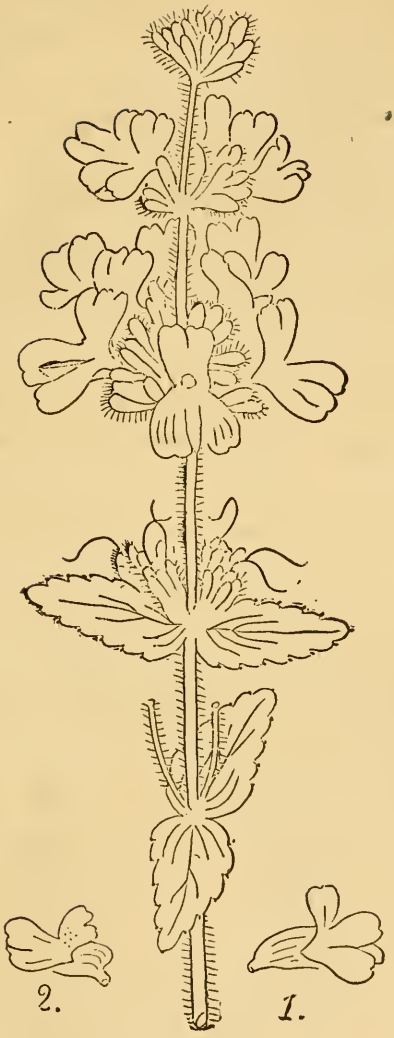


Fig. 35.

June 2, 1861.

President in the Chair.

Dr. Kellogg read the following paper:

Lewisia alba (Kellogg).—Fig. 36—White Spatulum of the natives. Leaves succulent, linear-spatulate, obtuse, grooved below the middle, the membranous margins waved, base similar and expanded; the upper half thickened and flattened, with a depressed line along the midrib; surface roughened and corrugated, glaucous, green, turning to red in withering.

Scapes succulent, somewhat shorter than the leaves (two to three inches in length), subterete, articulated at the crown of the root by a constricted base, also above the middle, where they are involucrate (?) with a whorl of about seven unequal leaves, the two leaves opposite the largest diameter of the scape about an inch in length, dentate; all grooved above, convex on the back, linear, obtuse, articulated at the insertion.

Sepals eight, somewhat obovate, emarginate, base and middle portion thick and fleshy, margins thin, sometimes slightly crenulate above, faintly colored.

Flowers white, about sixteen-petaled, subequal, oblong-ovate, obtuse or emarginate, base cuneate into an obsolete incurved claw, summit crenulate.

Stamens extrorse, short; anthers pink-colored; style eight-parted or eight filiform.

Root large, fusiform, branching below, the loose outer bark dirty white, the inner portion snowy white and farinaceous.

Astragalus hypoglottis (*var. strigosa*, Kellogg).—Fig. 37.—A small plant with relatively large purple flowers in condensed spikes or heads on long axillary peduncles. A plant of rather unusual beauty. The calyx deep purple, petals from purple shading to white on the extreme points and margins.

The specimens in this vicinity have neither "tomentose" nor "villous" pods, but quite glabrous. It evidently varies much, for *hypoglottis* proper has one-seeded cells, and var. *polyspermus* three to four-seeded cells, while this has six to eight; in one specimen the leaves are acute, while others are emarginate, besides other particulars uniting the characters of both.

Stem slender, slightly decurrent, angled, branches ascending from the base, hirsute throughout with black, appressed hairs.

Stipules cohering with each other underneath the petioles, triangular-ovate, acute or acuminate, margins conspicuously ciliate with black appressed hairs, membranaceous, often cut-dentate.

Fig. 36.

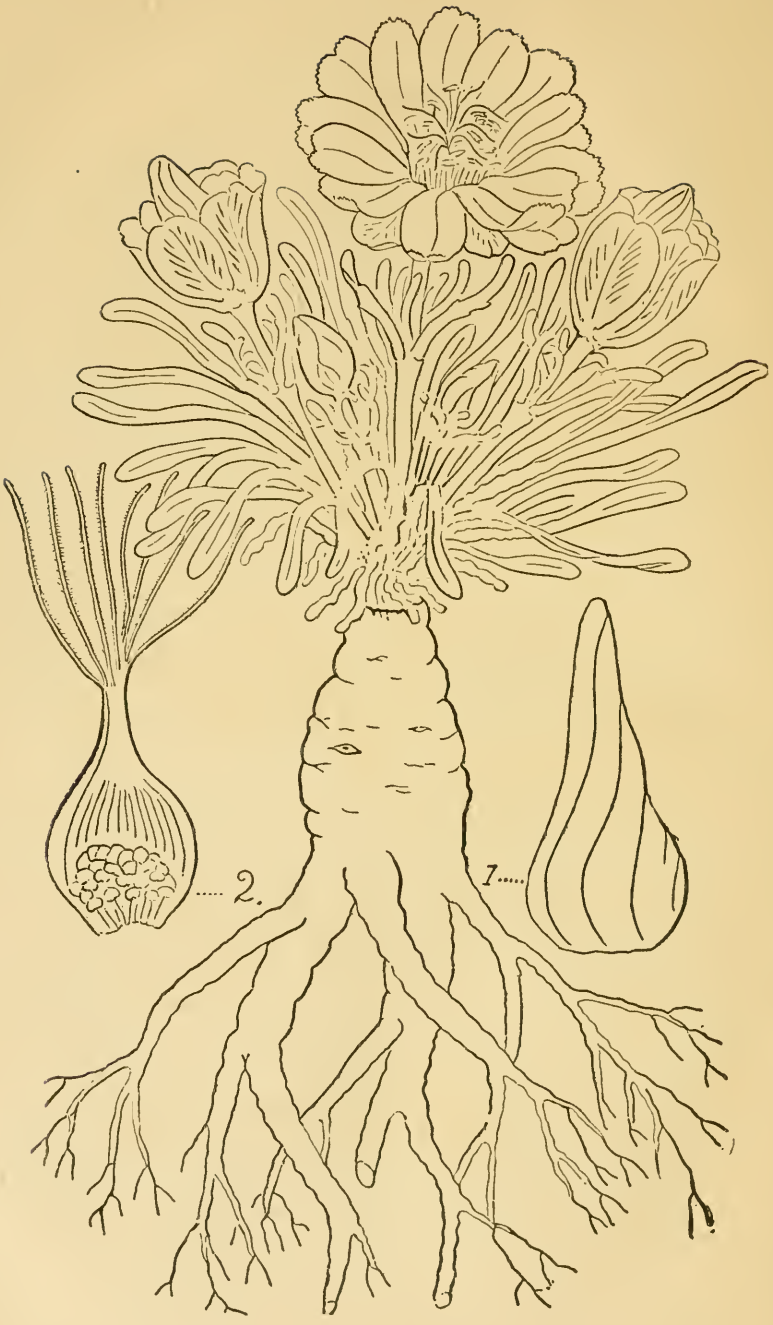
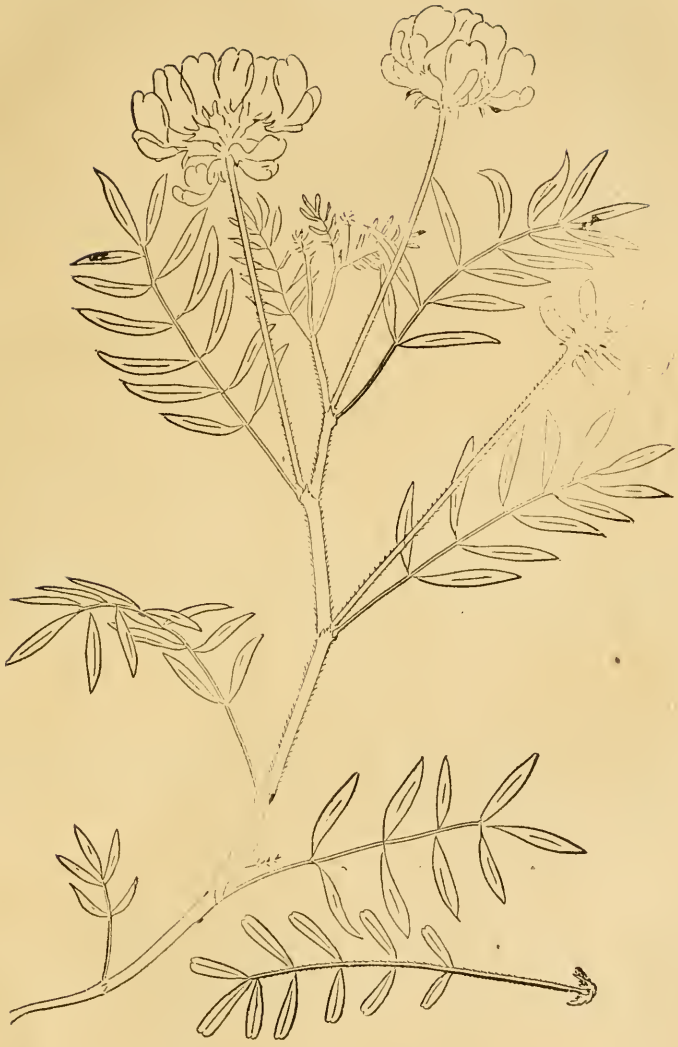


Fig. 37.



Leaves unequally pinnate, about two inches long; leaflets in about six pairs, opposite, linear-lanceolate (half an inch or more in length.

Peduncles longer than the leaves, angular, minute subulate, bracts about as long as the pedicels, or one-third the length of the calyx; about nine-flowered, in a close capitate spike; flowers purple, large; calyx teeth subulate, as long as the tube, lower tooth diverging from the flower nearly to a right-angle, clothed with black hairs.

Banner oval, emarginate, one-third longer than the wings, the lateral margins recurved below, erect.

Legumes curved, acuminate and pointed with the persistent style, glabrous, colored and plane above upon the back, cells somewhat unequal or subtriquetrous, six to eight-seeded cells, or about sixteen-seeded.

July 7, 1861.

President in the Chair.

The following paper was read:

New Californian Animals. By J. G. Cooper, M. D.

Note.—The animals here described belong to the collection of the State Geological Survey, and brief diagnoses of them are published with the approval of Prof. Whitney, State Geologist, to secure for the survey the priority of description.

A. Species new to Science.

The first that I undertake to describe may possibly have been before described from Mexican or South American specimens, but as Mr. Cassin, of Philadelphia, is unable to identify it with any of them, I venture to name it:

Athene whitneyi—Whitney's Owl.

Spec. char.—Above light brownish gray, thickly spotted with angular pale brown dots, the most densely on head, but those on back largest; back also somewhat barred with waving lines of the same color. A concealed white collar on back of neck, forming a white bar across middle of feathers, which are plumbeous at base like the rest. Quills with three to six spots on each web, those on inner web white, as are those on the outer web of second, third and

fourth quills. Rest of spots light brown. A row of white spots on edges of lesser coverts, four on the upper, seven on the lower series, with a row of light brown spots between. A few white spots also on outer secondaries. A white stripe on outer row of scapulars, edged by large light brown stripes toward middle of back. Rest of wing feathers dark brown, the secondaries with light ashy dots toward their ends. Tail feathers colored like the quills, the light spots forming five broken bars, and another narrower bar at the tip. Wings and tail ashy brown beneath, with white bars; edge of wing white, a dark brown patch at end of coverts, which are elsewhere white, tinged with yellowish.

Stiff feathers above eye white, with black spots on middle of shafts. Feathers below orbit light brown, faintly barred with darker; bristles around bill black for their outer half. Chin and throat feathers white, their base black, and tips of lower series light brown, the white thus forming a broad crescent in front of the neck, extending between outer angles of orbits, somewhat broken at the median line, and edged with brown, darkest laterally. Sides of neck narrowly barred with ashy alternating with light and dark brown; a large white patch in front of neck, mottled with blackish. Breast imperfectly barred and blotched with the same colors, the brown forming large patches toward abdomen, margined with gray and white.

Sides more grayish, tinged yellow, flanks plumbeous. Tibial feathers narrowly barred with light and dark brown. Tarsal bristles white, those on toes yellowish, soles yellow, claws horn brown, bill pale green, (black with yellow edges when dry) iris bright yellow.

Length 6.25 inches; extent of wings, 15.25; wing from carpus, 4.50; tail, 2.25; tarsus, 0.90; middle toe, 0.60, with its claw, 0.70—inner lateral claw reaching to base of middle, outer to base of inner; hind toe and claw, 0.50; gape of bill, 0.45; height, 0.30; width at base, 0.40.

No. 208, male, (?) shot at Fort Mojave, lat. 35°, Colorado Valley, April 26th, 1861; the only one met with.

This owl is the smallest species yet discovered in the United States, being considerably less than the little *Glaucidium gnoma*. In colors it much resembles this species, but in generic characters differs essentially, being in these closely allied to *Athene*, though it might perhaps form a distinct genus. Not having access to any analysis of the South American genera, I have preferred to retain this bird in *Athene*.

The next, which is undoubtedly a new bird, I have dedicated to the interesting little daughter of my kind friend, Prof. S. F. Baird.

Helminthophaga luciæ—Lucy's Warbler.

Spec. char.—Above light ash-gray, with partially concealed spot on vertex, and the upper tail coverts chestnut brown. Quills and tail tinged with brown, edges of primaries and coverts paler; beneath white, tinged with yellowish, this color extending to lores and around eyes, forming also a faint line above and behind them. Quills beneath plumbeous, tail feathers also, the outer edged with white internally, and with a white patch on inner web near the end. Iris brown, bill black above, bluish below, feet pale lead color. Length 4.25 inches; extent of wings, 6.50; wing from carpus, 2.25; tail, 1.50; tarsus, 0.65; middle toe and claw, 0.95; bill along ridge, 0.35; along gape, 0.45; depth at base, 0.15; width a little more. Specimens vary a little, over or under these measurements. Female differs in small size and duller colors only. Agrees very well in generic characters with the other species, but has the first quill shorter than the three next, and the tail shorter in proportion.

This is the second species of the genus discovered in New Mexico since the publication of Prof. Baird's Report on Birds, Vol. IX, P. R. R. Reports. The other, *H. virginiæ*, is figured and described in the volume of plates published by Baird, Cassin and Lawrence, to complete the illustrations of new birds of North America.

This bird was common at Fort Mojave, near lat. 35°, in the Colorado Valley, where it arrived about March 25th, and remained until I left there, the twenty-eighth of May. I saw none along the Mojave river, on the route westward. I collected five male specimens and one female.

Prof. Baird thinks with me that the following will undoubtedly prove a new species, after a comparison of specimens:

Xerobates agassizii—Agassiz Land-Tortoise.

Spec. char.—*Young*, with the carapax higher and more arching than in *X. carolinus*, the margin serrate all round, the primary disks of the scales projecting from a tenth to an eighth of an inch. Color of primary disks entirely pale yellow, the annual rings of growth only being dark brown. (Young just hatched probably all yellow.)

Remarks.—Closely resembles *X. carolinus*, the "Gopher" of Florida and the other Cotton States, of which no descriptions accessible are full enough to enable me to point out all the differences. But as another species intervenes between the range of that and this one, namely, *X. berlandieri* of Agassiz, found in Southern

Texas and Mexico, I feel confident that comparison of specimens will show constant distinctions between them. From *X. berlandieri* it differs even more than from *carolinus*. Besides the serrate margin, which is most distinct in my youngest specimens, (four years) while Agassiz's figure of the young has no serrations, and different coloration; it has but twenty-four instead of twenty-six marginal scales, (abnormal in his figured specimen?) and the primary disk of the vertebral scales is more than half as long (anteroposteriorly) as it is broad, instead of about twice as broad as long. The other scales also differ in details of form.

Three young specimens—a male of seven years age, two females of six and four years—obtained from the mountains of California, near Fort Mojave.

I take the liberty of naming this fine tortoise after the celebrated Zoölogist, whose work on the development, anatomy and classification of American Turtles (Contrib. to Nat. Hist. of U. S.) leaves nothing to be desired in these particulars. We may hope before long to see his descriptions of the genera and species, on which he has been engaged for several years, and which, like the tortoise itself, though slow in coming, will doubtless prove of solid worth and durable quality.

This is the first land tortoise ever found west of the Rocky Mountains, where but one species of the family is known to be common, the terrapin of our markets, (*Actinomys marmorata*, Agass). The latter I found within the great Utah basin, in the Mojave river, and have also heard of it near Carson Valley and the Upper Columbia river. Two or three other species live near the junction of the Gila and Colorado, and I hear that a land tortoise is common near the Gila, but whether this species or *X. berlandieri*, we do not know. I saw one full grown specimen in the possession of an Indian, but was unable to procure it. Broken shells are frequent on the higher parts of the mountains west of the Colorado, where the Pah-Utes eat them. Judging from these, it seems to attain a length of about a foot.

I obtained several other reptiles and fish which will probably prove new, but have not yet been able to determine them.

B. Known species new to the State of California.

Mammalia.

Vulpes velox, (Aud and Bach).—Swift or Kit Fox, Fort Mojave, one specimen.

Thomomys umbrinus, (Baird). — Sonora Gopher-rat, Mojave river bottoms and Cajon Pass.

Hesperomys austerus, (Baird).—Slate-colored wood-mouse, Fort Mojave, two specimens.

H. Sonoriensis, (Leconte).—Sonora wood-mouse, Mojave river.
Lepus callotis? (Wagler).—Texan hare, Fort Mojave.

BIRDS.

Sphyrapicus nuchalis, (Baird).—Red-necked Woodpecker, Fort Mojave, one female specimen.

S. williamsonii, (Baird).—Williamson's Woodpecker, Fort Mojave, one male, very rare.

Colaptes chrysoides, (Baird).—Malherbe's Flicker, Fort Mojave, a male and two females, the first *known* United States' specimens, rare.

Panyptila melanoleuca, (Baird).—White-throated Swift, Cajon Pass, one specimen, the third known to have been ever collected, rare in this State.

Chordeiles texensis, (Lawrence).—Texas Night Hawk, Fort Mojave and Mojave river, four specimens.

Tyrannus vociferans, (Swainson).—Cassins' King bird, Cocomongo Ranch, California, one specimen, common.

Empidonax traillii, (Baird).—Traill's Fly catcher, Fort Mojave and westward, common, two specimens.

Pyranga aestiva? (Vieill).—Summer Red bird, Colorado Valley, common. Differs from eastern specimens only in larger size, and differs wholly in color from *P. hepatica*, as figured in P. R. R. Rep., Vol. X, etc. It seems to agree with specimens from Texas.

Ampelis garrulus, (Linn).—Large Waxwing, Fort Mojave, one specimen, most south-western locality recorded.

Vireo belli, (Aud).—Bell's Vireo, Mojave river. The first found west of Rocky Mountains, common, two specimens.

Harporhynchus lecontii, (Bonaparte).—Le Contes' Thrasher. Deserts along Mojave river, common, two specimens; the only one ever before obtained was Le Contes'.

Poopiza bilineata, (Sclater)—Black-throated Sparrow, Fort Mojave, common.

Spizella pallida, (Swainson).—Clay-colored Sparrow, Fort Mojave, common in April; the first found west of the Rocky Mountains, 2 specimens.

Pipilo chlorurus, (Baird).—Blanding's Finch, Fort Mojave, rare, two specimens.

[*Icterus cucullatus*, (Swainson).—Hooded Oriole. Many seen in interior valleys near San Bernardino. Obtained in Lower California by J. Xantus.]

[*Hydrochelida plumbea*?—Short-tailed Tern, or a new species,

with black breast and gray wings; seen flying over headwaters of Mojave river, near Cajon Pass, June 8th, 1856. The above has never been seen west of the Rocky Mountains.]

Reptiles.

Pituophis bellona, (Baird & Girard).—Churchill's Bull snake, Fort Mojave, common, one specimen.

Masticophis testaceus, (B. & G.)—Coppery Whip snake, Fort Mojave and Mojave river, common, three specimens. First of each found west of Texas?

Salvadora grahamiae, (B. & G.)—Graham's Salvadora, For t Mojave, not rare, two specimens, first seen in the United States.

July 21, 1861.

President in the Chair.

The following manifestly new species of *Hosackia* was collected and presented by Dr. Andrews—specimen No. 116 o his collection:

H. macrophylla, (*Euhosackia*,) Kellogg.—Fig. 38.—Stem erect, fistulous, flexuous, villous throughout, somewhat striate-angled; a foot or more in height.

Leaves long (four or five inches), sub-sessile; leaflets eighteen to twenty-one, somewhat alternate or sub-opposite (distributed about equally from base to apex) obovate, oblong, broadly cuneate, mucronate.

Stipules narrowly lanceolate, acuminate, foliaceous (one-quarter to one-half an inch long).

Peduncles short, (about one-third less than the leaves) umbel six to eight-flowered; pinnate, bracts large (two to three inches long), with seven to nine leaflets, situated a little above the middle of the peduncle, stipules lance-subulate, acuminate (form as in the cauline leaves, but narrower).

Flowers purplish, (together with calyx and pedicels) vexillum distant on a long claw and with the wings much longer than the obtuse keel. Teeth of the calyx minute, triangular, acute. Fruit unknown.

Dr. Kellogg read a description of a new species of *Ceanothus*, brought by Dr. J. A. Veatch from Washoe.

Ceanothus cordulatus, (Kellogg).—Fig. 39—A shrub four or five feet in height ; branches erect, flexuose ; branchlets numerous, very short, divaricate, leafy at the base, terminating in a stout thorn ; whitish glaucous ; stems strictly terete.

Leaves small, (i. e., one-quarter to one-half an inch long, rarely three-eighths broad) three-ribbed, (with two other outer obscure nerves) ovate-cordate, entire, often emarginate, reticulate, with translucent veins, short hirsute above and below, especially conspicuous along the nerves beneath ; petioles short, hirsute, in the mature state stout, seldom one-sixteenth of an inch long, in the young state two to three times that length and very slender, minutely pubescent ; lamina becoming thickened and coriaceous, persistent.

Stipules cubulate, hirsute. Leaves alternate in fasiculate clusters, somewhat canescent beneath.

Flowers in thyrsoid panicles one to two inches in length, springing from the summit or approximate lateral branchlets ; peduncle and pedicels sub-glabrous.

Fig. 39.

Calyx petals and pedicels white at the time of blossoming, but bright pea-green before expansion; panicles sometimes leafy at the base.

The form of flowers as usual in this genus; calyx divisions inflexed turbinate; petals saccate or hooded; unguiculate pistil three-parted about one-third its length. Fruit unknown.

This species appears to be near *C. hirsutus* (Nutt.); but the leaves are not "nearly sessile," nor "glandularly serrulate," nor "panicles terminal." Nor does it answer to *C. divaricatus* (Nutt.) as the leaves are not "grandularly serrulate," and seldom half the size; nor are the flowers "blue."

Dr. Kellogg presented also the following description:

Hosackia balsamifera, (Kellogg).

Stem branching from a perennial crown, ascending, flexuous; striate, very villous throughout with short viscid hairs.

Pinnate leaves three to four inches long; petiole falcate above, about one-third the whole length; leaflets broadly obovate, cuneate two to three-nerved, abruptly very short acuminate-mucronate, mostly scattered, nine to thirteen leaflets; axils always foliaceous; stipules large foliaceous, rhombic-cordate acuminate, about five-nerved.

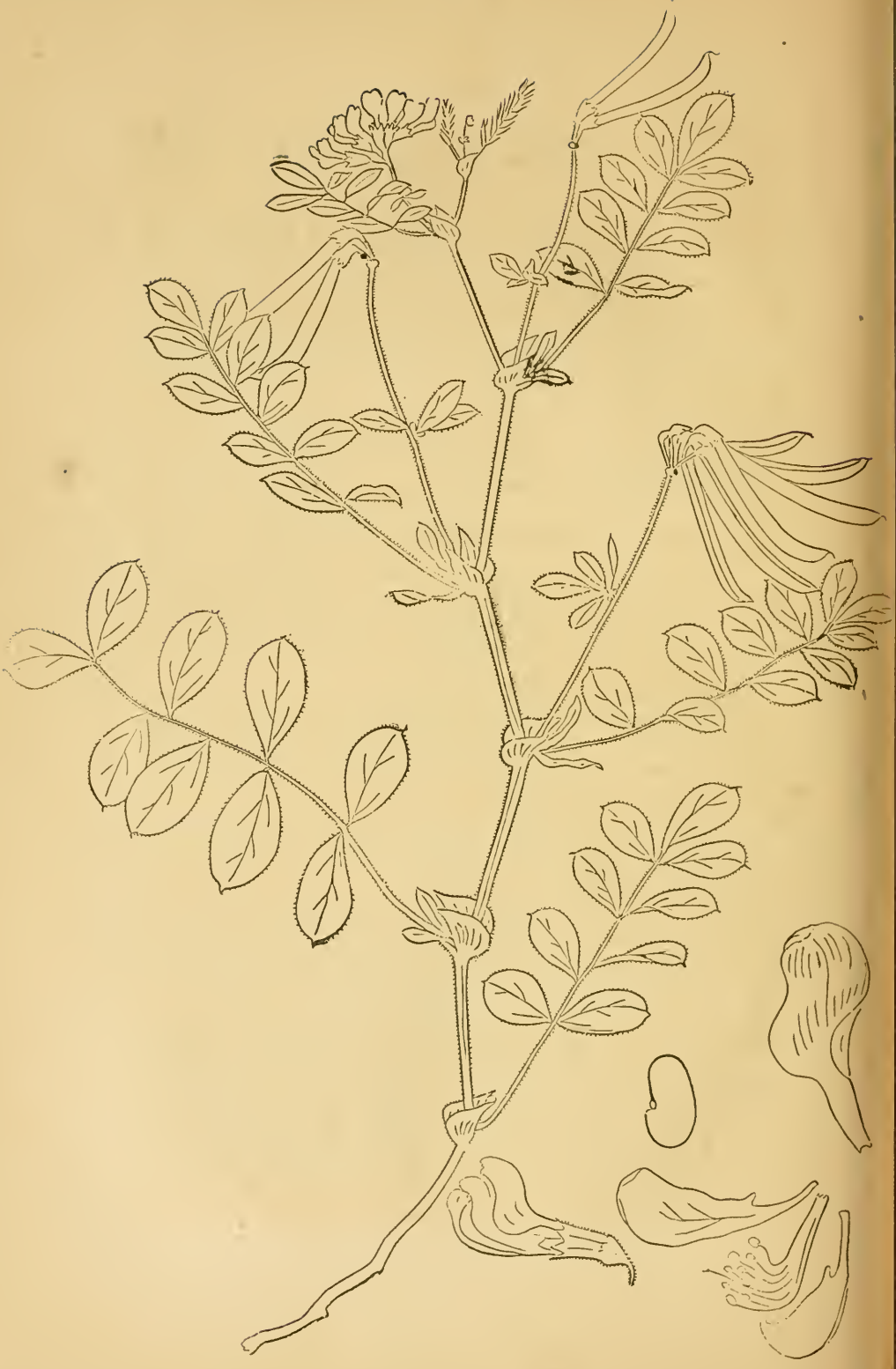
Peduncles axillary, (super axillary?) about as long as the leaves; umbel eight to twelve-flowered; pedicels purple, about a quarter of an inch long; flowers small, purplish mixed with white, the tubular calyx purple; teeth very short, minute, subbilabiate, slightly ventricose above the obconic base.

Bracts three or more foliate, subsessile or petioled; axils foliaceous (often merely a few rudimentary leaves, or only one or two conspicuously developed); bracts situated midway or below the middle of the peduncles.

Legumes an inch or more in length, nearly straight, curved towards the point, slightly compressed, seven to nine-seeded, with spongy partitions between the seeds; seeds oblong, smooth, black; position of the radicle quite prominent.

A well marked species, readily recognized by its manifold sensible properties, e. g.: its viscid character, which renders it difficult again to restore its natural form if once carelessly pressed together; also by the remarkably fragrant aroma which the whole plant exhales, evidently enticing various insects which too often devour the fruit. The very grateful balsamic exudation mentioned above has to the taste the delicious sweet, warm carminative flavor of the common garden anise or fennel.

Fig. 40.



To the eye of the casual observer the foliaceous axils of the leaves in particular present the appearance as if two pairs of stipules existed! (by some hocus pocus) of which upon closer examination one pair proves to be two conspicuously developed leaves with a third rudiment, leaving attached to the stem its proper single pair of broad foliaceous stipules.

In the general appearance of the umbel of purplish flowers, it reminds one of *Astragalus hypoglottis*, but with the flowers smaller.

August 5, 1861.

President in the Chair.

The following paper was read by Mr. R. Pumpelly:

Mineralogical Sketch of the Silver Mines of Arizona.—Arizona proper, or the Gadsden Purchase, is that part of our frontier which has the Rio Grande and the Colorado rivers for its eastern and western, and the Gila river and Mexican boundary line for its northern and southern limits.

It thus extends over both slopes of the *Sierra Madre*, which here loses its continuous character, giving rise to almost unconnected mountain groups. It is also traversed from N. W. to S. E. by granitic *sierras* seldom over seventy to ninety miles in length, and distant from each other from twenty to forty miles. This configuration gives rise to a most remarkable occurrence of parallelism.

The intervals between these ranges are plains, having a gradual descent from the *sierras* on either side. In the western part of the territory, where but little rain falls, water courses are very rare and the surface of these tracts is almost unbroken; but in the central portion, near the larger mountains, they present the appearance of extensive valleys and are cut up by river beds and frequent tributary *cañons*.

These plains are all connected and form members of the immense quaternary deposits, extending from the Gulf of California eastward.

The quaternary formation is stratified, and composed of both rounded and angular rocks with pebbles and sand—the detritus of the neighboring mountains and the underlying formations. A gradual and regular descent of the surface of the whole quaternary area towards the Gulf of California and the Colorado river is perceptible, showing that there has been a gradual elevation extending over a large area, and probably during a long lapse of time. That this

upheaval is of very recent date, is proven by the presence of existing species of marine shells scattered over the surface.

As I have already said, the majority of the mountain ranges are granitic, but we find in many places, and especially those where the parallelism is disturbed, extensive representations of other formations.

Usually, outcroppings of gneiss, micaceous, talcose and clay slates are observable, underlying the quaternary at the base of the granitic ranges. In many places the plains consist entirely of the detritus of these rocks, showing that they extend from mountain to mountain. Towards the Gulf of California, these slates are accompanied by metamorphic limestone, and often appear forming independent ridges, or inclined against the higher granite hills. They form the gold region of Sonora, and are probably of the same age as the similar formations of California, of which, indeed, they seem to be the continuation. We find them rising out of the desert, at intervals, from Sonora to the Gila river and the Colorado, and again underlying the tertiary on the western skirt of the Colorado desert, and at various points in Southern California.

Near the coast, and traversed by the boundary line, is a very interesting volcanic formation. The country is studded over with volcanic cones, some containing craters; immense streams of lava cross the desert, or cover, as with a mantle, high granite hills.

The next formation of importance is that of the stratified conglomerates. These occur in strata of very variable thickness and texture, but all are composed for the most part of fragments of quartziferous porphyry, cemented by a feldspathic mass, also quartziferous. This formation is traversed by intrusive dykes of a porphyry of a similar character to many of the fragments enclosed in the conglomerates.

There is also a great variety of porphyries, both quartziferous and free from quartz; and these are the rocks which for the most part stand in the closest connection with the veins of the country.

Many of these porphyries appear to be the result of metamorphic action on sedimentary rocks; but others have every characteristic of an eruptive origin.

Lastly, dykes of a trachytic porphyry, and of a cellular, black rock usually in connection with a reddish *wacke* and a sandstone, are observable at various points through the country.

Climatic influences have given the country a marked and peculiar character of vegetation. Towards the coast, the plains are barren and arid deserts, and the traveler may ride hundreds of miles without seeing other plants than dry and thorny *cacti* and scattered bushes of greasewood. The granite mountains bordering these deserts are even more barren. Not a tree, nor even a *cactus*, can

be seen on their sides. They tower high above the plains, great masses of white, reflecting the rays of the sun with dazzling brilliancy.

The only water to be found over an area of many thousand miles is at a few points in the mountains, where the rains have collected in natural tanks sufficient to last for a few months. During the rainy season, which often nearly fails, shallow pools are formed in slight depressions on the surface, but a few days' sun is sufficient to exhaust these sources.

Further from the coast the plains begin to show more vegetation; gradually appear the *palo verde*, the *mesquite* and a greater variety of cacti, and on the hills scattered *saguaras* (Cereus giganteus); until, in the eastern portion of the *Papagoria*, the country is more thickly covered with a low growth of *mesquite* and *palo verde* brush, above which looms a perfect forest of the columnar *saguara*.

East of the Baboquiveri range, the character of the country changes; the plains are cut in the direction of the longer axis by deep valleys, receiving tributary cañons from the mountains on either side, and all that remains to show their original character are the cut-up *mesas*, or table lands, lying between the river and the *sierras*.

These *mesas* retain indeed much of the desert appearance; but they are clothed with bunch and gramma grass, and scattered *mesquite* bushes. Many of the valleys have an extensive growth of *mesquite*, and along the river beds in the neighborhood of hidden or running water grow large cottonwood trees, and in some places fine ash timber. On the hill sides, above the level of the *mesas*, are scattered the live oak of the country, the trees varying from twelve to twenty-five feet in height, giving the country the appearance of an old orchard. As we ascend the mountains, the oaks are mingled with the cedar; until, at an elevation of about 6,000 feet above the level of the sea, the pine region commences.

Owing to the peculiar structure of the river beds, which run through loose quaternary deposits, the water falling during the rainy season soon sinks out of sight and follows its course underground, appearing only where the underlying older formations rise, or where the valley is crossed by a dyke, in either case natural dams being formed. These occurrences are sometimes of sufficient extent to form running streams for several miles, although usually either only a spring is formed, or more frequently water is obtained by digging.

These valleys of Central Arizona, as well as the *mesas* and hill sides, are covered with an abundant growth of different grasses, forming extensive tracts of grazing country. There are not many localities suitable for cultivation, these being confined to such places

as have running water for a considerable distance, which can be conducted in canals for irrigation.

Arizona forms a link in the great chain of mining regions that stretches along the western side of the continent. Though but a small portion of the country has been explored; yet, between the Rio Grande and the Colorado, numerous districts of great mineral wealth have been discovered, and on some of them more or less labor expended. The Mexicans have, at various times since the middle of the last century, commenced workings on a great number of veins, but owing to the continued inroads of the Apaches, but little was accomplished by them.

After the conclusion of the Gadsden treaty, Messrs. Poston and Ehrenberg, with a small party, entered the country, and after prospecting a large number of localities found the Heintzelman vein.

The results of an examination of this proved so satisfactory, that considerable attention was drawn towards that part of New Mexico. Joint stock companies, with little ready capital and immense expectations, were formed. Speculators bought in stock for ten per cent. of its nominal value, and sold out at from fifty per cent. to ninety per cent. to tradesmen and widows, too poor to meet assessments, when means for working were absolutely necessary. Men were put in charge who had never seen a mine, and usually with no professional assistance. The results of enterprises conducted in a similar manner are well known. Between the absence of available funds on the one hand, and of protection to life and property, on the other, enterprise was already beginning to stagnate, when the withdrawal of the troops made the abandonment of the country absolutely necessary.

The most important of the mines already known and worked is the Heintzelman, or *Cerro colorado*, belonging to the Sonora Mining Company. It is situated west of Tubac, about twenty-four miles by road. The vein runs north and south, has a nearly vertical dip, and is enclosed in a brown porphyry, free from quartz, and containing ill-defined crystals of feldspar. The thickness of the lode is from twelve to twenty inches. A vertical main shaft has been commenced, with the expectation of intersecting the vein at a depth of two hundred feet, but it is only completed to about one hundred and twenty feet. This shaft communicates by cross-cuts, at sixty and one hundred feet, with two galleries.

The ore is separated by hand into two classes, rendered necessary by the difference in their chemical character and in their richness in silver. The first class consists of the more massive and richer ore, composed of Stromeyerite, tetrahedrite, blende and galena, with native silver; the gangue is quartz, with some barytes and the carbonates of magnesia and lime. The blende and galena

are so predominant in this class as to render the ore unfit for amalgamation, while the percentage of silver in the Stromeyerite is too great to allow of its being treated profitably in the barrels. This class represents about ten per cent. of the entire amount of ore, and the average of its yield of silver, calculated on the entire amount smelted, is nearly $1,000 to the ton of 2,000 pounds, while the amount contained is about fifteen per cent. more.

The second class contains the same minerals as the first, but they are more intimately associated with the gangue, which in this class forms the bulk of the ore. The blende and galena have a moderate percentage of silver, (thirty to fifty ounces) while the tetrahedrite (Fahlerz, or Gray Copper ore) varies from one to one and a half per cent., and the Stromeyerite is said to rise as high as twenty-six per cent. Chlorobromide of silver and native copper have occurred, and native silver in small flakes is frequent. Two varieties of quartz are found, one in the ordinary glassy form, often comby; and an opaque white variety, very brittle and associated with the richer minerals.

Crystallized specimens are very rare, and of the copper-silver-glance none have been observed.

I have observed the following well defined paragenetic successions occurring in cavities:

a. 1 quartz; 2 brownspar; 3 scalenohedral calcite.
b. 1 brownspar; 2 barytes; 3 scalenohedral calcite.
c. 1 quartz; 2 galena; 1 quartz.
d. 1 quartz; 2 blende; 3 calcite.
e. 1 quartz; 2 blende; 3 rhombohedral calcite; 4 native silver; 5 scalenohedral calcite.
f. 1 quartz; 2 brownspar; 3 barytes; 4 native silver.

From this it will appear that the general succession in age is: 1st. quartz; 2d. brownspar; 3d. blende, barytes; 4th. calcite; 5th. native silver; 6th. scalenohedral calcite. From this list the relative ages of blende and barytes do not appear.

Galena, blende and tetrahedrite are usually closely associated with each other in this ore, while the argentiferous sulphuret of copper is entirely independent of them, but is, at times, mixed with erubescite.

Native silver occurs in the common filigree form in cavities in the argentif. copper-glance, and is often observable in minute specks on the tarnished surface of blende and tetrahedrite.

The reduction works are on the Arivaca ranch, eight miles distant from the mine, and connected with it by an excellent road. The process used is the European barrel-amalgamation for argentiferous copper ores, and was introduced by Mr. Küstel, a German Metallurgist, about three years since. The extent of the works is

very small, permitting of the treatment of about one and a half tons a day. Six dry stamps, a steam *arrastra*, one reverberatory roasting furnace, four barrels, a retort and one refining furnace, together with a ten horse power engine, constitute the works.

The second class ore, after being coarse stamped, is removed to the arrastra, which is capable of grinding one ton per day to the necessary fineness. The resulting slime, after drying, is pounded and sifted. Five hundred pounds of the ore, after being mixed with from eight to ten per cent. of salt, are subjected to the chloridizing roasting for about four hours. About one-half hour before withdrawing the charge, two per cent. of unburnt limestone is added to reduce the bichloride of copper to protochloride. In this manner, six roastings are made in twenty-four hours.

The barrels are charged with 1,000 pounds of the roasted ore; 100 pounds metallic copper in metallic balls, and 144 pounds of water. After revolving two hours, to effect the partial reduction of salts injurious to the mercury, by the copper, five hundred pounds of quicksilver are added.

After revolving twenty-four hours in all, including the second watering to collect the disseminated globules of quicksilver, the whole is withdrawn and the amalgam separated and retorted. The resulting silver is simply melted in a small reverberatory refining furnace, with the addition of a little borax, and cast in bars of different sizes, having a fineness of 0.990 to 0.998. In the absence of coin, these are used as a circulating medium, and find their way to Sonora and, ultimately, to England.

The defects of this process, as applied at Arivaca, are very great, and are attributable in part to the character of the ores and absence of some facilities. The roasting is performed too hurriedly, and the roving character of the Mexicans renders it very difficult to make them good workmen at the furnace, where so delicate a process, requiring long practice, is to be well executed. The percentage of sulphur in the ore subjected to this operation is so very low, that the decomposition of the salt must be imperfect, causing inordinate loss of this material, which is very expensive. Owing to the small amount of lime added during the roasting there cannot but be an unnecessarily large loss of quicksilver. The loss of silver is said to be from twenty to thirty per cent., which destroys the main advantage of the European barrel process over the cheaper Mexican amalgamation; but, by more carefully meeting the requirements of the method, this loss could probably be reduced to at least ten per cent. These works were erected for temporary use, and consequently the amount of manual labor is more than double that which is necessary.

The workmen at the furnace receive one dollar per day of twelve

hours; other Mexican laborers twelve to fifteen dollars per month, and to each man a ration of sixteen pounds of flour per week. American laborers are paid from thirty to seventy dollars per month and boarded.

The cost of salt, which is brought from near the coast, is four cents per pound; of copper twenty-five cents per pound, and wood from four to six dollars per cord delivered at the furnace. The price of quicksilver is one dollar per pound.

The first class ore was formerly smelted at the mine in Castilian furnaces, with the addition of an ore of sulphide and carbonate of lead, litharge and iron ore. The loss of silver was from fifteen to twenty per cent., and the cost of extracting that metal about sixty dollars per ton of ore. The yield, as before stated, was nearly one thousand dollars to the ton.

From the results obtained, in 1859, on one hundred and sixty tons of amalgamated ore, it appears that about $24,000 worth of silver was produced. The loss of quicksilver equalled one pound (=one dollar) for every forty dollars of silver extracted. The consumption of copper was 1480 pounds, of salt 32,000 pounds, and of wood three hundred cords.

The production of silver at the Heintzelman mine is estimated at over $100,000 (not including large amounts of ore stolen and worked in Sonora) but had it been well and regularly worked and provided with reduction works of sufficient capacity, it might have produced over $1,000,000 in the same time.

This is the first experiment made in the United States in applying the barrel process to the treatment of argentiferous copper ores, and it is not surprising that, in submitting to it ores of the peculiar character which these possess, and especially when we consider the absence of necessary facilities, we should find in it important defects, many of which are remediable.

No experiments have been made in working this ore by the *patio* or Spanish-American amalgamation process, so that it is not known to what extent the rejection of the present method would prove advantageous; but the results obtained at Arivaca show conclusively that, by remedying the defects within the limits of possibility, and by proper substitution of mechanical for manual labor, the European method can be used with profit in Arizona for ores of this class and containing about one hundred and fifty dollars to the ton.

The same may be said of the ores of many other mines which are free from lead, and in which tetrahedrite or copper-glance is the principal silver bearer.

Near Arivaca there are said to be twenty-five openings on veins worked formerly for gold and silver.

The valley of this ranch is a large plain. The soil rests on clay

slate, which is also in part covered by a slight deposit of the usual quaternary. The hills bounding the valley on the north and south are of quartziferous porphyry. This is a fine-grained rock, with pink crystals of orthoclase and quartz crystallized in double pyramids.

The northern line of contact between the clay-slate and porphyry is marked by a bold vein of quartz running east and west. In this are several openings, made previous to the Apache war. The ore which I observed was galena, and its altered products disseminated in quartz. It is said to contain gold. Several quartz veins traversing the porphyry have been worked for gold, as have also the beds of the *arroyos* in the neighborhood.

Arivaca has too little wood for extensive operations. When the Heintzelman mine is again worked, the reduction should be effected at Tubac, where the erection of large works would be an incentive to the opening of many of the mines in that neighborhood.

Santa Rita.—The mines of the Santa Rita are situated in and around a beautiful valley, about ten miles east of Tubac, and among the foot-hills of the Santa Rita mountains. The valley and the hills to the north are of a metamorphic quartziferous porphyry, while the hills to the east consist of a feldspathic rock. It is in these two formations that the veins occur.

The hills to the south are formed in part by the porphyry conglomerates already mentioned, and in part by a remarkable feldspathic porphyry. This last rock has a compact light gray ground, bearing numerous crystals of a white triclinic feldspar and small prisms of hornblende, but entirely free from quartz. It is apparently older than the conglomerates. In it no veins have been discovered.

The veins in the feldspathic rock are very numerous, and have with few exceptions a nearly east and west course. Their dip is nearly vertical, and they vary from ten to twenty-five inches in thickness. The gangue is almost entirely quartz, and the ore generally argentiferous gray copper and galena. When this last mineral is unaccompanied by the tetrahedrite, its yield is rarely over 0.1 per cent. of silver, but when occurring in proximity to that mineral it contains often from 0.5 to 0.75 per cent.

The gray copper ores vary from light steel gray to tarnished black, and contain from one to over two per cent. of silver. This mineral, when associated with galena in decomposing, is replaced by a porous vitreous substance of yellowish green color, and consisting principally of antimonate of lead, containing from one to two per cent. of silver. The "*crystal vein*" is of a massive ore of galena, with about twenty per cent. of zinc-blende and copper pyrites.

The gangue is quartz, but no tetrahedrite was observed. This galena is very poor in silver, containing from 0.1 to 0.2 per cent. only. Thus to the presence of tetrahedrite is apparently due the silver of these ores.

In this vicinity are several veins of *gossan*, or oxyd of iron, the cappings of deposits of ore, and themselves containing a moderate per centage, about one per cent., of silver.

The wall rock of these veins is a crystalline granular rock, and has a slightly bluish tint on its fresh fracture, while its weathered surface is discolored by oxyd of iron proceeding from the alteration of the little hornblende contained in the rock. It also has a little mica and disseminated particles of magnetic iron. It thus approaches in composition to a dioritic rock.

The veins which occur in the metamorphic porphyry have, so far as opened upon, shown a different character from the above. The porphyry itself has a compact gray ground, impregnated with carbonate of lime, and bearing numerous crystals of opaque, white, triclinic felspar, grains of quartz and dark gray mica in six sided plates. It contains also specks of magnetic iron.

Veins in this rock are of quartz, often comby, containing a black tetrahedrite, with from four to eight per cent. of silver, and are in places impregnated with galena in small cubes, which contain 0.5 per cent. of silver. The gangue is discolored by the blue and green carbonates of copper and black manganese, with films of the sulphuret of silver and of native silver. Experiments made on various quantities of these ores in the *patio*, with the use of salt and mercury, without roasting or magistral, have given an average yield of fifty per cent. of silver, and comparison with correct assays shows that from eighty to eighty-five per cent. of the silver contained can be extracted by the simple action of salt and mercury. This fact would seem to show that the silver of this tetrahedrite is contained as mechanically mixed sulphuret. Some of the veins in this porphyry have been thrown out of position by a large dyke of granite.

These mines have been but little worked, although three attempts have been made—twice by the Mexicans and recently by the Santa Rita Company, but in each case the Apaches have forced an abandonment.

The ores reduced by the last Company were divided by hand separation into two classes. The first, containing tetrahedrite in quartz and brownspar, had an average yield of one hundred and seventy-six ounces of silver to the ton. The second class, a quartzy lead ore with little tetrahedrite, averaged eighty-one ounces to the ton.

Cahuabi Mines.—Westward of the Baboquiveri range, on the

outskirts of the desert, in a country clothed with only bushy *mesquite* and *cacti*, and almost destitute of water, there exists a region which, from the character of its veins, appears to contain greater mineral wealth than any other part of Arizona yet explored. It is situated in the center of a large plain, forming part of the *Papagoria*, and about eighty miles by trail northwest of Tubac.

The veins which I observed occur in a quartziferous porphyry and in an amygdaloid rock. This latter has a brown compact base, containing numerous acicular crystals of triclinic felspar, and calcareous spar in impregnations and small threads. Cavities, some filled with quartz and others with Delessite, are frequent. In this formation is the Cahuabi vein. It is from twelve to fifteen inches thick, and consists of quartz and heavy spar, containing argentiferous copper-glance, galena and black tetrahedrite. The ore of this vein is said to average from one hundred and fifty to two hundred dollars per ton.

The *Tajo* vein, about three miles from the *Cahuabi*, occurs in the same rock and is about two feet in thickness. The gangue is barytes and quartz. The ore consists of copper-glance, galena and tetrahedrite with some blende. With the copper-glance is associated copper pyrites. This vein contains also considerable metallic gold. The ore is said to vary from one hundred and fifty to one hundred and seventy dollars per ton.

Four miles west of the *Tajo* is a vein which traverses a quartziferous porphyry of the same character as that which bears the gold-quartz veins of Arivaca. The gangue is quartz, and contains black tetrahedrite and some vitreous copper.

A great number of veins of quartz and barytes occur in these two formations, the latter seeming to prefer the amygdaloid rock. One vein of barytes, containing a "bonanza" of sulphuret of silver, was found and worked by the Mexicans, and several specimens of heavy spar associated with silver-glance from various localities were shown me.

The San Pedro Mines.—These are about thirty-five miles east of Fort Buchanan, and were opened by a St. Louis Company. The ores that I have seen from this locality are tetrahedrite and massive copper-glance, containing copper pyrites, with quartz and barytes for gangue from the San Pedro vein, and galena with iron pyrites from the St. Paul mine.

These veins were being opened and promising well, when the Company abandoned them on the account of the assassination of the employés by the *Peons*.

The San Pedro river near these mines is said to be capable of furnishing sufficient water power for extensive reduction works.

From a study of the fissure silver veins of central Arizona it would appear—firstly, that they have in common, quartz, galena and tetrahedrite; secondly, that there is a close connection between barytes and copper-glance, more or less argentiferous, in their occurrence in a vein; and thirdly, that the proportion of silver in the galena is largely increased when this mineral is associated with tetrahedrite. A large number of assays made on the gray copper ores of different mines showed a range of from one to eight and a half per cent. of silver. In many, if not all the richer varieties examined, a large per centage was undoubtedly contained as mechanically mixed sulphuret of silver.

In the Santa Cruz mountains, south of Fort Buchanan, is a series of lead mines, several of which were excavated by Mexicans several years since. They appear to follow the line of contact between an argillaceous limestone, in which corals have been found, and a probably metamorphic porphyry. In places the deposits are of considerable extent, often many yards in thickness, but, apparently, very irregularly developed. Near the surface the galena is often entirely changed into carbonate of lead associated with porous quartz.

At the Patagonia mine the ore consists of galena sufficiently altered, at the present depth of working, to render its reduction extremely simple. The average yield of silver from this ore has been, thus far, about eighty dollars per ton.

There is another class of contact veins bearing both lead and copper ores.

To this class belongs the deposit near San Xavier on the Santa Cruz. The ore is galena with copper pyrites and tile ore, associated with oxyd of iron and quartz, the whole interstratified with metamorphic limestone.

The galena examined contained 0.20 per cent., the copper pyrites 0.25 per cent., and the tile ore 0.10 per cent. silver.

Near Caborca, in northwestern Sonora, are deposits of a somewhat similar character. The strata of metamorphic limestone are almost vertical, and near their contact with granite become highly impregnated with lime garnets. Along the line of contact between the two formations, the presence of copper ores is indicated by frequent occurrence of green and blue carbonates and impure red oxyd. These indications often lead to the discovery of limited deposits containing a few hundred tons of copper.

One of these, worked in 1861, yielded from two hundred and fifty to three hundred tons of twenty-five per cent. ore.

There was no vein; the ore, which was accompanied by calcareous spar, being gradually replaced at the bottom of the deposit by the limestone of the formation.

The ore is copperglance, tile ore or impure red oxyd, and some copper pyrites. Accompanying these deposits, and also where no copper ore is visible, the line of contact is occupied by masses of magnetic iron. Where the same limestone comes in contact with diorite, the former contains large crystals of magnetic iron and spinel.

Planchas de la Plata.—In Sonora, just south of the line, and near the meridian of Tubac, are the *Planchas de la Plata* mines, still celebrated throughout the Republic. According to the best Mexican and Jesuit authorities, large masses of native silver were discovered there in 1769. Pieces of great size were obtained, (one is said to have weighed 3,600 pounds) and the workings were being prosecuted with vigor and success, when the Spanish Government declared the deposit to be a *criadero*, and as such to belong to the Crown.

The place was therefore abandoned, and every attempt made at regular working since the revolution has been frustrated by the Apaches.

The most singular feature connected with the discovery is, that no vein, from which these masses could have come, was found. The deposit seems to have been a regular placer. The silver occurred in pieces of every size down to small grains. Several rich veins were opened in the neighboring mountains, but were also abandoned from absence of protection. The only specimens that I have seen from this locality were apparently a partially decomposed quartziferous porphyry, from the wall rock of the Mina Colorada, and were impregnated with grains of silverglance.

General Conclusions.—Before the working of mines in Arizona can become regular and profitable, many changes will be necessary. The Apaches must either be exterminated or reduced to complete submission, and this can only be accomplished by a long series of campaigns. A port is also necessary, without which all supplies and machinery have to be transported over deserts from the Gulf of Mexico or the Colorado river. Guaymas, three hundred and fifty miles, and Port Lobos, one hundred and fifty miles from Tubac, are the natural entrances to the country, and so long as these remain in the hands of a treacherous and capricious government, no enterprise can flourish either in Arizona or Sonora. Further, the present unnatural boundary line will always be a source of trouble, affording a shelter to the robbers and assassins of both countries.

The substitution of white for peon labor, would probably be a failure, owing to the debilitating influence which the climate exerts on northerners. The Mexican labor is good when properly super-

intended; but, to render it advantageous, the recognition of the traditionary custom of peonage is necessary. A thorough code of mining laws is also much to be desired, for however well the plan of permitting miners to make their own regulations may be thought to work in gold districts, it will never place silver mining on a solid basis; but cannot, on the contrary, act otherwise than prejudicially to the interests of both miners and the State.

There is but little doubt, that after a few years of proper development, Arizona might become an important source of silver, although its veins do not possess the great thickness of many of the mines of Mexico, although the average richness of the ore is greater and more concentrated. Still, it cannot be expected to produce the brilliant results obtained in Central Mexico.

August 19, 1861.

President in the Chair.

The following communication was presented by Col. L. Ransom:

DECLINATION OF THE MAGNETIC NEEDLE.

Being connected with the United States General's Office in California from the commencement of the public surveys in 1851 until 1858, I became familiar with the field operations of the Deputy Surveyor from examinations of the field notes and maps of surveys, as returned from time to time.

As the regulations of the General Land Office required the variation of the compass to be taken as often as once in each township, (of six miles square) I became impressed with the great difference in the variations between the northern and southern portions of the State, and at once determined to make a record of those differences.

I therefore ruled a rough map to designate the township and range lines, and from time to time entered the magnetic variations as taken in each surveyed township and returned by the Deputy Surveyors; and since I left the Surveyor General's Office, I have been enabled, through the courtesy of those having the surveys in charge, to complete my notes and memoranda, so far as the public surveys have progressed.

From these, I have been enabled to present the Academy with a small skeleton map of the State, on which are delineated the township and range lines, as they have been and are intended to be established by actual survey, with lines of *equal variation of the*

compass, or magnetic needle, at intervals of thirty minutes of distance. These lines are approximate, yet as nearly correct as the materials from which they are drawn would permit.

Innumerable difficulties at once present themselves in an undertaking of this kind. Returns of variations are too often made by those styling themselves surveyors, who are not sufficiently conversant with the mode of ascertaining them. Others, who are competent, are often too intent on gain to spend sufficient time to insure accuracy in their observations. Defects in the instruments used, and occasional local attractions, have their influence in producing inaccuracies.

The expression, "as true as the needle to the pole," has obtained credence from the very common belief that the magnetic needle invariably points to the polar star; and further, that if any variation does exist—when ascertained—it will be found to be constant.

From observations, it is ascertained that at the south line of the State the magnetic needle, instead of pointing to the true north, varies to the east about 12° 40′, while at the north line of the State it exceeds 18°.

It will be perceived, in tracing the lines of equal variation on the map, that they are not in a direct line, but in many places very much curved; and that these curves are also very irregular. In several of them there appears a decided "sag," or rapid depression to the south soon after crossing the crest of the coast range going east.

At a few points in the State, extraordinary local attraction is experienced. This is particularly the case a few miles westerly of the town of Sonora, in townships one and two south, ranges twelve, thirteen and fourteen east, where the variation is from fourteen to eighteen degrees. The district of country bordering on the "Buttes," west of the city of Marysville, in townships fourteen, fifteen and sixteen north, ranges one, two, three and four east, indicate changes of variation from fourteen and one-half to seventeen degrees. West of "Lassen's Peak," in townships thirty and thirty-one north, ranges one, two and three east, the variation is from fourteen to seventeen degrees. In the vicinity of "Shasta Butte," in townships forty-one and forty-two north, ranges one, two, three and four west, the variation is from fourteen to eighteen degrees. About the Humboldt, Mount Diabolo and San Bernardino very little if any local attraction is experienced. This is especially the case on what is styled the "Desert."

Added to these difficulties in tracing lines by the magnetic needle may be mentioned the constant but irregular changes termed "diurnal" and "annual."

From observations continued during a series of years in different

portions of the Northern Hemisphere, it is undoubtedly known to the academy that the needle is never "at rest," but continually vibrating, or changing, either to the east or to the west. These observations of change have been reduced to something like regularity. For instance, it is ascertained that somewhere about eight o'clock in the morning, the needle is at its greatest eastern position. At near two o'clock in the afternoon it is at its greatest western position. Then it moves east again until eight or nine in the afternoon. Then west until two or three in the morning, returning to its eastern position at about eight o'clock in the morning of each day. These hours vary somewhat in different places, and the oscillations or changes are greater in summer than in winter. In Cambridge, it is said to be fifteen minutes in summer and ten in winter. In Paris, it is sometimes twenty-five minutes in summer, and in St. Petersburgh sixteen minutes in summer and only two in winter.

Observations tending to show the extent of the diurnal variations or changes in this State, are limited. I am informed that for a few years past the President of Santa Clara College has paid some attention to the subject, but the result of his labors has not yet transpired. In conversation with some of the more intelligent surveyors of the State, they appear to be aware of the existence of important changes during the day, but no experiments have been made by them to ascertain the range.

Some casual observations made by me in Amador Valley, in Alameda county, in August, 1851, between the hours of eight A. M. and two P. M., showed a variation of nine minutes during that period.

The annual variation is subject, it is believed, to greater irregularity and less system. The observations taken in this State, so far as known to me, are meager.

Lines run in 1850 near the old San José Mission, in Alameda county, at the true variation at that time, were retraced in 1856 by the same person with the same instrument, at a variation showing an average annual change of seven minutes. Lines run in 1852 some ten miles west of Santa Clara, in Santa Clara county, now indicate a change in tracing them of about two and one-half minutes per annum. Lines run in the vicinity of San Francisco in 1852, now show changes averaging near four minutes per annum. Lines run in 1851 near the base of Mount Diablo, were retraced recently at a variation amounting to some two and one-half minutes per annum.

Col. Lewis, an intelligent surveyor and mathematician of this city, informs me that his observations for the last ten years go to show an annual increase east in the variation, in this section of the State, of about four minutes.

Observations for the last half century, collected by the Coast Survey, as taken along the coast, the larger portion of which are not considered by them reliable, show the *average* annual variation eastward to have been something over one minute.

These observations, however meager, go to show disturbance and change. It is not supposed or believed that these annual changes are anything like regular.

The occasional earthquakes with which we are visited in this State, notwithstanding they do no material injury other than to frighten the timid, are believed to have more or less effect on the magnetic forces, and to cause *sudden* changes in some localities.

Mr. W. P. Blake exhibited specimens and read a notice of the "Bailey Silver Ore," so called, which has recently attracted much attention in San Francisco. He had made a qualitative examination, whose results he gave, stating that he was "obliged to conclude that this substance is either a new and undescribed species or an artificial compound; the latter is most probable. It has the general aspect of an alloy rather than of a mineral."

September 2, 1861.

President in the Chair.

Dr. Kellogg presented the following paper:

The following new and quite anomalous plant, was recently sent us from the head-waters of the Carson River, by Mr. C. D. Gibbs, who remarks that "the specimens, which are much the same, were collected on both sides of the summit of the Sierra Nevada."

The plant is about four feet in height, with a stout, simple stem, obtusely quadrangular and nearly smooth, springing from a perennial fusiform root. The flowers are pale blue and speckled with darker blue, arranged in a compound panicle, occupying the upper half of the stem; the cauline leaves in whorls of four, narrowly lanceolate and nerved; the radical leaves broader.

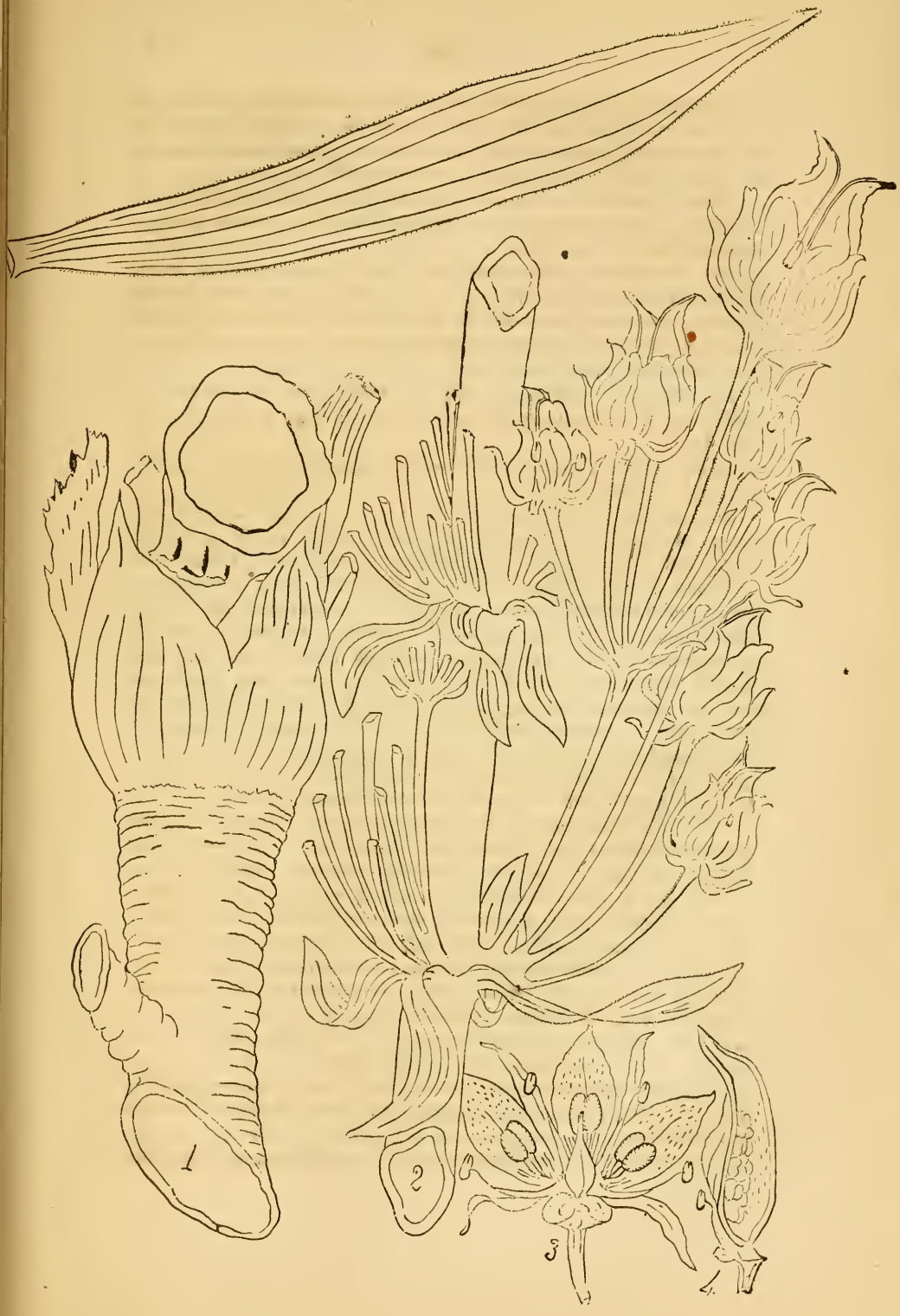
As we find no genus answering to this plant, we offer it as

TESSERANTHIUM, (Kellogg.)

(The name significant of the ruling quadruple form of the flower; as also of the prevalence of the number four or integers of four, in all its parts.)

Generic character.—Flowers perfect, perianth spreading, with-

Fig. 41.



ering-persistent, segments cohering at the lowermost base, calyx divisions four, linear-lanceolate; petals four, base broad, ovate-oblong, lance-pointed, biglandular, gibbous on the back; filaments flattened, subulate, short, the attenuated apex outwardly recurved resupinating the anthers; the expanded base cohering with the perianth opposite the calycine segments (or at the sinus of the petals). Anthers introrse, two-celled, cells distinct, oblong sagittate or lobed at the base, fixed by the middle. Styles two, contiguous, short, stigmas flattened and slightly expanded. Capsule sessile, chartaceo-ligneous, one-celled, two-valved, ovoid-conical, gibbously carinate. Seeds numerous, flattened, sub-winged, parietal in several series perpendicularly attached or parallel with the valves.

T. radiatum, (Kellogg.) [Specific name from the remarkable radiations of the pedicels, similar to the rays of an expanded fan.] Fig. 41.

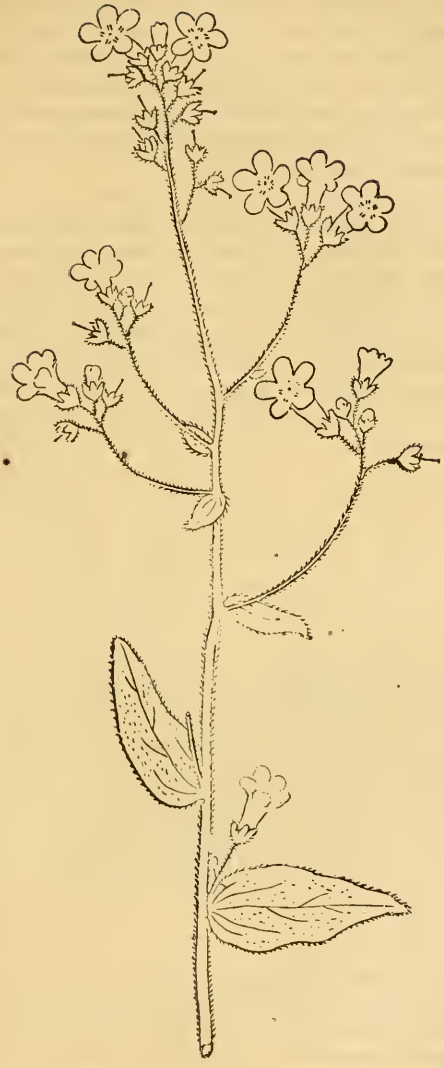
Stem upright, obtusely quadrangular, slightly puberulent; from a fusiform rhizoma.

Radical leaves broadly-lanceolate, striate, nerved, margins scabrous, narrowed and clasping at base; cauline leaves narrower, chiefly three to seven-nerved verticillate (by fours), margins scabrous.

Bracts merely reduced leaves in whorls of four; bracteoles at the secondary subdivisions in pairs, from the edges of the rachis; inflorescence definite, in a terminal somewhat elongated pyramidal raceme-panicle, the superaxillary pedicels opposite, in long fan-shaped radiations of two to four ascending from each angle and more or less cohering together at the base, pedicels one-flowered, two-edged or obcompressed, expanding above, sharply four-angled just beneath the base of the flower, the capsular valves corresponding to the two principal scabrous angles, those of the stem or principal rachis in whorls of four in the subdivisions *opposite*.

Calyx divisions four about equal (or alternately a little longer) linear-lanceolate acute, three-nerved, green (or only slightly colored towards the base), translucent margins somewhat waved, alternating with the petals. Petals four, ovate-oblong lance-pointed somewhat acuminate, nerved (chiefly three or more), the two large oblong contiguous glands are situated above the broad base, flowers spreading, at length strongly carinate, withering-persistent, in the blooming state pale livid blue speckled with darker blue, mid-vein also dark blue. Filaments glabrous, cohering with the perianth opposite the calycine segments—short (about half the length of the petals), flattened-subulate with an expanded three to five-nerved base slightly inter-connected by a hirsute margin attenuated upwards to a fine point; anthers oblong, two-celled, bifid at the base, fixed by the middle, introrse—but *apparently* extrorse by resupination (the base being turned up over, *i. e.* uppermost, from the out-

Fig. 42.



ward recurving apex of the filament). Styles two, closely contiguous (or one, and partible), very short, plane on the inside, stigmatic apex flattened and slightly expanded. Ovary sessile, ovate acute, coriaceous and somewhat rugose, one-celled, two-valved, ovules parietal, attached by the edge parallel with the valves, in three to five rows, the series laterally ascending. Mature capsule coriaceo-ligneous, oblong-ovoid conic above, slightly compressed valves opening at the median ventral suture from above, the apex of each valve reflex-spreading, gibbously carinate ridged and rugose on the back, seeds flattened and somewhat margined.

No. 1 in the Fig. exhibits the outline, size and form of a portion of the root and its crown or base of the annual stem. No. 2, a section from the lower portion of the cymose panicle, showing the mature capsules with petals, stamens and calyx, as they appear in the withering-persistent state. No. 3, the flower a little enlarged, showing the glands and relative position of its parts. No. 4, a valve of the capsule of natural size laid open with the seeds in situ on one side, while the opposite side exhibits the scars or umbilical attachment of the seeds.

October 6, 1861.

President in the Chair.

Mr. W. P. Blake noticed the occurrence of some very beautiful crystallizations of silver in the cavities and slags of a brick furnace which had been used in this city for smelting ores of silver with lead. The crystals are found in cavities, and are in bead-like strings or linear groupings of octahedra, with brilliant surfaces, about the twentieth part of an inch across the bases. Other crystals are flattened octahedrons, forming thin triangular plates. The specimens are much like some of the crystallizations of silver occurring in mines, and would not generally be recognized as artificial.

Dr. Kellogg read the annexed descriptions:

The following plant is from Mr. C. D. Gibbs, from the head-waters of Carson River.

Echinosperuum nervosum, (Kellogg.) Fig. 42.

Stem herbaceous, simple, upright, minutely strigose throughout, upper floriferous branches erect, spreading, elongated into lax rather

Fig. 43.

naked virgate racemes; the lower, axillary and solitary. Bracts foliaceous, bracteoles (when present) minute, ovate, acute.

Leaves sessile, ovate-lanceolate, or oblong-lanceolate, acute, three to five-nerved, minutely silvery strigose above, hirsutely strigose beneath. Calyx segments lance-pointed, rarely somewhat obtuse, three-nerved, about half the length of the corolla tube, shorter than the pedicels. Salver-form corolla imbricated, throat closed by five slightly emarginated scales, stamens and pistil included, the pistil slightly compressed, stigma-capitately sub two-lobed.

Nuts four, muricate.

Flowers with a blue border, the tube pale whitish.

The fruit and veins of the leaves often purplish.

The specimens of *Mertensia* herewith presented were collected near the head-waters of the Carson River by Mr. C. D. Gibbs.

Mertensia stomatechoides, (Kellogg.) Fig. 43.

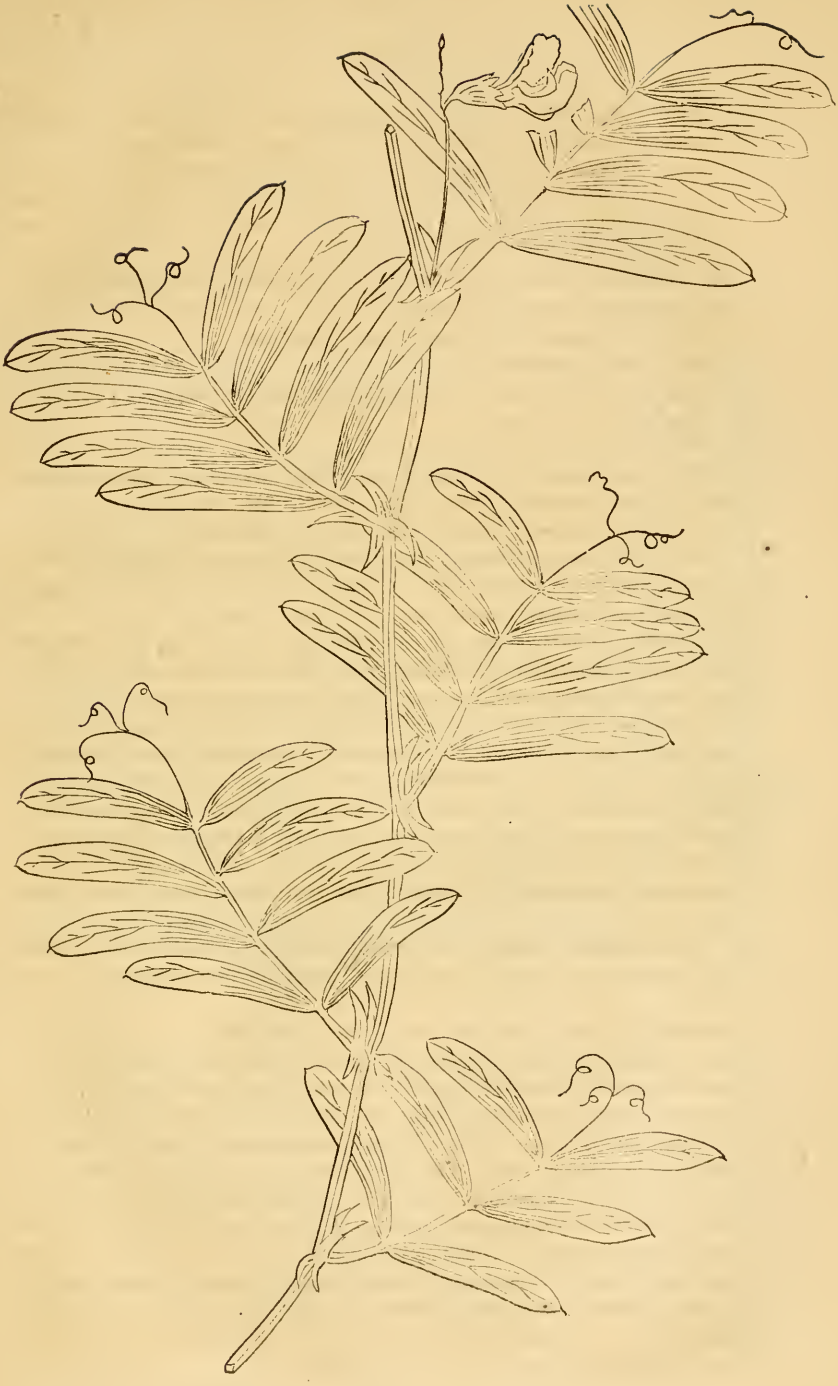
Stem herbaceous, erect, smoothish, (or beset throughout with a few callous globules, which see magnified at No. 1, Fig. 43;) angled by the decurrent ribs and margins of the leaves.

Leaves ovate-lanceolate, acuminate mucronate (by a callous prolongation), three-nerved, sessile, erect, sub-clasping, decurrent; the upper cauline leaves lanceolate, (radical leaves unknown.)

Lamina membranaceous, green, somewhat roughened by very minute rugæ; also minutely tuberculed—chiefly above—with numerous white callous gland-like globules or prominent points beautifully clothed with frosty radiating villi, (see No. 1, Fig. 43, as they appear under the common pocket [Stanhope] lens;) villous globules fewer beneath, scarcely a few hairs rarely seen; margins scabrously serrulate, (the remote minute marginal callosities obtuse or pappillose scabrous).

Inflorescence axillary and terminal in sub-corymboid racemes, sub-revolute, nodding, a few of the lower ones bracted at the base. Pedicels nearly as long as the flowers, also studded with the white stellular globules. Calyx short (about one-third the length of the tube), segments lance-linear, acute, mucronate, short-ciliate, three to five-nerved. Corolla purplish blue, tubular-funnel-form, lobes very short, obtuse, spreading, each three-nerved—which together with the intermediate nerve from each filament makes the tube twenty-nerved; five small purplish, emarginate, minutely pappillose scales or folds between the stamens of the open throat. Filaments equal, short, flat, membranaceous, one-nerved; anthers oblong-linear, obtuse, sub-sagittate at base, longer than the filaments. Pistil persistent, glabrous, filiform, sub-compressed, two-nerved, much exsert; stigma minutely capitate sub-two-lobed. Nuts triangular, erect, acute with a callous apex, one to two rows of tubercles on the margin, wrinkled on the slightly convex back.

Fig. 44.



October 20, 1861.

President in the Chair.

Dr. Kellogg read the annexed paper:

The following species of *Lathyrus* was sent from Washoe by Dr. Lanszweert.

Lathyrus Lanszwertii, (Kellogg.) Fig. 44.

Stem slender, acutely quadrangular and striate naked, below; sparsely somewhat appressed pubescent above, ascending one to two feet in height.

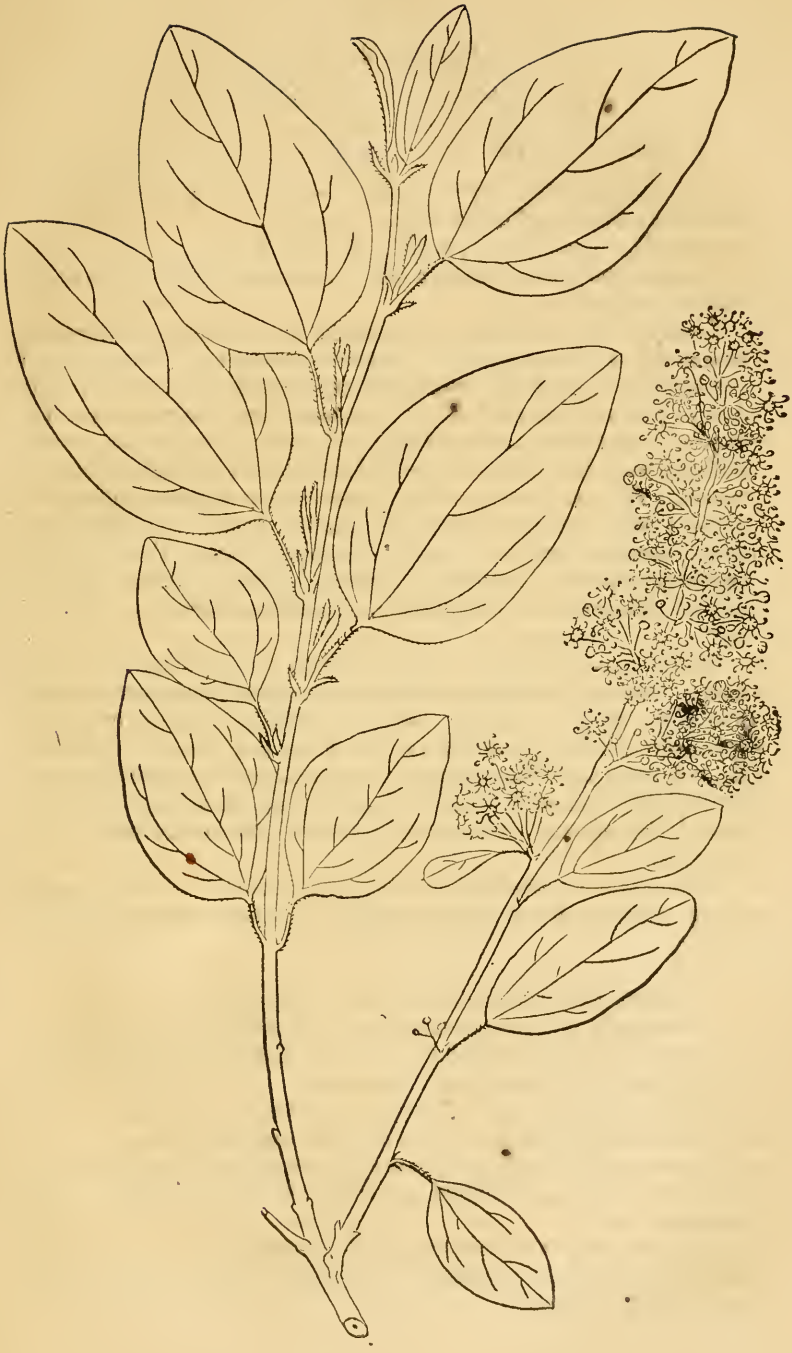
Leaflets three to four pairs, linear-oblanceolate, cuneate, entire, sub-acute, mucronate, sub-sessile, opposite, five to seven-nerved, sub-pubescent, lamina rather rigid, thin, veins prominent, petiole sulcate, striate, angled, tendrils three-parted, pubescence loosely appressed. Stipules semi-sagittate, linear-lanceolate, sub-falcate, entire, very acute or nearly subulate pointed, upper third sparsely pubescent, ciliate, nerved.

Peduncles shorter than the leaves (one to two inches long), angled, one to four-flowered, flowers pale flesh-colored, rather large. Calyx tubular-campanulate, somewhat two-lipped, teeth broad or triangular-lanceolate, two upper deeply cleft, short; all one to three-nerved (the marginal veins scarcely to be regarded as lateral nerves). Calyx also nerved from the sinuses, margins ciliate. Vexillum obovate, emarginate, cuneate, margins minutely waved; wings adherent to the keel, oblong, wrinkled, the internal tooth-like process large, causing a conspicuous swell or outward curve at the origin of the claws, tufted, bearded on the upper side below the stigma, and thence a scabrously bearded line extending down nearly the whole length. Embryo legume straight, oblanceolate, compressed, four to six-seeded, glabrous. Mature fruit unknown.

Remarks.—The plant appears to be closely allied to *L. polymorphus*, Nutt. But that species is from six to ten foliate above, leaflets obtuse at each end, crowded at the base of the stem, which is erect and branched—the leaflets are also scattered and the petioles terminated by a small bristle; besides, the stipules are minutely semi-sagittate at the base. The peduncles longer than the leaves and many flowered—flowers purple. The calyx segments by no means agree, for they are as remote as possible from being *subulate*, —"somewhat unequal" is not applicable.

It is also near *L. myrtifolius*, but that has obtuse glabrous leaflets and scabrous marginal stipules, peduncles longer than the leaves, &c.

Fig. 45.



November 3, 1861.

President in the Chair.

Dr. Kellogg read the annexed paper:

The following form of *Ceanothus* was found in the Yo-Semite Valley, by Madam Werthermann.

Ceanothus nevadensis, (Kellogg.) Fig. 45.

Stem bright green, similar to the leaves, nearly glabrous, warted, scarcely angled.

Leaves ovate, sub-acute, mucronate by a conic gland, entire, lamina thin, sub-coriaceous, dull lustrous pitted above (not varnished nor resinous); glaucous, reticulate, and very short appressed pubescent below, three moderately prominent ribs from the base; the smaller leaves often ovate-oblong, sub-acute or somewhat obtuse. Petioles very slender, appressed pubescent, half an inch or more in length, a few dark purple conic glands above scattered along the upper third, stipules subulate, acuminate, ciliate. Panicles elongated, terminal, five or six inches in length, leafy at the base, secondary subdivisions very short, filiform, pedicels glabrous like the calyx. Flowers white, small, calyx segments incurved.

Remarks.—This species appears to be closely allied to *C. velutinus*. But the leaves are not rounded, cordate, nor serrate; neither is the slender elongated racemoid-panicle "thrice compound," nor in the general appearance is it so large and robust. Could the shaded damp and lofty habitat of this plant cause so great difference as we have observed? The leaves, we observed, are not at all varnished, shining, nor resinous, nor exhaling the strong odor of *C. velutinus*.

Torrey says *C. velutinus* has "axillary panicles." This is probably a mistake, if we recollect rightly. These certainly are not axillary.

Streptanthus tortuosus, (Kellogg.) Fig. 46.

Stem simple or branching, glabrous and glaucous throughout.

Lower leaves petiolate, lamina somewhat spatulate, cuneate at base, entire, serrate above, obtuse, or sub-acute.

Middle cauline leaves oblong, sub-acute, serrate above, entire below, and slightly narrowed towards the sagittate base.

Bracts orbicular, clasping, entire, or minutely repand-denticulate; about two to four, distributed at the base of the branches and lower siliques.

Racemes simple or branching, pedicels erect (about one-eighth of an inch in flower, increasing to one-fourth or half an inch in fruit), shorter than the calyx.

Fig. 46.

Closed calyx bright purple or lilac-red, base gibbous, apex of the sepals acuminate recurved, two lateral largest; petals a little exsert on a linear tortuous claw, lamina narrow spatulate, margin undulate.

Mid-vein and veinlets purple, margins whitish. One pair of the longer filaments usually united, another linear-sagittate. Siliques long (two to two and one-half inches), narrow linear compressed, recurved valves one-nerved, areolation tortuous.

Seeds wing-margined; funiculi free above, somewhat adnate at the base.

Specific name from the unusually tortuous lines of the areolar reticulations. The specimens presented by Mr. C. D. Gibbs, from the copper region of the Sierra Nevada Mountains.

November 17, 1861.

President in the Chair.

Dr. Kellogg read the annexed paper:

Lonicera intermedia, (Kellogg.) Fig. 47.

Stem upright, glabrous, four-angled.

Leaves deciduous, opposite, elliptic, acuminate or nearly ovate-acuminate, margins minutely soft ciliate, pubescent beneath, paler green, lamina thin, flaccid and veins prominent; glabrous above, petioles one-fourth to one-half an inch in length, ciliate at the base.

Peduncles winged, the margins stipitate glandular, short (about one inch in length), two-flowered.

Bracts four, in two pairs: the exterior ovate short-acuminate, about nine-nerved, membranous, sparsely glandular hirsute; interior pair somewhat obcordate, deeply two-lobed, enclosing the ovaries and mature fruit, thick, fleshy, purple, densely stipitate glandular (often divided quite down to the base).

Corolla tubular, curved, somewhat irregular, border deeply lobed the fifth inner lobe or lip somewhat smaller, or often partially developed, tube gibbous at the base (on the outside), slightly hirsute within, externally hirsute, a few glandular hairs and sessile glands intermixed.

Style sub-winged above; sparsely bearded below, as are the filaments, scarcely exsert.

Berries small, purple, distinct; very sparsely pubescent and glandular in the embryo state, at length glabrous.

This plant was sent to us by Mr. C. D. Gibbs.

Without the flower it might be easily mistaken for some forms of *L. involucrata*.

Fig. 47.

December 1, 1861.

President in the Chair.

Dr. Ayres presented the following description of a new ichthyic form, from the coast of Lower California.

Cynoscion parvipinnis, (Ayres.)

Form elongated, somewhat compressed, head pointed, dorsal outline more arched than the abdominal. Length of the head one-fourth of the total length; greatest depth a little less than one-fifth of the length. Lower jaw longer than the upper. Mouth of moderate dimensions, the maxillary scarcely reaching a line even with the posterior border of the orbit. Teeth very small on the sides of the upper jaw, becoming larger anteriorly, while in front are two or three quite large canines; those on the sides of the lower jaw are larger than those of the upper, decreasing in size toward the front. Eye distant not quite twice its own length from the anterior border of the upper jaw, its length being contained a little over six times in the length of the head. Scales soft, covering the entire body and the head except the jaws.

The origin of the first dorsal fin is a little posterior to the line of the tip of the operculum; its height at the third spine, which is the highest, is about half the depth of the fish; the last two spines are very short and almost concealed, causing the fin to appear as though separated by quite an interval from the second dorsal, though it is in fact continued to it. Its length is more than twice its height.

The second dorsal is highest at the first soft ray, (which is preceded by a short spinous one,) and diminishes thence regularly. Its greatest height, which is contained three times in its length, is a little less than that of the first dorsal.

The pectorals are somewhat pointed, their height less than one-ninth of the length of the fish.

The ventrals, arising posterior to the origin of the pectorals, have a height equal to half the length of the head.

The anal a little posterior to the line of the middle of the second dorsal. Like that fin, it is highest at the first soft ray, (which is preceded by a short spinous one,) and diminishes thence regularly. Its length and height, which are equal, are equal to the height of the second dorsal.

The caudal fin is even posteriorly; the height of the outer rays is about half the length of the second dorsal.

D. X; I-22; P. 16; V. 1-5; A. I-10; C. 4-1-8-7-1-3.

Fig. 48.

This species, which until recently would have been called *Otolithus*, belongs, quite manifestly, to that division to which Mr. Gill has given the name *Cynoscion*. The species is well marked, and easily recognized by the characters given. A single specimen only has yet been seen. This was brought from the coast of Lower California, in about Lat. 27° N., by Capt. C. M. Scammon; it is nineteen inches in length.

December 15th, 1861.

President in the Chair.

Dr. Kellogg read the following description of a plant brought from the coast range at some point north of San Francisco:

Wahlenbergia Californica, (Kellogg). Fig. 49.

Stem simple, weakly, ascending slightly, two wing margined edges retrorsely aculeate, glabrous; flowers mostly solitary and terminal on long peduncles, (or rarely an axillary rudiment below) about four to six inches in height.

Leaves alternate, ovate, sub-acute, mucronate, dentate; teeth mucronate, margins retrorsely aculeate, lamina thin, veiny, naked, sub-three-nerved at the base, sub-sessile. Calycine tube obconically campanulate, border five-lobed, strongly ten-nerved—five of which are from the sinuses; segments lance-linear, very acute, conspicuously one-nerved or obscurely five-nerved; margins retrorsely aculeate, about one-fourth of an inch in length, or half the length of the corolla. Corolla monopetalous, erect, funnel-form, border five-cleft, division lanceolate acute, about ten-veined, twice the length of the calyx; pale blue.

Pistil as long as the tube, minutely pubescent, stigma two-parted; stamens shorter than the style, filaments somewhat flattened below, minutely short pubescent.

Mature fruit unknown.

Remarks.—The extreme delicacy of the flowers and fewness of specimens have prevented us from obtaining as thorough a knowledge of the plant as is desirable. Our figure is from a dried specimen.

From such investigations as we have been able to make, no plant of this genus appears to have been collected on this coast. They are chiefly found at the Cape of Good Hope, and in India and Japan, also Australia and on the Islands; a few are found on the calcareous soils of mountains in the Southern hemisphere. We hope to be able to return and do more ample justice to the plant at some future time.

Fig. 49

JANUARY 6th, 1862.

ANNUAL MEETING.

President in the Chair.

The following Officers were elected for the year:

LEANDER RANSOM,.....PRESIDENT.
DR. J. N. ECKEL, DR. S. B. BELL, ...VICE PRESIDENTS.
DR. W. O. AYRES,.....COR. SECRETARY.
PROF. W. H. BREWER,.....REC. SECRETARY.
WM. HEFFLEY,.....TREASURER.
PROF. J. D. WHITNEY,.....LIBRARIAN.

CURATORS.

W. M. GABB,.....PALÆONTOLOGY.
DR. J. B. TRASK,.....CONCHOLOGY.
DR. J. G. COOPER,.....ZOOLOGY.
DR. H. BEHR,.....ENTOMOLOGY.
H. G. HANKS,.....MINERALOGY.
H. G. BLOOMER,.....BOTANY.

COMMITTEES.

DR. AYRES, DR. TRASK, COL. RANSOM, ...PUBLICATION.
DR. ECKEL, MR. HEFFLEY, DR. TRASK, ...LIBRARY.
MR. HEFFLEY, DR. TRASK, ...FINANCE.

January 20th, 1862.

President in the Chair.

Professor J. D. Whitney exhibited a specimen of cinnabar, found about fifteen miles north-west of Black Rock, in Nevada Territory, where it is said to occur in considerable quantities. It was discovered by Mr. C. F. Hoffman, Topographer to the Lander Wagon Road Expedition. Accompanying the cinnabar was silica resembling that occurring with the ores of mercury, in the Coast Ranges of California.

Dr. Kellogg presented the following paper:

The Society acknowledge their obligations to Mr. G. W. Gibbs for the following new species of *Astragalus*, from the Sierra Nevada, near the head waters of Carson river:

Astragalus Gibbsii, (Kellogg). Fig. 50.

Stem erect, (?) herbaceous, fistulous, flexuous (simple or) branching, striate, canescently short (sub-wooly) villous, one to two feet in height. Leaves on short petioles (quarter to an inch in length); leaflets eight to ten pairs, obcordate, cuneate; on the upper stem obovate, retuse, cuneate at the base, minutely villous above and below, on very short petiolules, (leaflets half to an inch long, rarely half an inch wide). Stipules foliaceous, triangular, acute, adnate to the lowermost base of the petiole, (scarcely cohering with each other beneath the petiole by a base line, which curves along the insertion of either stipule to its middle, and is thence strongly decurrent to the leaf below); upper stipules ovate, acuminate, nerved. Axillary spikes on very stout, long and striate peduncles, (eight to ten inches in length) or twice as long as the leaves.

Flowers large, (an inch long) pale-purplish tinge, nodding, rather crowded at the extremity, about fifteen to twenty flowered. Bracts ovate, acute, at length about as long as the pedicels.

Calyx tubular-campanulate, the obtuse base somewhat abruptly and obliquely prominent above, sub-two-lipped, two upper teeth approximated, five-nerved from the teeth; teeth very short, (about quarter the tube) broadly acute, subulate pointed, calyx colored, the pubescence dense, creamy white.

Vexillum erect, broad, emarginate, plaited or folded in the center, and villous on the back along the ridge, reflexed at the sides. Wings oblong, the acute apex more or less tortuous, upper margin ciliate; keel short, very obtuse. Ovary stipitate, (stipe half as long as the calyx) or included, pubescent, upper suture thickened, slightly inflexed from above, six to seven seeded.

Our specimens are without mature fruit.

Fig. 50.

February 3*d*, 1862.

President in the Chair.

Dr. Ayres stated some remarkable facts connected with the recent floods in this State.

For the last two months, the fishermen who supply the markets of this city with fish have taken in the bay of San Francisco many fresh water fishes, of species generally found in the *rivers*, not those inhabiting the smaller creeks. These have been caught at all the various points in the bay, at which salt water fishes only have previously been found. It is well known that the surface waters of the bay have been nearly fresh during these floods, and the fishes in question must have followed down and lived this length of time in the fresh surface water. They have not been seen in the bay before this. The following species have been noticed:

Archoplites interruptus.
Catostomus occidentalis.
Catostomus labiatus.
Orthodon microlepidotus.
Algansea formosa.
Lavinia compressa.
Ptychocheilus grandis.
Mylopharodon robustus.

Many serpents have also been brought down, and have been cast up in numbers alive on the beach. Even rattlesnakes have been caught in the nets, it is said.

In connection with this, Dr. Ayres mentioned, as a curious result of civilization, that immediately in Oakland rattlesnakes have increased much in numbers since the lands have been fenced, and the hogs, which previously destroyed these serpents, thus restricted in their range.

February 17*th*, 1862.

Dr. Kellogg presented the annexed description.

The following *Boraginaceous* plant, collected by Mr. H. G. Bloomer, Botanical Curator to the Academy, is common in the vicinity of San Francisco:

Eritrichium connatifolium, (Kellogg). Fig. 51.

Stem simple or sometimes branching from the base, ascending, subglabrous below; loosely appressed strigulose hirsute above;

lower racemose branches axillary, mostly opposite; terminal spikes (bi or) triparted, revolute, bracted throughout; flowers white with a yellowish throat, few, rather remote, on long, lateral, superaxillary pedicels.

Lower cauline leaves opposite, connate and vaginate, stem sheathing at the base, long (two to four inches in length, one-quarter in breadth) linear, sublanceolate, acute or subacute; lowest leaves more attenuated towards the base; upper cauline leaves alternate, linear or linear-sub-spatulate, appressed, strigulose, with white hairs; all ciliate, ciliae subappressed, three-nerved, nerves submarginal, inconspicuous, lamina of the lower leaves often subglabrous or with a few hairs chiefly beneath on the mid-rib.

Bracts large; pedicels long, (from half an inch to *one inch and three-quarters in length*, in a much smaller specimen than the one here figured) thickening upwards at the base of the calyx; calyx half as long as the flower, and twice as long as the short corolla tube, segments lanceolate, acute, densely appressed, hirsute within and without, with tawny pili, closed and persistent in fruit.

Corolla rotate-salver form, lobes rounded, stamens and pistil included.

Nuts rugulose on the back below, slightly granular near the margin above, the subcarinated back of the apex smoothish.

This plant appears to be closely allied to *E. Chorisianum;* but the leaves are opposite and sheathing, and the pedicels lateral and superaxillary, and very long, and not very short; nor are the segments of the calyx simply bearded at the apex, but throughout. The three-nerved character also is omitted.

It is also near *E. Californicum*, but that is described as leafy at the base only of the racemes; and the pedicels very short, or only one-third the length of the calyx, or nearly sessile; and the calyx longer than the flower, besides being spreading in the fruit state.

It approaches *E. Scouleri*, but that is many flowered, and the racemes without bracts, and short, pedicellate flowers, small and yellow.

Dr. Torrey, in the Mexican Boundary Report, says: "We have a strong suspicion that *E. Californicum*, *E. Chorisianum*, and *E. Scouleri* are not distinct." This may also prove to be only another variety, but its form is so peculiar, we scarcely feel authorized to make so large an allowance in the present state of our observations.

Fig. 51.

March 3*d*, 1862.

President in the Chair.

The following paper was read by Mr. W. M. Gabb:—

DESCRIPTION OF TWO NEW SPECIES OF PENNATULIDAE FROM THE PACIFIC COAST OF THE UNITED STATES.

Pennatula tenua.—Elongated, slender. Naked portion between two-thirds and three-fourths the length of the pennate division of the shaft; elongated, narrow, fusiform, narrowed and bluntly rounded at the lower end. Widest part, two-thirds of the length from the end; surface deeply wrinkled longitudinally, and minutely, in a transverse direction (in an alcoholic specimen.) Back of shaft deeply grooved from the origin of the pinnæ to the upper extremity, on each side of this groove roughened by numerous rounded papillæ, smaller than the polype cells. Pinnæ about forty in number on each side on the only specimen I have seen, placed entirely on the front of the stalk, with a groove between them; narrow at the base, about twice as wide at the outer edge, which is folded, in the larger ones, towards the middle of the series, into a number of wrinkles like a ruffle. Anteriorly, the polypes extend along the margin as far as the end where it unites with the stalk; posteriorly, there is a half-inch which is naked; internal support somewhat flexible, nearly as long as the stalk, square with rounded corners, tapering at both ends to a fine point, spirally coiled at the upper end; curved into a long hook, with the terminal branch straight, at the lower end. This branch is about as long as the distance of the hook from the end of the stalk.

Total length 8·5 in., greatest circumference of the naked part of the stalk ·3 in., length of the same 3·9 in., length along the polypiferous edge of one of the largest pinnæ 2·2 in., width of ditto .6 in., length of internal support, exclusive of curves, 5·7 in., length of lower hook ·9 in., greatest diameter of support, ·10 inch.

From Cape Flattery, Washington Territory, in eighty feet of water. Coll. Cal. Academy Natural Sciences. Presented by Dr. Sproat.

The long slender general form of this species will distinguish it. I have only seen one specimen, which has been preserved in alcohol so long, that I cannot determine what was the color during life. The whole surface is now of a nearly uniform drab color, somewhat lighter in the protected portions than elsewhere.

Virgularia elongata.—Colony long, slender. Stem flexible and elastic to some extent even in the dried state; at the base attenuated and cylindrical, above thicker and grooved, somewhat subquadrate and marked by numerous fine longitudinal lines; broken section, radiate as in a belemnite or the spine of an echinoderm.

Polypiferous lobes exsert, arranged on opposite sides and alternating; below very small, and with a groove between the two series. Each lobe has ten or twelve fusiform translucent (calcareous?) spines, projecting considerably beyond the margin of the fleshy portion (in dried specimens) of the lobe itself, and each spine appears to correspond to a polype cell, or the boundary between two. Below the lobes, the fleshy covering is dilated into an elongate fusiform mass.

Length 18 inches, (upper end broken off from all the specimens); from tip of lower extremity to commencement of lobes, 2·8 in.; width of largest lobes, ·12 in.; greatest diameter of stem, ·05 in.; width of fleshy expansion below the lobes, ·15 in.; smallest diameter above the expansion, ·07 in.

This species has been found only on one occasion in San Francisco Bay, when it was washed up in immense numbers on the beach. I have seen a fragment of the same species from Monterey, Cal., collected by Dr. Cooper, of the Geological Survey.

March 17*th*, 1862.

President in the Chair.

Dr. H. Behr read the annexed paper on certain Butterflies of California:

Genus Danais is represented by one species, and this is the most common and widely spread, Danais archippus Cramer, that on the Western Continent occupies the same position as Danais chrysippus, on the Eastern. D. archippus extends from the Northern States through all tropical America to Buenos Ayres, and is equally numerous on the Atlantic as the Pacific side of the continent. The Gerontagcic species, [chrysippus Cramer] that represents our archippus in Asia, Africa and Australia, does not extend so far north as our Danais, and is only occasionally met with in Mediterranean Europe, the northermost locality where it ever was

found being Naples. The insect is equally common on the Cape Verde Islands as in Manila, Adelaide, etc., but it is an interesting fact, and worth mentioning, that the Sandwich Islands possess our American, and not the Gerontageic and Polynesian species D. chrysippus. I account for this anomaly in its geographical distribution, by considering the Sandwich Islands archippus a California colony. We see through our whole Summer and Autumn our Danais in the very streets of the city, struggling against the western gale that sweeps this peninsula. The food of the caterpillar consists extensively of plants of the Asclepias family. Our botanical members know best that the nearest habitat of any of the plants, is on the other side of the bay; so that evidently the brown-winged visitors are an immigration. And really in crossing the bay you may observe frequently the uncouth but powerful flight of this large butterfly, always in an easterly direction. There is a great gathering of this Danais on the outer Telegraph Hill, and a considerable number is constantly seen sea-faring themselves out on the Pacific.

Now it is my opinion that somehow or other single individuals, favored by concurring circumstances, may have reached, and reach now these distant islands, and be the founders and maintainers of this unexpected colony. For instance, they might get into a strong northerly breeze, get carried by that into the trade-winds, and amongst hundred thousands, perhaps one pregnant female may chance to alight on an island, deposit her eggs on some of the Asclepias family, with which group of plants the islands are well stocked, and the colony is there. If the Gerontageic and Polynesian species Chrysippus exists on the Sandwich Islands, I do not know. I always received from there Archippus. It remains now to account for that singular propensity of an insect species to get drowned in the Pacific.

There seems to exist a law in the animal kingdom that compels, not only single individuals, but extensive flocks, to strive against a current, may it be one of water or of air. Dr. Ayres, our Ichthylogical friend, will have observed that instinct frequently in fishes, and there it seems to have a cause, namely, to keep a station, or a certain range, that would be immediately lost if the animal would trust itself to the current. More difficult it is to account for this instinct in certain insects, that by that very propensity are carried to localities, where the individual perishes without propagating the species. It appears to me that this instinct has the same cause that compels certain Mammalia, of the family of the Glires, for instance, the Norwegian Lemming, by wandering in one straight line to seek a destruction that they are pretty certain to meet. It is

this instinct in that great economy that we call Nature, one of the safety-valves, or to express more properly, one of the compensation weights of that mechanism, that prevent a species getting too numerous and superseding their neighbors and contemporaries in creation.

Amongst the Lepidoptera, I know of very few instances of real migration, and on a later occasion, I shall state those few instances; but that instinct to seek a current of air, and to strive on against it, is very generally spread to that whole class. This instinct or law of nature compels, not only its victims to drown themselves; it also forces them up to the summit of mountains, and to freeze to death there, far above the boundary of all vegetation, in the solitude of an irrespirable rarified atmosphere. It is especially the group of the Pierides and true Papilionides that long for this most romantic death, and it is one of the most curious, and in the first time, unaccountable sights, to witness, in a solitude of snow, and on a barren rock, swarms of brilliant Butterflies, glowing in all the brilliant coloration of the tropics.

The genus to which our Danais belongs seems not to be subject to this dangerous propensity. The Danais, with her congeners, Euploea and Heliconia, shun the mountains, and seem to affect sea-coasts. These butterflies frequently are to the sailors bearers of terrestrial welcome, before the coast is seen; and I think the Asiatic genus Euploea, bears its name from this peculiarity. I consider the name derived from Eu, "well," and Ploion, "vessel," well meaning to navigators; or it may be derived from Eu and Pleo, "I navigate," and means an *insect that is a good navigator*. In this case it is the current of cold, densified air that by its specific weight, presses back the extended, and by heat, rarified atmosphere of the tropical lowlands. A current of cool air is daily rushing down certain gulches, and they are the very same gulches that are most frequented by those Lepidoptera we are to meet beyond the limits of vegetation.

Danais evidently is also a good navigator—without such nautical talents it never would have reached Honolulu; and this accounts, perhaps, for its extensive geographical distribution.

April 7th, 1862.

President in the Chair.

The following paper was presented by Mr. W. M. Gabb.

DESCRIPTIONS OF TWO NEW SPECIES OF CEPHALOPODES IN THE MUSEUM OF THE CALIFORNIA ACADEMY OF NATURAL SCIENCES.

Octopus punctatus.—Body ovate, rounded at the extremity. Head moderately large, without any well marked neck; compressed above, about one-fifth as long as the body, abruptly truncated in advance of the eyes, so that the constriction below the arms is barely more than half as wide as the greatest diameter of the head. Eyes of medium size; not prominent; color destroyed by alcohol. Abdominal aperture wide, the ends being directly behind the eyes; lip simple and acute. Siphon broad at the base, rapidly narrowing and extending a little beyond the origin of the arms. Arms subquadrate in section, the largest about four times the length of the body; proportionate length beginning with the dorsal side, 2, 1, 4, 3, varying very little in length, and being of about the same thickness. Cupules moderate, about half the diameter of the arms, largest just beyond the termination of the umbrella; short, robust, tapering almost imperceptibly, and slightly constricted just below the top. Umbrella small, not extending between the arms for one-fourth of their length, but continued as a very narrow membrane, for about one-half of their length along the side farthest from the dorsal side. Mouth very small, surrounded by small lips. Surface smooth, flesh-colored, and profusely marked by very minute reddish-brown, or chocolate-colored points. These points are so closely placed on the dorsal surface of the body and arms, as to produce a nearly uniform, dirty-brown appearance; on the inside of the arms, the inner surface of the umbrella, and the whole ventral surface they are sparsely scattered. Length of body and head to origin of the arms, 3·5 inches. Circumference of body, at its broadest part, 4·3 inches. Length of body to the opening in the abdomen, 2·5 inches. Breadth of head, 1·1 inches. Length of the longest arm, from the mouth, 10·8 inches. Length of shortest, 9·25 inches. Circumference of one arm, 2 inches. Diameter of largest cupule, ·3 in. Length of siphon, ·7 in. Diameter at base, ·7 in. Diameter at apex, (flattened) ·3 in.

Locality—common in the neighborhood of San Francisco. Also found on the coast of Lower California, having been brought from Scammon's Lagoon, in abundance, by Capt. C. M. Scammon. The

specimen from which the species is described is comparative small. Dr. W. O. Ayres told me that he had seen them several feet in length, and spoke of one in which the arms were over seven feet long.

It appears to approach most nearly to *O. megalocyathus* Couthouy, (Gould, Mollusca of Wilkes' Expedition, p. 471) but differs in the absence of the lateral membrane, the size of the mouth, the size of the cupules and the general coloration. There may be other differences, but I have not had an opportunity of examining the figures of Couthouy's species.

Onychoteuthis fusiformis.—Body slender, fusiform, prolonged and sharply acuminate posteriorly, truncated sinuously above, having a slight projection in the median dorsal region, and being equally emarginate on the ventral side. Head small, narrower than the body, subquadrate; eyes moderate and prominent, lachrymal sinus large. Sessile arms, not half so long as the body, nearly of the same size; formula of relative size, counting from the dorsal side, 1, 2, 4, 3, the second and last, being almost exactly of the same length, the dorsal the smallest. The dorsal arms are connected at their base by a minute membrane, which does not run up their sides; the second and third arms, and the tentacles have this membrane on one side, running to the extreme tips; the ventral and the adjoining arms are united by a larger membrane, but like the dorsal, the ventral arms are unprovided with it beyond the base, and are not united to each other; the tips are laterally compressed. The cupules on the sessile arms are strongly constricted at their base, and are pedunculated; they are arranged in a double series, without being either in pairs, nor yet alternating. They commence a short distance from the base of the arms, and are continued to the extreme tips, becoming smaller and scattered as they approach the end. Tentacles, nearly two-thirds the length of the body, exclusive of the head, the club forming about one-third of the whole; the club is little if at all widened; tentacle naked to the base of the club, where the "sucker" is placed, consisting of a small, irregularly rounded disc, bearing eight or nine sessile cupules. Beyond, as far as the extreme tip, are large and small, strongly hooked claws, arranged in an irregular line, and each one pierced near the base, and above grooved for half its length on the concave side. Mouth small, surrounded by a thin, simple lip, and outside of that, by a seven-lobed fold of skin, two lobes of which are placed opposite the base of the ventral arms—one opposite the space between the dorsals, and the other four opposite the laterals. Mandibles black. Siphon small, hardly projecting beyond the mantle. Fins dorsal,

triangular, terminal, half as long as the body, outer angle rounded. Internal plate long, very slender, widest in the middle, tapering both ways, median ridge as high as the lateral plate, conical portion at the base, minute, laterally compressed, tip curved.

Color, light yellowish-brown, on the under surface and inside of the arms; back purplish-brown, nearly black on the median line and the posterior portion of the head, caused as in the preceding species, by the peculiar arrangement of dark spots. On the back of the fins these spots are of two sizes—large ones surrounded by an uncolored space, and small ones of a lighter color, interspersed.

Length of horny plate, 3·2 inches; width, ·15 inches; length of terminal cone, ·15 inches; circumference of body, 2 inches; length of fin, 1·6 inches; breadth of fins, 2·1 inches; length of longest sessile arm, 1·5 inches; length of shortest, ·9 inches; length of tentacle, 2·1 inches.

Said to have been caught off Cape Horn.

April 21*st*, 1862.

President in the Chair.

Dr. H. Behr read the following paper:

Our Californian Argynnides.—The genus *Argynnis* is one of the most natural ones in its group, and it is so well defined in its characters that the boundaries between it and neighboring genera are nearly the same with all authors.

But that very facility we find in circumscribing the genus, is a great disadvantage, when we come to draw the lines between the different species. The easy definition of the genus has its cause in an unusually great uniformity of character. Even the well examined and since long time known species of Central Europe are in some instances doubtful.

In studying our Californian species the perplexity is the greater, as the scarcity of the material in collections has produced a series of diagnosis that occasionally refer to varities instead of the regular form. For the purpose of avoiding to render greater the confusion that does exist, we will give only numbers with the diagnosis of species that we were not able to ascertain from the descriptions that were within our reach.

1. *Argynnis calippe Bd.*

I find nothing to add to the masterly diagnosis and description of this species. It is the only *Argynnis* that is found near our city

and it seems pretty universally distributed throughout the State. There exists only one generation, and the imago is found in June.

2. *Argynnis* (sp.) Alae denticulatæ fulvae maculis ordinariis ornatae; posticae subtus fuscae usque ad fasciam maculatem intermediam partim dilutiores, a fascia media ad marginem fulvae; lunulae marginales semilunares, maculae fasciae intermediae subrotundae mediae fasciae tres radicales subquatuor, cunctae cum costa margineque abdominali argenteae.

This species is very similar to *Calippe*, but actually differs by the upper side being colored in the usual way of the genus, and not showing the pale lunulae and spots of the disc, like *A. Calippe* that resembles in this respect more an Euptoieta than a true Argynnis. The lunulae are not triangular, nor are the silver spots of the intermediate fascia egg-shaped as in *Calippe*.

This species frequents several localities near the Bay of San Francisco, but is not very common.

3. *Argynnis Leto* mihi.—Alae maris fulvae, radicem versus fuscae ubique signaturis ordinariis nigris instructae, posticae subtus dilute ferrugineae, a radice usque ad mediam alam cinnamomeae, maculis marginalibus semilunaribus argenteis, fascia media e septem intermedia e tribus maculis compositae, atque duabus maculis punctiformibus radicem versus positis, cunctis argenteis.

Cybele Boisd. in literis.

This species, although Dr. Boisduval pronounces it, in a private letter directed to Mr. Lorquin, identical with *A. Cybele*, Godt. is certainly a distinct species peculiar to the western slope. The upper side of male is like that of *A. Cybele* female, and the *Leto* female has the hind wings black, with a band of white spots in the middle, and of orange ones near the margin in a similar way as in the *A. Idalia* male. The under side of the hind wings differs most essentially as the marginal silver spots are always semilunar, never triangular as in *A. Cybele*.

This species has been discovered by our indefatigable entomologist, Mr. Lorquin, in a sequestered valley near Carson City.

A. Aglaja has been mentioned as an inhabitant of California. I have not yet seen any specimen captured in this country, but would not be much astonished if really this European and Siberian species should extend to Arctic America, and from there following the high ridges of the Pacific coast to Alpine California. Nevertheless it would be strange to have here a Gerontogeic species when all the Neogeic ones differ; for there is not one Atlantic Argynnis met with here; in case *A. Aglaja* really should prove to be a Califor

nian, it would not be difficult to recognize this species from its nearest California relations by the greenish hue of the under side of the hind wings; for there is no green about any of the California species.

In Morris's Catalogue of North American Lepidoptera, there are now six species very closely related amongst themselves, but decidedly distinct. Most of them have been described, and only one or two are new. Of course it is very difficult to recognize the species from a mere diagnosis, and even the diagnoses of Boisduval, being interspersed here and there into the *Annales de l' Entomologie* are not altogether within my reach. I have therefore adopted the plan to give the characteristics of the species, without a name, but to add a figure and leave it to others that are in a better position for researches, to add the name.

Their names are Zerene, Mormonia, Hydaspe, Egleis, Adiaste. Amongst these, for instance, the diagnosis that Dr. Boisduval gives of Zerene, certainly comprises two species, of which one seems to be not yet known in Europe. All these species approach, in their markings, nearest to the European *T. Adippe*, and *A. Niobe*, but differ constantly by the want of the series of eye spots that is always found in either species between the marginal lunulae and middle fascia of the hind wings.

4. *A. Adippe* similis, sed alae posticae serie ocellorum inter maculas marginales fasciamque mediam destitutae. Maculae cunctae argenteæ marginales triquetrae, fasciae intermediae quadrangulares. *A. Egleis*, Boisd ?

This and the following species are not so intensely colored on the upper side as most of the related species are, and the coloration of the female partakes even a little of that of *A. Calippe*. Under side of the hind wings reddish-brown, with a few diluted spots; from the intermediate fascia to the margin, straw-colored: and the intermediate fascia also towards the margin bordered by buff color.

This species is found high up in the mountains.

5. *A. Adippe* similis, sed alae posticae serie ocellorum inter lunulas marginales fasciamque intemediam destitutae Maculae marginales certe argenteæ, reliquae pruina quadam metallica obductae: marginales semilunares, fasciae intermediae ovales, radicem versus nigro marginatae.

This species is found in different localities, but always in mountainous regions. It is much more common than No. 4, and easily recognized by the black bordering of the spots of the intermediate fascia, their oval, not quadrangular shape, and the rounded form of the marginal spots.

6. *A. Adippe* similis, sed alae posticae serie ocellorum. inter lunulas marginales fasciamque mediam destitutae. Maculae marginales certe argenteae, reliquae pruina quadam metallica obductae. Umbra radicalis ultra fasciam macularem mediam porrecta.

Size of *A. Niobe*—coloration of the upper side, orange-brown; markings as usual; underside similar to No. 1, but much darker; and the maculae where they have no silver, dark-yellow; and the saturated coloration of the radical half of the hind wing extended beyond the middle fascia.

From the Sierra Nevada.

7. *A. Adippe* similis, sed alae posticae serie ocellorum inter lunulas marginales fasciamque mediam destitutae. Alae posticae subtus pallide ferrugineae, fasciae maculares ordinariae vix pallidiores nunquam argenteae.

Size more considerable; about that of the *A. Adippe*. Upper side of this species characterized by the greater part of the ordinary marks on the hind wing wanting, so that they appear almost covered by the fiery brown that forms the ground; markings of the under side are very indistinct; even the black bordering on the radical side of the maculae common to all species of this group, is here scarcely perceptible.

8. *A. Adippe* similis sed alae posticae serie ocellorum inter lunulas marginales fasciamque mediam destitutae. Alae posticae subtus ferrugineæ, fasciae maculares opacae pallidae marginales lunulatae. Zerene, Boisd?

Size even more considerable than that of the preceding; under side of the hind wings of a deep brown, approaching violet, on the more diluted spots; the maculae pale brown and well bordered with black, especially on the radical side.

This species is found in several localities of the Sierra Nevada.

9. *A. Adippe* similis, sed alae posticae subtus serie ocellorum inter maculas marginales fasciamque mediam destitutae. Alae posticae subtus cinnamomeae a fascia media usque ad marginem pallide ferruginae maculae gilvescentes opacae, marginales triquetrae.

Size like the preceding; radical side of the maculae on the under side in a very decided manner bordered by deep black.

This species was found by Mr. Lorquin on the road between Nevada City and Bear Valley.

All these species, related as they are amongst themselves and to exotic species, are undeniably distinct. They inhabit different

localities; they vary as little as our European *Aglaja*, and in a long series of specimens I find them constant to their respective diagnoses and without anything that should look intermediate or like a transition. Of great importance for the diagnosis of these specimens, is the shape of the marginal lunulae, and the silvery or opaque nature of the different fasciae macularum. I must confess that in the first time I paid little attention to this separating mark. I concluded from the European *A. Adippe* and *Niobe*, in which species the presence or absence of the metallic hue is of no account, that it would be similar in these their California relations: but it is quite different with the California species, and the more or less opaque or silvery hind wings constitute well-marked and constant specific characters.

The only representant of the Arctic form of *Argynnis* as now known in California is *A. Epithore* Boisd. But there may be discovered several other species by a closer examination of the Alpine mountains of California.

All those species are only known in the imago state. It is to be expected that the *caterpillars* feed like the majority of the *gerontageic Argynnides* on species of Viola. On this occasion I may venture the remark that the geographic distribution of the genus *Argynnis* seems exactly parallel to that of the *Viola*, and not only in occupying the same regnum, but also having the centre of variety and multiplication of species in the very centre of the regnum Violæ. Indeed we find the greatest variety of the genus *Argynnis* and the genus *Viola* in the northern, temperate and arctic zones; from there they diminish in number, and degenerate gradually in osculant genera, like *Atelia* and *Cirrhochroa* in the old world, *Agraulis* and *Euptoieta* in the new. The true *Argynnides* seem nowhere to pass the line, and only far in the southern extremities of America and Australia where the antartic representants of Viola begin, begin also a few scattered but normal forms of *Argynnis*. We know very well that even the typical species of *Argynnis* are not altogether restricted to the genus *Viola*, but nevertheless there exists an intimate connection between this entomological and botanical genus that makes them not only coincide in their geographical distribution, but shows itself even in the osculant genera of the tropics that feed, as much as we could ascertain, on Parietales—that is, on relations of the Viola tribes. So *Euptoieta Claudia* and *Agraulis Vanillae* live in the larva state on species of Passiflora; and we once raised, in Manila, a *Cithosia insularis* from a caterpillar we had found on a species of *Blackwellia*.

As to our California *Argynnides*, they all, with one exception, belong to the type of *A. Aglaja*, a type that is more numerously represented, and altogether more developed on this continent than

in the old world, where the type of *A. Aglaja* is very poorly represented, and where the type of *A. Paphia* takes its place. This last-mentioned form is wanting here and on the whole continent.

May 5th, 1862.

President in the Chair.

Mr. H. N. Bolander read the following paper:

Of the grasses found in the Academy's Herbarium, I determined the following species:

1. Aira elongata, Report of the P. R. R. Expedition.
2. Brizopyrum Douglasii, Captain Beechy's Botany, p. 404.
   Syn. Brizopyrum strictum, Torr.
   Poa Michauxii, Kunth.
   Poa Douglasii, Stend.
3. Kœleria cristata, Gray's Man.
4. Agrostis microphylla, P. R. R. Report.
5. Melica pœoides, Phil. Journal.
6. Melica imperforata, Captain Beechy's Botany.
   Melica imperfecta, P. R. R. Report.
7. Stipa Neesiana, " " "
8. Elymus villosus, " " "
9. Festuca nicrostachys, Phil. Journal (new series).
10. Lolium tremulentum, (?) Gray's Man.
11. Beckmannia crucæformis.
12. Polypogon Monspeliensis and maritima.
13. Gastoidium Lendigerum.

The grains of No. 10 are said to be noxious to cattle. Lindley remarks: "The effects of this grass are undoubtedly deleterious, although perhaps exaggerated." It grows in abundance in the meadows back of Oakland, and if it should prove to be that grass and possess those noxious qualities so generally attributed to it, we must certainly hear something about it before long. It was not advanced sufficiently to determine it with safety.

Gray says: "Almost the only instance among grasses:" but there are quite a number of grasses which possess noxious qualities.

Festuca quadridentata is the poisonous grass in Quito.

Molinia varia is injurious to cattle.

Paspalum scrobiculatum of India is poisonous; it renders the milk of cows grazing upon it narcotic and drastic.

About the grass No. 2, Brizopyrum Douglasii, is to be remarked that it is diœcious, which is rare among grasses.

Buchloë dactyloides, the so-called Buffalo-grass, and Monanthochloë littoralis, are two instances of diœcious grasses in North America.

The so-called *Buffalo-grass* grows in abundance on the Western plains, from Canada down to Northern Mexico; it is the grass on which the buffaloes principally subsist. Its true nature was for a long time unknown. Nuttall described the male plant as Sesleria dactyloides: also Torrey, in the Report of the P. R. R. Kunth gives it under the name Calanthera dactyloides. The female plant is given by Stendel under the name Antephora axilliflora.

The latter, Monanthochloë, grows in Florida and Island of Galveston, Texas, where it covers large tracts of moist, sandy, saline soil.

In East India is known the genus Spinifex, with six species, which are only incompletely diœcious; in South America the genus Gynerium, with five species.

The so-called "bunch grass" is the *Festuca scabrella*. The so-called "grama grass" of Texas and New Mexico is the *Festuca macrostachya*. It is said of the bunch grass that it fattens quicker, but gives not the amount of strength and muscle as the grama grass.

Grasses in the vicinity of San Francisco which I saw this season:

Aira elongata.
Brizopyrum Douglasii.
Agrostis macrophylla.
Melica poæoides, and imperfecta.
Stipa Necsiana.
Elymus, 2–3 species.
Festuca, 2–3 species.
Lolium tremulentum (?).
Spartina, 1 species.
Uniola, 1 species.
Phalaris, 2 species.
Hordeum, 2 species.
Cȳnodon Dàctylon.
Lophochlæna Californica.
Avena, 4 species (?).
Ceratochloa, 2 species (?).
Poa, 3 species (?).

17 genera, with 29–30 species.

June 2d, 1862.

President in the Chair.

Dr. Kellogg presented the annexed description:

Lilium parvum (Kellogg). Fig. 52.

Stem terete, sub-glabrous, eighteen inches to two and a half feet high.

Leaves scattered, oblanceolate, sub-acute, glabrous above, three-nerved, margins scabrulose, nerves smooth beneath, lamina very minutely scabrulose; bracts foliaceous, lanceolate, or ovate acuminate, ciliate, five to seven-nerved, the lowermost whorled.

Flowers about five to nine, verticillate by threes and alternate or opposite above; erect, tubular-bell-shaped, sepals revolute above the middle, tube and throat yellow and purple spotted within; revolute limbs red, with well-defined limits; three inner petals somewhat narrower, glabrous and slightly grooved above, sub-glabrous and abruptly ridged on the back; outer broader sepals plain, somewhat more spotted; claw thickened, grooved within and convex on the back; pistil scarcely a little longer; stigma simple or sub-three-lobed, not parted; stamens sub-equal, regularly spreading; ovary half the length of the style.

We are indebted to Mr. H. G. Bloomer, Botanical Curator to the Academy, for his worthy zeal in cultivating this little native lily, from which our sketch is taken; also to Mr. Stivers for specimens from the mountains, and to Mr. C. H. Dorr for specimens from Nevada Territory.

The most obvious characteristics are the small erect or sub-erect flowers, and the scattered leaves; the peduncles in some instances appear to be somewhat tortuous, and the flowers only partially erect. In their native habitat, more extended observation leads us to conclude that they seldom exceed the size indicated in the accompanying sketch.

July 7th, 1862.

President in the Chair.

Mr. Bolander read the following descriptions of plants:

Juncus Leseurii.—Outer sepals linear-lanceolate, sharply acu-

Fig 52.

minate (one-fourth of an inch long), the green back faintly six-nerved below; the involute hyaline margins several lines wide, of a dark-brown color, and slightly exceeding the inner sepals. Inner sepals scarcely involute, acuminate, green on the back, faintly three-nerved below, broadly hyaline-margined of a brown and white color.

Ovary oblong; style as long as the ovary; stigmas three, long, spirally twisted; stamens six, on very short filaments (about one-third the length of the anthers); pod obovate-triangular, abruptly long-pointed, scarcely exceeding half the length of the outer sepals (one-sixteenth of an inch in diameter); seeds oblong, smooth.

Scape naked and simple, furnished below with leafless, obtuse sheaths of a tawny color, terete, scarcely striate, 1–3 feet high. One-fourth peduncled, corymbose and cymose panicles produced from the side of the scape, at about 3–7 inches below the pungent tip.

Peduncles flat inside or triquetous, smooth 1–2 inches long (one sometimes sessile); each peduncle and pedicel subtended by two tawny, unequal, ovate-oblong, abruptly-pointed or obtuse, many-nerved or nerveless bracts or scales.

Flowers almost sessile, secund, subtended by two broadly-ovate, obtuse or minutely-pointed, tawny, hyalinous scales.

Salt-marshes of the bay of San Francisco, October—November.

Panicum thermale.—Spikelets two-flowered; lower neuter, upper hermaphrodite. Glumes two, very unequal, herbaceous, pubescent; lower very minute, ovate; upper ovate, distinctly 5–7 nerved, acute.

Palæ of the neuter flower, two; lower ovate-oblong, acute, five-nerved, pubescent; upper hyaline, one-half the size of the lower.

Palæ of the hermaphrodite flower, ovate, cartilaginous, smooth, lower enclosing partly the upper.

Ovary smooth; styles terminal; stigmas plumose; stamens three; anthers purple; squamulæ two, smooth; a low grass growing in large tufts; roots fibrous; culms 6–8 inches high, weak, compressed, very branchy upwards and leafy; leaves short, flat, thickish, tomentose-pubescent, spiny-acuminate, very scabrous on the margins; sheaths short, striate, peculiarly punctate; ligula scarcely visible, ciliate; panicle very small, few-flowered, partly vaginate, shorter than the terminating leaves.

The whole plant is like velvet to the feel. There are, however, some specimens which are rather smooth.

Habitat: On hot rocks and in hot water flowing from the Geyser springs and Geyser mountains, in the northern part of Sonoma County.

Danthonia Californica (California Wild Oat Grass).—Spikelets 5–10-flowered, distichous, imbricated, the uppermost abortive, one-half to three-quarters of an inch long.

Glumes two, nearly equal, membranaceous, lanceolate, 4–5-nerved, pointed, hyaline-margined, as long as the flowers or nearly so, tinged with purple, persistent.

Paleæ two; lower, broadly ovate-oblong, round on the back, smooth, chartaceous, bearing between the sharp-pointed or awn-like teeth (half of the palea long) of the tip a flattish and spirally-twisted awn (about the length of the palea), a tuft of silky hairs at the base, and on each side of the margins, about the middle, many striate-nerved; upper, lanceolate, bicarinate, ciliate-hairy on the two nerves, obtusely-pointed, fully as long as the lower palea, membranaceous.

Ovary stalked, subpyriform, concave at the apex, glabrous; styles two, terminal, distant and divergent; stigmas plumose, fully twice the length of the ovary (pilis) denticulate; stamens three; anthers dark purple; squamulæ two, broadly wedge-shaped, either undulate-sinuate or unequally repand at the apex, with several subdivided strong veins; caryopsis ovate-oblong, three-sixteenths of an inch long and one-sixteenth wide, smooth, convex on the back, slightly concave on the other, bearing two small divergent teeth at the beak.

Root perennial; culms decumbent, many arising from the same root and spreading in opposite directions, terete, smooth, striated, from six inches to three feet long; leaves linear, convolute-pointed; sheaths long and bearded at the throat; ligula scarcely visible; panicle simple and sub-compound, spreading 3–7–10-flowered, branchlets scabrous.

Habitat: On borders of cultivated fields near the bay at Oakland; hills near Mission Dolores, San Francisco.

August 4th, 1862.

President in the Chair.

Dr. Kellogg read the following paper on a species of *Trixis* brought from Cerros Island by Dr. J. A. Veatch:

Trixis Californica (Kellogg). Fig. 53.

Stem shrubby, branches spreading, branchlets purplish, appressed pubescent with short white hairs, also glandular and stipitate glandular; bark light ashy hue below.

Fig. 53.

Leaves sessile or sub-sessile, lanceolate and ovate-lanceolate, acuminate, mucronate; base somewhat cuneate, sub-decurrent, obscurely three-nerved; margins quite entire, sub-revolute, short appressed pubescent chiefly above, glandular-scabrous throughout, densely sub-papillose-glandular beneath; foliage rather dry and rigid, green alike above and below.

Bracts four or five, apparently reduced leaves, lanceolate, sessile, three to five-nerved.

Heads few, small, campanulate, in loose paniculoid-corymbs or sub-solitary; pedicels long or variable. Flowers yellow.

Involucre of eight equal, long, linear, acuminate scales, very villous at the attenuated apex (see No. 6), sparsely appressed pubescent and glandular on the back, three-nerved, one or two slender scales of an inner series.

Receptacle alveolar, densely villous, with white hairs from between the entire alveoli; disk heterocarpous: florets similar, outer ones expanded: external ligule three-toothed about twice the length of the opposite two-toothed (not "bi-parted") sub-revolute lip, teeth villous or bearded on the back (as seen at No. 4); long throat dilated upwards from a very short tube, five-nerved sparsely scabrous upwards, at length nearly concealed in the elongated tawny pappus.

Central florets erect, often unexpanded; lips sub-equal, the larger enfolding the lesser two-toothed lip: pistil purplish, the recurve spreading branches semi-cylindric, glabrous; stigma obtuse, sub-two-lobed; papillose bearded below (see No. 5); anthers yellow; linear lance-pointed.

The larger, outer and chiefly fertile achenia, oblong, obovate, cuneate, slightly compressed, rostrate: beak erect, glabrous, otherwise papillose-glandular and sparsely appressed pubescent, slightly ribbed; pappus sessile, somewhat lateral at the summit (see No. 2), or the ovary often partially separated from the pappoid calyx tube (as at No. 3); capillary pappus scabrous upwards, articulated (?) above the base, and deciduous, or very fragile, leaving the bases attached (as seen at No. 3); central achenia linear cylindrical when infertile, or fertile and teretish, long and tapering at each end, minutely five-ribbed, sub-papillose-scabrous: pappus sub-stipitate (No. 1).

This species appears to differ from its allies chiefly in the nerved leaves and bracts, &c.—its appressed pubescence—the florets also are not pilose, nor the lesser lip bi-parted, as generically noted; and where so much importance is attached to the stigma, its sub-lobed form is worthy of note. The alveolar receptacle, and perhaps the bearded teeth of the flowers, will be found to be quite characteristic.

September 2d, 1862.

President in the Chair.

Dr. Kellogg read the following descriptions:

Viola aurea (Kellogg). Fig. 54.

Stem short, erect, ridged by the decurrent petiole to the leaf below.

Canescent hirsute (but beneath the dense white hairs the hue of the whole plant is yellowish green, more observable on the stem, petioles, veins and peduncles).

Stipules adnate, subscarious, lanceolate acuminate, entire, obscurely nerved.

Leaves ovate, sub-acute; base cuculate, entire, tapering into the petiole and thence decurrent, coarsely sub-repand dentate, three-nerved triplinerved above; densely canescent hirsute above and below; petioles one to two inches in length, or about twice the length of the lamina, sub-winged, base and stipule encircling the stem.

Peduncles longer than the leaves; bracts opposite, minute.

Sepals ovate, acute, three-nerved, glabrous within; margins ciliate.

Corolla pure brilliant yellow; wings smooth: lower petal simply saccate.

Style capitate, curved, laterally bearded; foramen nearly central.

Capsule (in embryo state) villous at the apex.

Brought by Mr. C. W. Dorr from Nevada Territory. An Alpine species, almost woolly in its external appearance.

Viola Sequoiensis (Kellogg). Fig. 55.

Minutely pubescent throughout: somewhat angular stem, flexuous; base ascending from a radical four to six inches in length. Lower stipules ovate-lanceolate acuminate, rarely entire; middle ovate-oblong, cut-lobed (or dentate): middle lobe elongated, all cuspidate-acuminate, about five-nerved; upper stipules broadly ovate, acute, dentate; teeth abruptly acuminate-cuspidate or finely subulate-pointed.

Leaves sub-cordate and reniform (often ten to twelve-lobed and three to four inches broad, on robust specimens of a foot in height), cordate, palmate, three to nine-lobed; segments more or less oblong-lanceolate, mostly entire, acute, sub-acute or obtuse, glandularly mucronate; margins pubescent and scabrulose; also beneath, chiefly along the nerves; on the upper surface less conspicuous.

Fig. 54.

Peduncles pubescent, two to three inches in length (or twice or thrice the length of the petiole).

Bractioles toothed on one side and scabrous at the base, opposite or alternate and separate, mostly situate above the middle.

Sepals lanceolate-acuminate, somewhat produced and emarginate at base, three-nerved, point tipped with a gland, pubescent.

Flowers yellow, large (at length the two upper petals become brownish, especially on the back, which is glabrous); lateral petals bearded; three lower petals brownish at the base, with a few striate radiating veins; spur short; claws rather long.

Style gradually attenuated to the pubescent base, compressed, laterally bearded, rostrate, foramen-margined; capsule ovate-acute, scabrous near the sutures of the valves.

Abounds in the redwood forests (*Sequoia sempervirens*) of Sierra Nevada mountains, Nevada City. In exposed localities it becomes more dwarfed and pubescent. At an elevation of 3,000 feet.

Closely allied to *V. lobata*, but that species is described as "glabrous;" the leaves also are scabrous as well as pubescent; the stipules appear to differ; the bracts are also scabrous on the marginal base, and with a lateral stipuloid tooth on one side; the sepals also are rather linear-lanceolate and very acuminate; besides many other points.

Dr. Kellogg read the following description of a *Spraguea* brought by Mr. C. H. Dorr, from Nevada Territory.

Spraguea paniculata.—(Kellogg.) Fig. 56.

Stems decumbent or prostrate, leafy paniculate, radiating (8 to 10 from the crown of minute fibrous radicals.)

Leaves mosly radical, in a rosulate cluster, about as long as the stems, (or relatively very large) spatulate, obtuse or emarginate, obscurely three-nerved, very minutely villous, lamina thick and succulent. Flowers somewhat secund scorpoid, and with the sepals pedicillate, petals oblong, stamens exsert, anthers oblong, pink. Growing in a dense ball or cluster prostrate upon the ground, and seldom three inches in height; at length melting into an excretory mucilaginous, watery mass. Found in a ravine extending to the west, about six miles from Virginia City, Nevada Territory, at an altitude of 3,000 feet. Flowers in May and June.

Fig. 55.

Fig. 56.

October 6th, 1862.

President in the Chair.

Dr. Kellogg read the following descriptions:

Audibertia Dorrii.—(Kellogg) Fig. 57.

Stem suffruticose, branches opposite, spreading, hoary-pubescent with minute frosty villi, striate, terminated by proliferous or condensed whorls, whorls often remote or separated, of about three or more.

Leaves entire, the lower cauline obovate cuneately decurrent into the short petioles (leaves about one inch in length, and one-third in breath), obtuse or emarginate, whitish hoary on both surfaces with very minute villi, punctate with dark colored glands, middle cauline more spatulate, lamina roundish, cuneately decurrent, the uppermost somewhat oblong, obtuse sub-sessile or sessile, at length becoming bractoid at the terminal whorls, rounded and obovate.

Bracts persistent membranaceous, reticulate, three to five-nerved roundish, (sometimes emarginate, rarely short cuspidate) smaller forms varying to oblong, glabrous within, externally somewhat strigose, margins ciliate, numerous, imbricated, covering the calyx purpleish, sessile or sub-sessile.

Calyx campanulate with the upper lip truncate, subentire or shortly tridentate, the middle tooth smaller, lower lip two cleft, toothed lobes lanceolate acute, points mucronate, margins ciliate; seeds naked, oval.

Flowers purple, in whorls either separate and somewhat remote, or condensed, as seen in the figure; tube assert about as long again as the calyx, slightly expanding, upper lip arched, tridentate, lower lip three-lobed, lobes mostly lanceolate, spreading. Naked within, minutely pubescent externally. Style exserted; stigma unequally two-lipped, the subulate lobes glabrous, stamens exserted, connective, continuous in the same direction with the connective, very slightly produced backwards, and naked, point subulate.

This plant is probably an *Audibertia* although the genus is described as only "bifid" instead of trifid, as the upper lip is seen to be in our specimens—the middle lobe of the lower lip also is neither "very broad" nor "emarginate"; the lobes also are equal.

It is certainly very closely allied to *A. incana*; but has the upper lip of the calyx "entire," and lower lobes obtuse. The racemes also are simple; these are often oppositely branched, and he numerous flowers in remote whorls; calyx and bracts purple.

Fig. 57.

Lupinus Stiverii, (Kellogg). Fig. 58.

Stem, suffruticose, appressed, canescent pubescent, fistulous, somewhat striated by decurrent ridges from the leaves.

Leaflets six to seven, an inch to an inch and a half long, (scarcely half the length of the petiole) oblong, obovate-spatulate, attenuately cuneate at base; obtuse, (or rather sub-acute) abruptly, very short acute mucronate, appressed pubescent above, margins canescent, more densely appressed pubescent beneath; petiole about half the length of the raceme, base expanded, stem clasping, strongly three-nerved at the point of insertion; stipules adnate, persistent, linear-lance sub-falcate, canescently villous.

Racemes condensed, conical, somewhat paniculate, long pedunculate, (three to six inches in length) rachis flexuous; flowers alternate, large; banner bright yellow, a few red spots in the center, rhomboid; wings pale blueish purple, oblong, projecting, longer than the vexillum, ciliate on the posterior margin of the tooth at the base; carina whitish, sub-falcate, short rostrate, obtusely pointed, a little longer than the wings, margins somewhat ciliate towards the base above, strongly ciliate underneath, (along the proper keel portion).

Calyx minutely bracteolate, upper lip deeply two-parted, segments lanceolate acute, naked within; lower-lip minutely three-toothed, middle tooth a little longer; pedicels very short, villous; bracts sub-caducous, setaceous, shorter than the calyx.

Legumes small, (similar to *L. micranthus*) torulose, constricted, but not shortened, naked, six to seven seeded, pods colorless or very pale greenish hue, opening at maturity with twisting valves, persistent at their base. Seeds slightly longer than broad, angled compressed, pale shining umber with dark spots chiefly above and *below*.

Found on the Sierra Nevada Mountains, at the Summit Meadows, on the Mariposa trail to Yo Semite, by Mr. Stivers.

The first plant in blossom, growing within fifty yards of the snow. Allied to *L. foliosus*, but in this the leaflets are glabrous above—the lower lip of the calyx entire, and the legumes pilose. It appears to approach *L. subcarnosus*, but in the number of seeds and naked pods, and color of the flowers, &c., it differs.

Lupinus confertus, (Kellogg). Fig. 59.

Stem leafy, silky-hirsute, with long weak or soft white hairs throughout; (the hairs under a strong glass are scabroid-tuberculate).

Leaflets five (or three) to seven, oblanceolate, acute or very shortly acuminate, apex somewhat recurved, narrowed at the base,

Fig. 58.

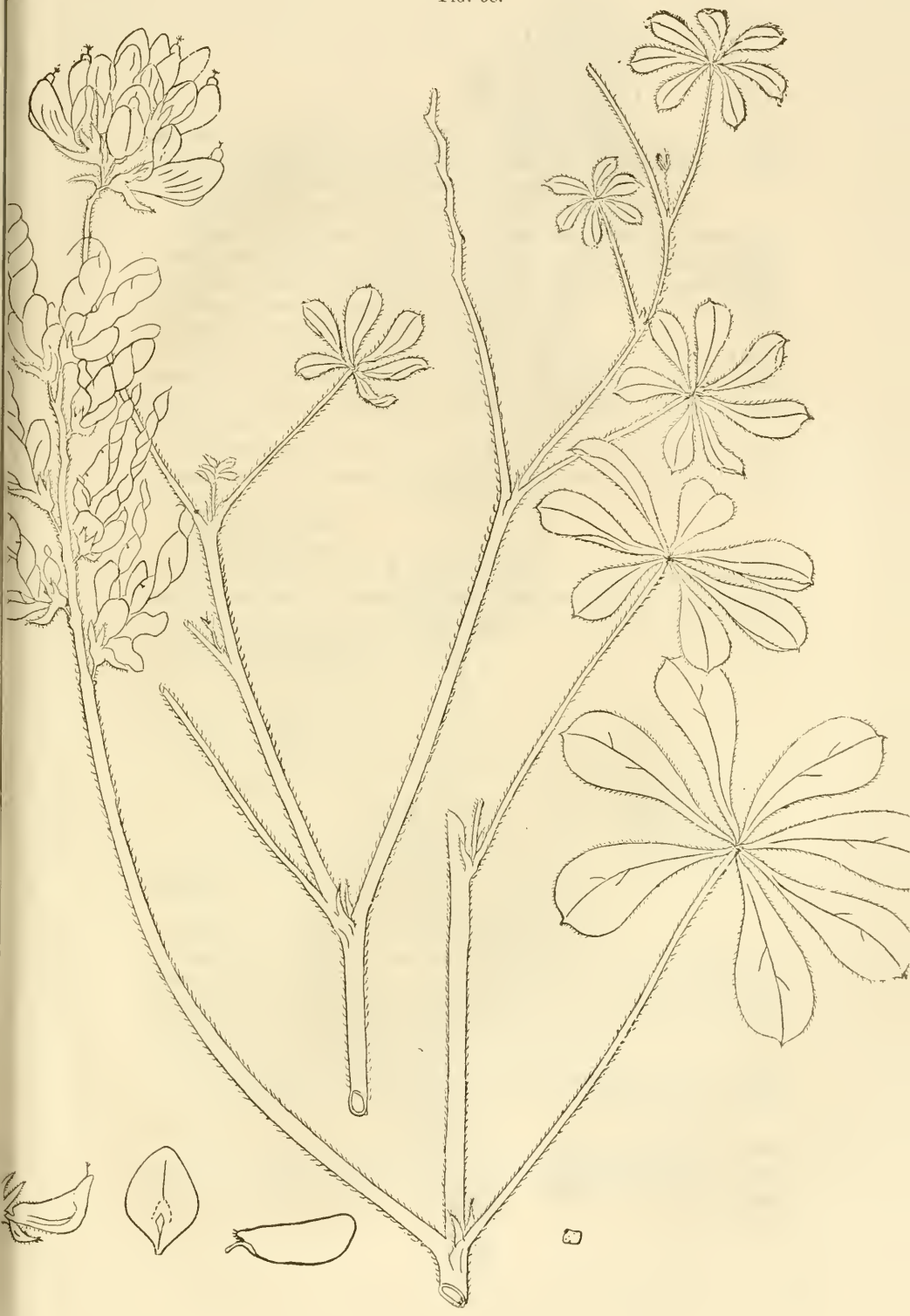


Fig. 59.

obcordate, very short, (scarcely an inch in length, and about one-third in breadth,) about one-third to one-fourth the length of the petiole ; silky alike on both surfaces.

Stipules persistent and adnate, subulate, acuminate.

Spike cylindrical, very densely flowered, strictly verticillate, whorls contiguous, peduncle about three inches in length, or rather more than half the length of the rachis ; twelve to fourteen whorled.

Bracts persistent, subulate, acuminate, as long as the calyx, silky pubescent, with long loose weak white hairs.

Calyx cleft nearly to the base, or gaping-campanulate, stipules none, or obsolete, with a mere point or tuft of hairs ; upper lip two-toothed, lower lip obscurely three-toothed, slightly longer ; pedicels very short.

Flowers persistent, blue, small or twice the length of the calyx ; banner oblong, sub-acute, sub-cuneate, scarcely clawed, wings oblong.

Keel silky-ciliate.

Stigma (bearded).

Pods included in the marescent flowers oval, acute or acuminate by the style, circumscription somewhat elliptic, much compressed, silvery-silky with short hairs, three-seeded, seeds oblong, (obliquely pendulous backwards).

November 3d, 1862.

President in the Chair.

Dr. Kellogg read the following descriptions of new species of *Lupinus*.

Lupinus calcaratus (Kellogg). Fig. 60.

Stem erect, eight to ten inches in height, somewhat appressed, silky pubescent throughout, leafy ; leaflets seven to ten, arcuate, canaliculate, lance-linear acute, mucronate, narrowed at the base, silk alike on both surfaces, half the length of the petiole, the upper nearly equal ; stipules ovate, acuminate persistent.

Flowers numerous, in a rather close alternate raceme ; bracts lance-subulate, as long, or often twice the length of the pedicels, caducous.

Calyx silky villous, base spurred, and with the upper lip colored (white), minutely bracteolate, upper lip two-toothed, short, erect ; lower lip carinate, ovate, acute, entire, color pale green, inclining

Fig. 60.

to white. Banner roundish, with a long reflected claw, pubescent on the back; wings oblong, externally puberulent towards the apex, &c.; keel ciliate; stigma naked; pods hairy, four-seeded.

This species is near *L. laxiflorus*. The spur is remarkably long, exceeding the pedicels; but (*L. laxiflorus*) is described as having blue flowers. This, as before stated, has no white flowers, but half the calyx, including the spur, is also white; the stem certainly is not "glabrous," as some have described *laxiflorus*, nor are the petioles of the leaves short, nor the points of the leaflets obtuse; the stipules are neither subulate nor caducous, nor is the raceme what we should designate as loose and elongated.

Finally, the white flowers and half colored calyx, which could by no means be spoken of as *slightly saccate*, induces us to consider it as a new species.

Lupinus caudatus (Kellogg). Fig. 61.

Stem persistent, somewhat decumbent; leafy and branching, silvery or satiny, appressed pubescent throughout.

Leaflets five to seven, linear-lanceolate, acute, mucronate, narrowed towards the base, about as long as the petiole.

Stipules persistent, small lance-acuminate.

Flowers blue, scattered and sub-verticillate, floral portion about twice the length of the peduncle, or two or three times the length of the petioles.

Bracts caducous, twice the length of the pedicels; calyx tubular campanulate, upper lip straight, two-toothed, (not colored) short and somewhat subulately spurred at the base, (spur erect nearly half the length of the pedicel); lower lip entire, elongated, carinate; linear bracts conspicuous; banner satiny pubescent on the back, chiefly along the middle portion; wings with an erect claw.

Keel, silky-ciliate.

Stigma, naked.

Legumes (embryo) linear, silky; seeded.

Closely allied to *L. calcaratus* (Kellogg). But the general appearance is quite distinct, being very silvery sericeous, with blue flowers. The calyx is not colored; the upper lip straight; the spur short, sharp and erect; the leaflets straight and radiating, only five or six in number; the flowers also fewer, and the spike less crowded. Found in the same localities, but more rare.

Fig. 61.

The following communication was received from Mr. W. P. Blake on the Great Trees of Mariposa and other localities in California:

The now celebrated Mariposa grove of trees (*Sequoia gigantea*) is nearly on the line between Mariposa and Fresno counties, and but a few miles south of the trail leading from the Mariposa estate to the Yo-Semite valley. It is about 5,000 feet above the sea, and on the western slope of a high ridge of the Sierra Nevada, from which there is a fine view of the desert-like plains of the San Joaquin in the distance.

From Clark's, in the valley of the South Fork of the Merced river, the ascent to the trees is over undulating spurs and ridges, covered with magnificent forests of pines, firs, and spruces, and almost without undergrowth, the smooth surface being broken only at wide intervals by out-crops of gneissic rocks. The trees are spread along a lateral valley, on the flank of the main ridge, in two groves, about half a mile apart, known as the Upper and Lower Grove.

The visitor, in passing through the lower grove, first meets a tree which is uprooted, and lies at full length on the ground, as complete a barrier to progress as a wall thirty feet high. Ascending the side of this huge trunk, by means of a ladder, and steps cut in the bark, I was enabled to make an accurate measurement of its length with a tape-line, and found it to be two hundred and fifty-six feet from the upper part of the swell of the roots to the top, where it was still eighteen inches in diameter; all beyond this having been burned away. Mr. Clark, who first saw the tree in 1837, says it measured two hundred and sixty-eight feet before it was burned. Being partly imbedded in the soil near the roots, its size or diameter could not be readily ascertained, but it probably is about twenty-five feet.

Beyond this, there is a very fine tree known as the "Grisly Giant," standing on a dry and rather rocky point, and visible to great advantage from the absence of many other trees around it. This tree is remarkable for the great size and number of its branches, which give it a considerable breadth of top, while in height it is inferior to many that are much more slender, and even to many of the pines and firs of moderate diameter. It measures eighty-nine feet around the trunk, about three feet above the ground, but an additional ten feet may be allowed for a large portion which is burned out of the side, making it, if perfect, about ninety-nine feet in circumference, or thirty-three feet in diameter. Another tree beyond, and about the same girth, is bifurcated about seventy-five feet from the ground; the two parts being nearly equal

in size and height. The trunks of two more trees were measured around with nearly the same result, and from thirty to thirty-three feet may be considered the greatest diameter of the trees in this grove, as it also is of those in Calaveras county. There are many a few feet smaller than this, but of those ranging from ten to twenty feet in diameter there are more than can be conveniently counted, besides groves and thickets of young trees of all sizes from seedlings upwards.

The fires which have swept through the forest have destroyed most of the young trees, and ruined many of the largest and finest by burning off the roots, and running upwards through the trunk, in many cases burning out an arched way from side to side high and broad enough for horsemen to pass through without touching. The fire burns out the centre of the tree most rapidly, and makes hollow cylinders of those that have fallen, through one of which my party rode erect for many feet. A year ago there was a hollow trunk, now consumed, through which horsemen could ride upright for one hundred and fifty feet, going in at the roots, and coming out half-way along the trunk.

In a low, marshy part of the valley a line of medium-sized trees may be seen growing on each side of a very ancient trunk, now completely decayed and moss-grown. All the appearances indicate that trees have grown and fallen across each other for ages, giving extraordinary depths of vegetable mould.

The form or taper of the trunks of these trees is worthy of remark. When standing at their bases and looking up, the trunk appears to taper off very suddenly towards the top, and to end in a stump-like point instead of running up in a slender spire. The great size of the body, also extends high up. These peculiarities are better shown in the trees that are standing than in the fallen one, in which, at one hundred and fifty feet above the stump, the diameter is about twelve feet; seventy-five feet higher up, it is reduced to six feet, and thirty feet higher to eighteen inches. The swell at the roots is very regular, and the trunks, almost without exception, are cylindrical and free from deep furrows.

In this grove, it is probable that the trees do not reach a greater height than three hundred feet. In the Calaveras grove, they have been estimated to be from three to four hundred feet high, and in 1854, when I visited them, I saw no reason to doubt it, but there was no good opportunity to measure a perfect prostrate tree. They are more sheltered from high winds than the Mariposa trees, and probably are taller.

The opportunities for determining the age of these trees is not as good as at the Calaveras grove, where one has been cut down

and cleanly cross-cut, so as to fully expose the rings. From a partial count at the end of one of the burned trunks, I judged that there might be from 1,800 to 2,000 annual rings. There are more, apparently, than in the stump of the Calaveras tree.

The climate of the locality is very similar to the Calaveras grove. In summer, it is warm and dry. In winter, the snow falls and rests about six feet deep, but nearly all disappears by the first of May. Rain seldom falls. This will account for the great depth of soil which hides the rocks. The snow melts gradually, and runs off without cutting the ground. At the Calaveras grove, the ground appears to be lower and much more wet during the summer than at the Mariposa; and at the latter, the trees are more widely spread on the slopes and high knobs of ground, where there is good drainage.

Mr. Clark, who is very familiar with the trees and has been collecting their seeds, says that the cones require two years to mature or yield seeds that will germinate. Formerly, trees of medium size were cut down so that their cones could be reached, but it is found that squirrels cut off and drop the cones in great numbers for food. By visiting the trees often, a plentiful supply may be picked up from the ground.

The number of trees of fair size in the upper grove is said to be four hundred and thirty; in the lower, nearly two hundred, or about six hundred in all. There are about two hundred at the Calaveras grove, which is about fifty miles distant to the north-west. A third grove, containing about five hundred trees, has been found eight miles south-east of the Mariposa trees, and in Fresno county. Some trees in this grove are probably taller than any in the Mariposa, being in a valley sheltered from high winds. Mr. Clark, who has visited them, says that two of the largest measure each eighty-one feet around the trunk three feet above the ground. Another grove is reported further south and east upon the Kaweeah or four Creeks—or about fifty mile from Visalia. It thus appears that there is a zone or belt of these interesting trees parallel with the crest of the Sierra Nevada, and at about the same elevation on the flank of the chain; much broken it is true by the many river-valleys and deep cañons, but indicating a continuity before the river valleys were excavated to their present great depth.

These giant trees are well known and much admired by the Indians, who call them *Wa-wo-nah*—meaning Great Tree.

Dr. J. G. Cooper read the following paper on some new genera and species of California Mollusca collected by him.

The collection of the Geological Survey, made during the years 1861–62, contains many species of mollusca and shells, of which no descriptions are to be found, and which we may therefore believe to be new. But as they may have been collected either by the Northwest Boundary Survey north of us, or by Mr. J. Xantus, at Cape St. Lucas, it has been considered safest, in order to avoid confusion, to send specimens or drawings of them to Mr. P. P. Carpenter of England, who has the above collections in his hands, in order that he may compare our species with them and decide whether they are really new. Meanwhile there are several species of soft mollusca (without shells) which are so difficult to preserve in a condition fit for description, that it may be presumed that they are still undescribed, and will not be described if in the collections mentioned. Having made careful colored drawings of them while alive, the writer is enabled, with the assistance of the specimens in alcohol, to prepare the following descriptions. Careful comparison with the figures and descriptions of the nearest allied forms, described in the late works of H. & A. Adams, Chenu, Gould and others, make it probable that the determinations here made are correct:

STRATEGUS, *nov. gen.*

From the Greek word for a general, in allusion to its brilliant colors, resembling a military uniform edged with blue and gold, and liberally spotted with gilt buttons. It seems also to hold the highest rank in its order.

Strategus inermis, *n. sp.* is the only species yet known.

Gen. Char.—Form elongated cylindrical, the body included in the wide reflexed borders of the foot, which nearly meet in the median line above. Head and tail uncovered, each forming about one-third the length of the animal. Foot extending forward as far as the mouth, and backward nearly to the end of the tail. When disturbed, the animal rolls over on its back and the foot envelopes its whole body like a cloak. The foot has no adhesive power, motion being effected by gliding and twisting much as with serpents—assisted by the support of the grass among which it lives.

Head obtuse with an ear-like fold of the skin at each corner, resembling a cat's head seen from above. Eyes moderate, placed on the top of the head at the base of these folds. Tentacles two, short, in front of the head on a line with the eyes. Mantle little developed, extending from the ear-like folds back to the posterior third of the body, and ending abruptly by a transverse fold.

Body contracted a little behind the mantle, ending in a broad bifid tail, the divisions equal, ovate, resembling somewhat the "flukes" of a whale.

Mouth circular—situated in front, *without teeth or horny jaws*, or even a denticulated tongue, the food being apparently swallowed whole, (though none was found in the specimens) opening directly into a large stomach occupying the anterior third of the body, from which a short S-shaped intestine passes through the liver, ending at the cloacal opening under the middle of the tail. In this part of the canal are three corneous bodies, probably intended for reducing the harder portions of its food by grinding.

Branchia single, plume-shaped, rising on the right side of the anus and curving over it towards the left, being completely covered by the tail. No shell.

Spec. Char.—Vinous-purple, ornamented with numerous rounded or oblong yellow spots: inner surface of enveloping folds, flesh-color. Edge of mantle and tail orange, with a narrow band of rich blue, forming a scolloped edging alternately blue and gold; a row of alternating spots of the same along the centre of the ear-like processes. Under surface of tail deep purplish-blue. Whole surface perfectly smooth and shining. Eyes white with a black pupil. Length, $3\frac{1}{2}$ inches; breadth, $\frac{3}{4}$ inch.

This beautiful animal inhabits muddy parts of San Diego Bay, where I found it not uncommon in spring. It creeps among the grasses slowly and looks like a large caterpillar. Though without any apparent means of escape or defense, it seems little molested by other animals. As an object for study in an aquarium for the investigation of the metamorphoses it doubtless undergoes, from the egg to its perfect state, it would be highly interesting. It is more highly organized than any other genus of *Opistho-branchiata*, resembling *Aplysia* more nearly than any other, and probably carnivorous or a carrion-eater.

Pleurophyllidia Californica, n. sp.

Sp. Ch.—Form ovate, obtusely rounded in front, subacate posteriorly, back nearly smooth, gray, with about fifteen slightly elevated white stripes, arising alternately from either end, and interlocking regularly together at various distances, each terminating in a sharp, bluish point. Broad expanded veil black, with a white margin. Lower tentacles very small, (eyes none?) upper tentacles on vertex. Foot narrower than mantle, ovate, sharp behind, laterally expanded into a narrow membrane. Color reddish; branchiae of a darker shade. Length, $2\frac{1}{2}$ inches; breadth, $1\frac{1}{4}$ inches.

This species closely resembles *P. lineata* of southern Europe, with which a comparison will be required in order to point out the essential differences. From the distance of locality there can, however, be no identity of species. Inhabits San Diego Bay, where I found them very numerous in December, crawling and burrowing on the sandy flats. After the floods in January, none were to be found.

Doris montereyensis, *n sp.*

Sp. ch.—Pale yellowish with scattered black spots (or entirely brown?), mantle rough tuberculate, or nearly smooth, dorsal tentacles knob-shaped, branchial rays bipinnate, short, in eight divisions, forming a crown-shaped expansion on the posterior third of the dorsum. Foot expanded into a broad, thin margin, as wide as the mantle. Length, 3 inches; breadth, 1 inch; height, ¾ inch; form elongated oval.

Dredged in six to ten fathoms, in Monterey Bay, adhering to fragments of sandstone — only two obtained in September. Small specimens, apparently the same species found in San Francisco Bay by Dr. Frick.

Doris (*Asteronotus*) *sanguinea*, *n. sp.*

Sp. ch.—Brilliant red, with a few large black spots irregularly distributed. Surface smooth; dorsal tentacles short; branchiae composed of eight simply pinate rays, expanding close to the posterior end of the body. Length, ½ inch; breadth, ¼ inch; height about the same.

Found under stones in San Diego Bay. Rare.

Doris (*Asteronotus?*) *alabastrina*, *n. sp.*

Sp. ch.—Alabaster white, opaque, form depressed-oval dorsal tentacles short, acute, branchiae of twelve simple rays expanding in the posterior fifth of the body. Length, four tenths in., breadth, three tenths of an inch.

Under stones at San Diego Bay. Only one found.

Doris (*Actinocyclus?*) *Sandiegensis*, *n. sp.*

Pale brownish yellow, with large annular brown spots irregularly scattered, varying from twelve to twenty, or entirely brown. Surface slightly rough, sometimes a little tuberculated. Dorsal tentacles conical, retractile; branchiae large, rising in five parts which become tripinnately divided, expanding so as to cover the posterior

third of the body like an umbrella. Mouth, proboscidiform, with two short lateral tentacles. Length, 3½ inches; breadth, 2½ inches; height, ½ an inch.

Numerous among grass on mud flats in San Diego Bay at or near low water mark, from November to May; but many were destroyed by the fresh water flood of January. A very active and interesting species for the aquarium.

None of these species of *Doridae* seem to agree exactly with the descriptions of the genera as divided up by the latest authors; and further generic names may be required when opportunities of studying the living animals are presented. At present, the names and descriptions here given will suffice for identifying the species. The same remarks will apply to the *Æolidae*, next described.

Æolis (Flabellina?) opalescens, n. sp.

Spec. char.—Bluish white, pellucid, somewhat quadrangular, posteriorly wedge-shaped ending in a sharp point. Foot anteriorly with two short spreading appendages, laterally thin and flattened. Head short; tentacles two, long, acute, (the lower pair replaced by the appendages of the foot.) Two erect, club-shaped appendages (dorsal tentacles) on the anterior part of the back, of an opaline color, with an orange stripe between them. Branchiae in five pairs of fasciculi along the upper edges of back, each bundle of about four rows, longest above their color yellowish, with a purple or blood-red spot near the end. A rosy tint often visible from the string of ova shining through the abdominal walls.

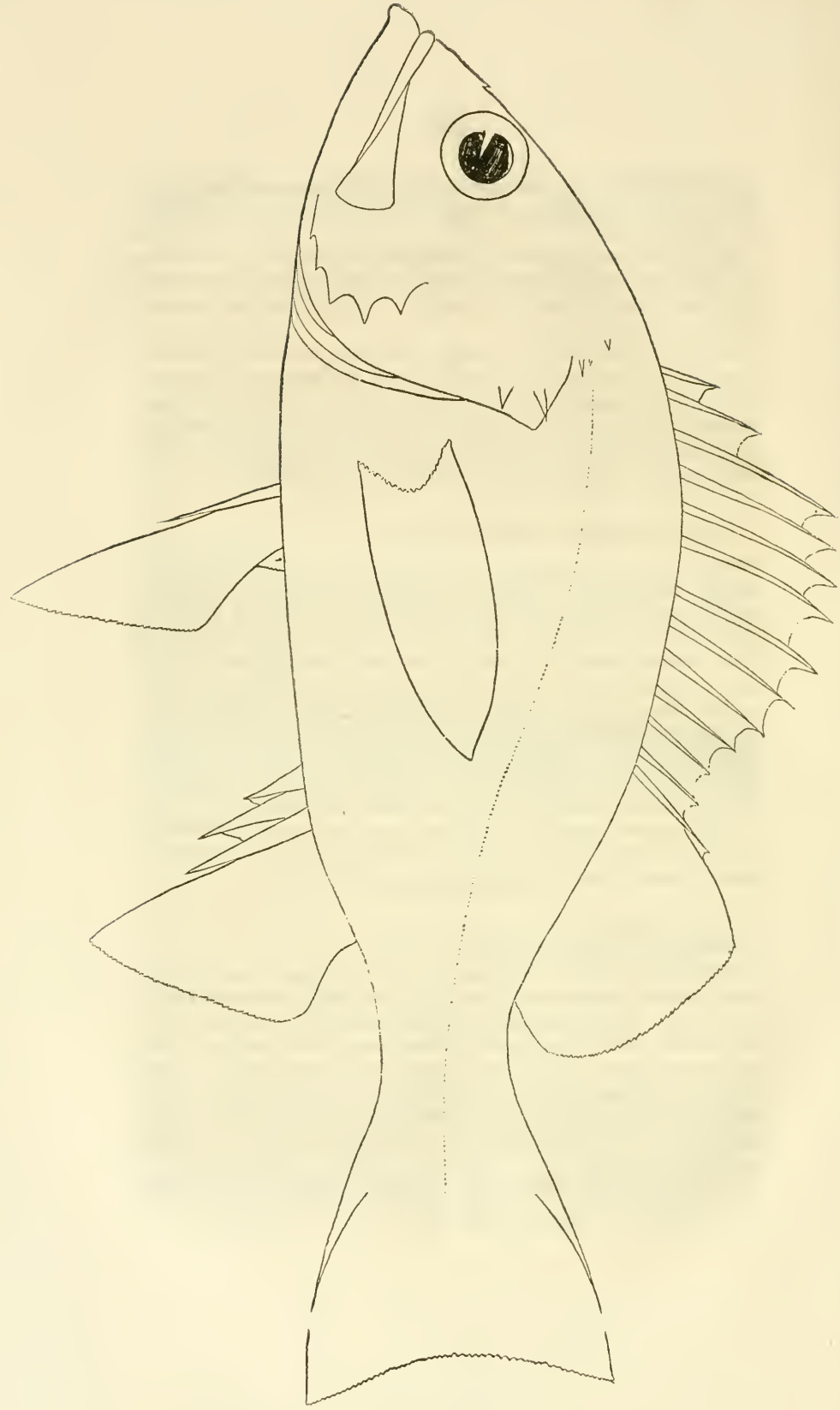
This elegant species is numerous in San Diego Bay in the winter, living among the grass, and depositing its ova on any fixed object it meets with. Length, 1½ in., breadth, ¼ inch.

Æolis (Phidiana?) iodinea, n. sp.

Spec. char.—Rich violet purple, narrow wedge-shaped, high in front, tapering to an acute point behind, slightly constricted in five parts of the body corresponding to divisions of the branchiae. Foot very narrow, slightly expanded. Head obtuse, with four tentacles, the upper longer and turned upward, the lower deflexed. Two club-shaped, orange-colored appendages a little behind the upper tentacles. Branchiae short in a double row, close together near the median line, their color, orange red. Length, 2½ inches; breadth, one fifth of an inch.

On rocks, among algæ outside of San Diego Bay. Rare inside.

Fig. 62.



Tritonia Palmeri, n. sp.

Sp. ch.—Form ovate, anteriorly subquadrate, posteriorly rounded, the back sloping down from the head backwards to a thin margin which is reflected upwards, forming the foliated branchiae; these extending around nearly the entire upper margin. Whole animal translucent and pale-reddish brown. United tentacles, expanded into a broad thin membrane in front of head, squared and fimbricated, resembling part of the branchiae. Dorsal tentacles (eyes ?) widely apart, large, and pedunculated, the peduncles enclosed in a membranous sheath. Foot rather broader than back, strongly adhering to any surface. Length, 2½ inches; breadth, 1¼ inches. Corneous jaws very large and strong, the only opaque or hard part of the animal. Teeth very numerous, inserted like a pavement behind the jaws, with an arrangement like the plume of an ostrich feather from left to right.

This singular animal was numerous at San Diego in the same localities and season as the *Diphyllidia*. It comes nearer to *Tritonia* than to any other genus. I have named it after Mr. Edward Palmer, a zealous naturalist who assisted me while at San Diego. Judging from the recorded habits of the genus, they inhabit floating algæ, and are carnivorons—though the specimens I found were crawling on the sand.

Dr. Ayres read the following brief statement:

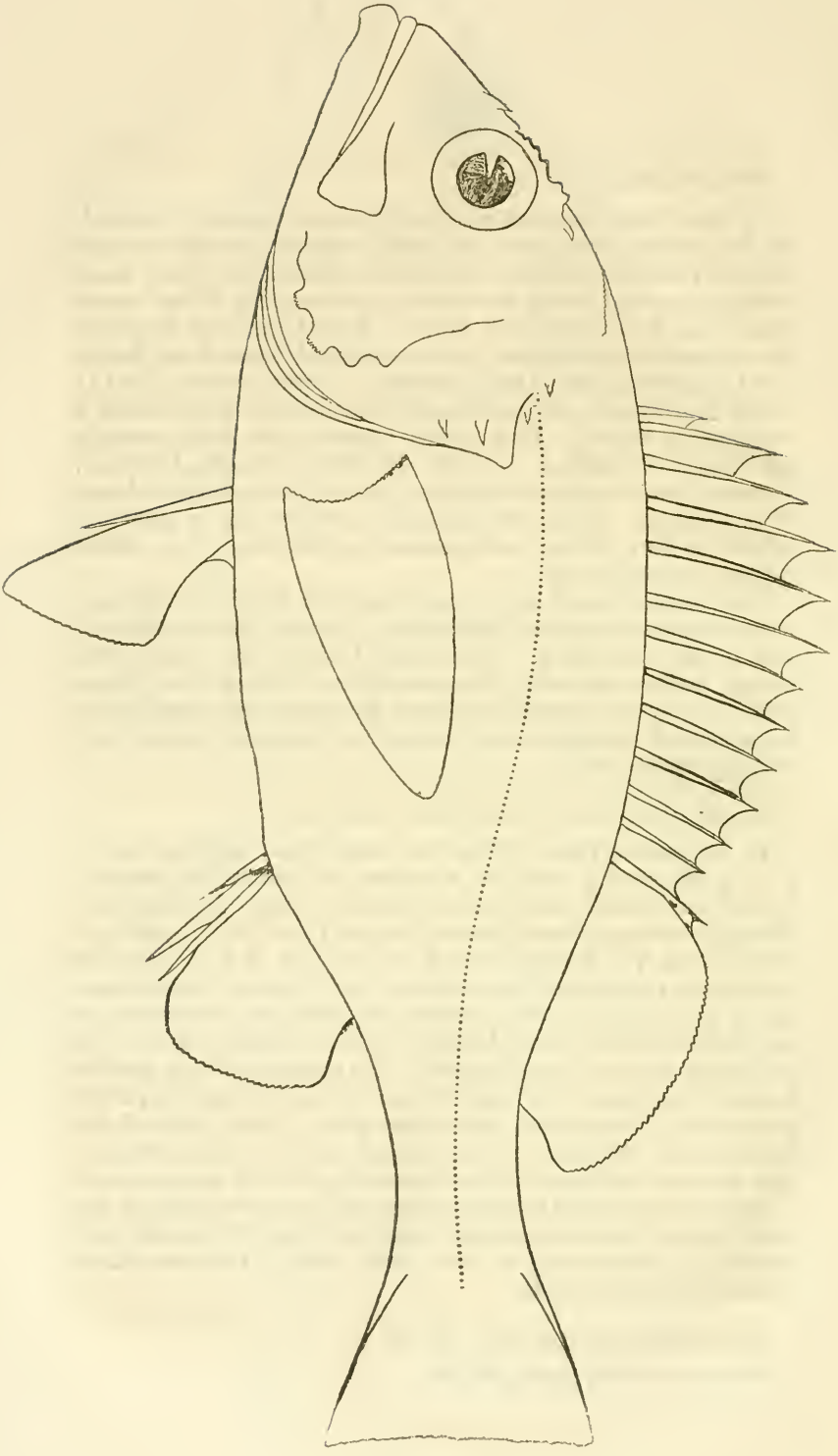
In September, 1854, (Proc. Cal. Acad. Nat. Sciences, vol. I, p. 7) I published a notice of a species of *Sebastes*, to which I applied the specific name *ruber*. Shortly before that date Mr. Girard had characterized *Sebastes rosaceus* (Pro. Phil. Acad. Nat. Sciences, vol. VII, p. 146); in P. R. R. Rep., vol. X, p. 78, he gives my *ruber* as a synonym of his *rosaceus*. In this he was doubtless misled by the color, as the two species have little close resemblance in any other respect. They belong in fact to what must now be recognized as two distinct genera. His species is of the smooth headed type; mine is of that division in which the head is ridged and spinous. A figure of each is here given. Their points of difference are at once seen. I may remark that the figures are accurate, and may be trusted for comparison by means of measurement.

Sebastes ruber grows to a greater size than any other species of the group in our waters, sometimes weighing twenty-five pounds, and reported by the fishermen as larger still; while *S. rosaceus* seldom exceeds five or six pounds.

Sebastodes rosaceus, Gir. Fig. 62.

Sebastes ruber, Ayres, Fig. 63.

Fig. 63.



Dr. Ayres presented the following descriptions of Fishes believed to be new:

SEBASTODES FLAVIDUS (Ayres). Fig. 64.

This species is very closely allied to *S. melanops*, Gir., and is scarcely to be distinguished from it except by color. It is generally a little more slender, with the soft dorsal somewhat higher, and the lower jaw a trifle more protuberant. But otherwise the proportions are exceedingly alike, and it was not till after comparison of multitudes of specimens that I felt warranted in separating the two species. In general appearance, however, they are entirely distinct, and as they lie in heaps upon the fish-stalls there is no possibility of confounding them, for there are no intermediate forms. *S. flavidus* is always of a dark greenish brown above, becoming yellowish green on the sides, and still lighter beneath. *S. melanops* is nearly black above, becoming merely lighter on the sides and beneath. The points of distinction as expressed thus in words appear very slight, but for the reasons given above I regard the two species as clearly separate from each other. To illustrate them more fully an outline figure of each is given, to which reference may be made for their proportions as the figures are strictly accurate in all the details, and may be used for measurement with entire confidence.

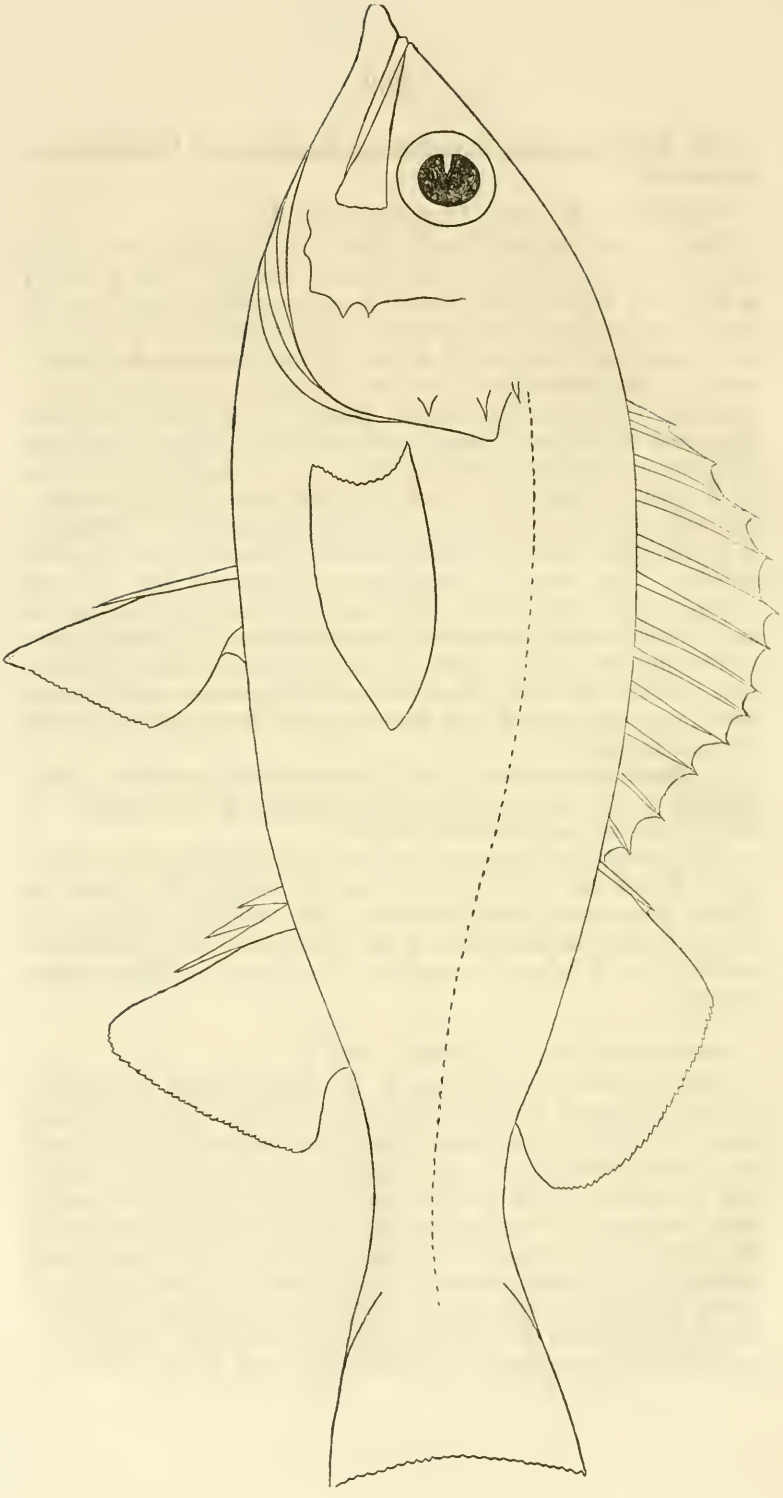
S. flavidus is taken in no inconsiderable quantities, being brought to the markets almost as abundantly as *S. melanops*. It seldom exceeds two pounds in weight.

The reasons for placing this species, together with others, in the genus *Sebastodes* will be given in another place. The characters of that genus as originally defined by Mr. Gill appear to me to be merely the specific characters of the single species, *S. paucispinis;* modified, as I believe it must be, the genus includes several species.

SEBASTODES OVALIS (Ayres). Fig. 65.

This species is of the type of *S. flavidus*, which it resembles almost completely in color. It is a stouter fish, the depth being about .32 of the length, while in *flavidus* it is about .28. In *ovalis* the spinous dorsal retains in a large degree its height, of spines and membrane, to its junction with the soft portion, the twelfth spine being about two-thirds as high as the fifth; while in *flavidus* the twelfth is less than one-third as high as the fifth, its membrane joining the thirteenth almost at its very base. In *ovalis* the soft dorsal is long and rather low, its height being less than one-half its length; in *flavidus* it is high and rounded, the height being about two-thirds of the length. In *ovalis* the anal fin is smaller, its

Fig. 64.



height being only equal to the length of the soft portion—the second spine is stronger and higher than the third, being as high as the soft portion; in *flavidus* the height of the soft portion is one-half greater than in *ovalis*—the height of the second spine is much less than that of the third and does not equal half the height of the soft portion. In *ovalis* the height of the pectorals is about one-fourth the length of the fish; in *flavidus* the same fins are much smaller, their height being but a little over one-sixth the total length. In *ovalis* the mouth is smaller, the tip of the maxillary reaching only about the line of the anterior border of the pupil; while in *flavidus* it reaches the line of the posterior border of the same.

S. ovalis is by no means common here, only an occasional specimen being brought to the market. In size it appears to be about the same as *S. flavidus*.

Sebastodes melanops. Gir. Fig. 66.

Syn. *Sebastes melanops*, Gir. P. R. R. Rep., Vol. X. p. 81.

For the purpose of comparison with the preceding I introduce a figure of this species. The description by Girard (*loc. cit.*) is tolerably accurate, but no illustration has hitherto been published.

Dr. Ayres made the following remarks in relation to the fishes of California, which are included in Cuvier's genus *Sebastes*.

Of fishes of this type we have on our Coast a greater number of forms than are known to exist at any other point. All the species here mentioned are brought to the markets of San Francisco, and are taken either in the Bay, or on the rocky shores and islands immediate adjacent. They are all sold under the absurd name of "Rock Cod."

As late as July, 1861, no attempt had been made to separate them into groups. At that date, Mr. Theodore Gill proposed to place *S. paucispinis*, (Ayres) in a new genus, calling it *Sebastodes*, "distinguished by the longer body, the very protuberant lower jaw, which has a symphiseal swelling beneath, the minute scales, the form and armature of the head, the deep emargination of the dorsal fin, and the emarginated caudal." A year later, in July, 1862, he proposed to include all our other species (a number of which I should judge he had not seen,) in a new genus *Sebastichthys*, with "eleven to twelve (XI.+I.—XII.+I.) spines in the first dorsal fin, palatine teeth and the physiognomy of Sebastes (*Norvegicus*)."

In these two propositions he appears to me to have been unfortunate, having based his decision, perhaps, upon the examination

Fig. 65

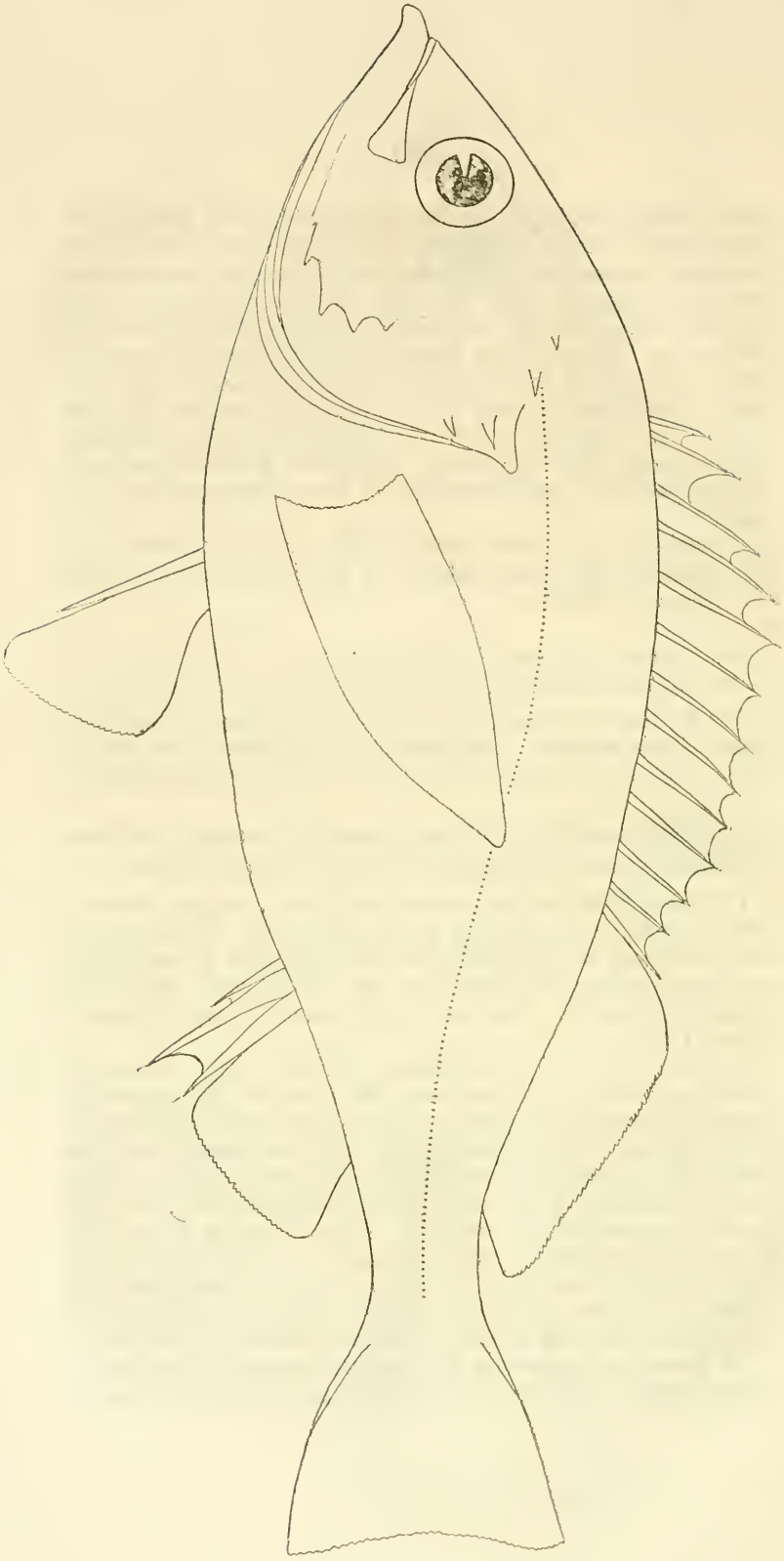
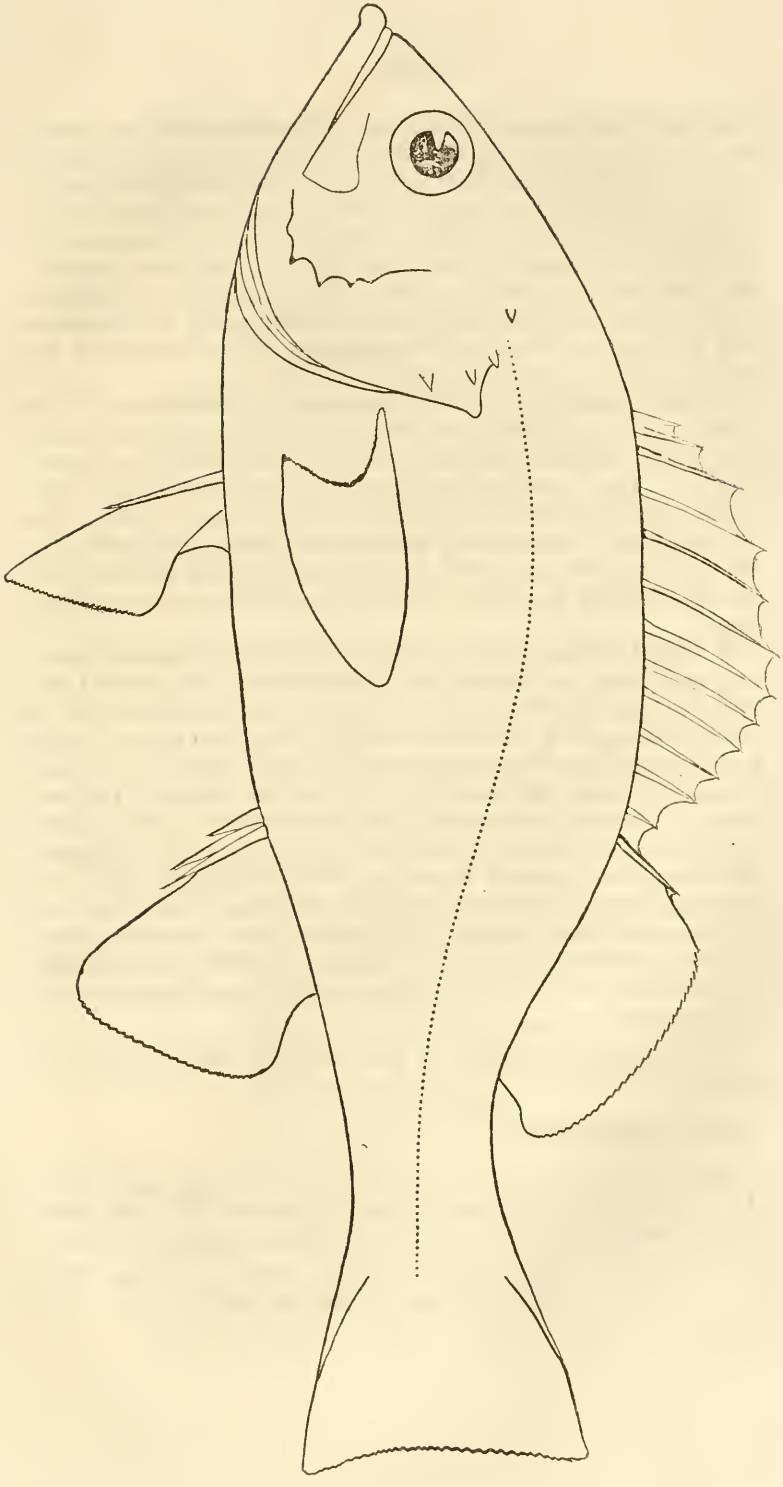


Fig. 66.



of an insufficient amount of materials. The grouping of the characters which he has assigned to *Sebastodes*, belongs only to the single species *paucispinis;* but the "longer body" is equalled in *elongatus*, a species of very different type; the "protuberant lower jaw," with its "symphiseal swelling," and the "form and armature of the head," are common to five of our species; the "deep emargination of the dorsal fin" is most strongly marked in *flavidus*, while the border of the caudal fin changes insensibly in the successive species from the slight emargination of *paucispinis* to the slight rounding of *nebulosus* and *nigrocinctus*.

Equally unsatisfactory is the definition of *Sebastichthys*. The number of spines of the dorsal fin is the same in all our species, *paucispinis* included; they are XIII, or if a division is preferred, XII+I. The "palatine teeth" are found in all our species, *paucispinis* included, as they are also in *Norvegicus* and its allies. The "physiognomy" can scarcely apply as a feature for distinction, for Mr. Gill has grouped in his *Sebastichthys* the very extremes; no two, for instance, can be more unlike than *nigrocinctus* and *melanops*.

A careful investigation of all the species, with the comparison of very numerous specimens of all (except *ovalis*) has satisfied me, however, that they should be arranged in two groups,—in one of which the summit of the head is strongly ridged and spinous, while in the other it is almost entirely smooth. Other features, it is true, accompany these, but they are of subordinate import. In place now of introducing new names, it may be better to call the smooth headed division *Sebastodes*, though it will necessarily be of different limits from that proposed under the same name by Mr. Gill. For the rough headed division we retain the old name *Sebastes*, as there is no apparent valid reason for separating them from that group of which *Sebastes Norvegicus* is the type. A difference in number of one, or at most two, dorsal spines, is scarcely sufficient to constitute a genus.

The synonymy, therefore, of our Californian forms, will be as follows:—

GEN. SEBASTES.

With the characters of Sebastes as given by Cuvier, except that the top of the head is always marked by spinous ridges, the orbits being commonly crested, so as to leave a depression between them.

1. Sebastes nigrocinctus. Ayres. Proc. Cal. Acad., Vol. II, p. 25, and p. 217, Fig. 67.

Syn. *Sebastichthys nigrocinctus.* Gill. Proc. Phil. Acad., 1862, p. 278.

2. Sebastes nebulosus. Ayres. Proc. Cal. Acad., Vol. I, p. 5.
   Syn. *S. fasciatus.* Gir. Proc. Phil. Acad. 1854, p. 146, and P. R. R. Rep., Vol. X, p. 79, Pl. XXII.
   (non. *S. fasciatus.* Storer. Proc. Bost. Soc. Nat. Hist, Vol. V, p. 31.)
   Sebastichthys nebulosus. Gill. Proc. Phil. Acad. 1862, p. 278.
3. Sebastes auriculatus. Gir. Proc. Phil. Acad. 1854, and P. R. R. Rep. Vol. X, p.80.
   Syn. *Sebastichthys auriculatus.* Gill. Proc. Phil. Acad. 1862, p. 278.
   Sebastes auriculatus. Ayres. Proc. Cal. Acad. Vol. II, p. 218, Fig. 68.
4. Sebastes ruber. Ayres. Proc. Cal. Acad., Vol. I, p. 7.
   (non. *S. rosaceus.* Gir. P. R. R. Rep., Vol. X, p. 78.)
5. Sebastes helvomaculatus. Ayres. Proc. Cal. Acad., Vol. II, p. 26, Fig. 8.
   Syn. *S. ocellatus?* Cuv. (fide Gill. Proc. Phil. Acad. 1862, p. 278.)
   Sebastichthys ocellatus. Gill. (loc. cit.)
6. Sebastes elongatus. Ayres. Proc. Cal. Acad., Vol. II, p. 26, Fig. 9.

GEN. SEBASTODES.

With the characters of the typical Sebastes, except that the top of the head is always smooth, the spinous ridges being so little developed as to be barely discernible, the orbits not elevated.

1. Sebastodes paucispinis.
   Syn. *Sebastes paucispinis.* Ayres. Proc. Cal. Acad., Vol. I, p. 6.
   Sebastes paucispinis. Gir. P. R. R. Rep., Vol. X, p. 83, Pl. XXII A.
   Sebastodes paucispinis. Gill. Proc. Phil. Acad., 1861, p. 165.
2. Sebastodes ovalis. Ayres. Proc. Cal. Acad., Vol. II, p. 212, Fig. 65.
3. Sebastodes flavidus. Ayres. Proc. Cal. Acad., Vol. II, p. 210, Fig. 64.
4. Sebastodes melanops. Gir.
   Syn. *Sebastes melanops.* Gir. Proc. Phil. Acad.,

Vol. VIII, p. 135, and P. R. R. Rep., Vol. X, p. 81.

Sebastes melanops. Ayres. Proc. Cal. Acad., Vol. II, p. 213, Fig. 66.

Sebastes variabilis. Ayres. (non. Cuvier). Proc. Cal. Acad., Vol. I, p. 7.

5. SEBASTODES ROSACEUS. Gir.

SYN. *Sebastes rosaceus.* Gir. Proc. Phil. Acad., Vol. VIII, p. 146, and P. R. R. Rep., Vol. X, p. 78, Pl. xxi.

(non. *Sebastes ruber.* Ayres. Proc. Cal. Acad., Vol. I, p. 7).

Sebastodes rosaceus. Ayres. Proc. Cal. Acad., Vol. II, p. 206, Fig. 62.

In addition to the species here indicated, I have seen another form, with transverse dark bands of the *nigrocinctus* type, which will probably eventually prove distinct.

I may add, in connection with this synopsis, that all these species are to a certain degree ovo-viviparous. The development of the young takes place within the body of the mother, but to what extent, I have not yet the means of stating with absolute accuracy. I have traced them from the first stages of cell-division to such an advancement as that the mouth, the intestinal canal, the vertebral divisions, and the vertical fins, are all plainly discernible, and of course the eyes strongly marked and prominent, the embryo being fully half an inch in length. Whether they are born, capable of independent motion, as in the Embiotocoids, I have yet to learn. The spawning time is from March to June.

The little "accessory scales" mentioned by Girard are not confined to the three species stated by him, but are common to all.

A more full exposition of these fishes, I trust to give at another time.

To complete the list of illustrations of this series, outline figures of the two following are given.

SEBASTES NIGROCINCTUS. Ayres. Fig. 67.

SEBASTES AURICULATUS. Gir. Fig. 68.

Fig. 67.

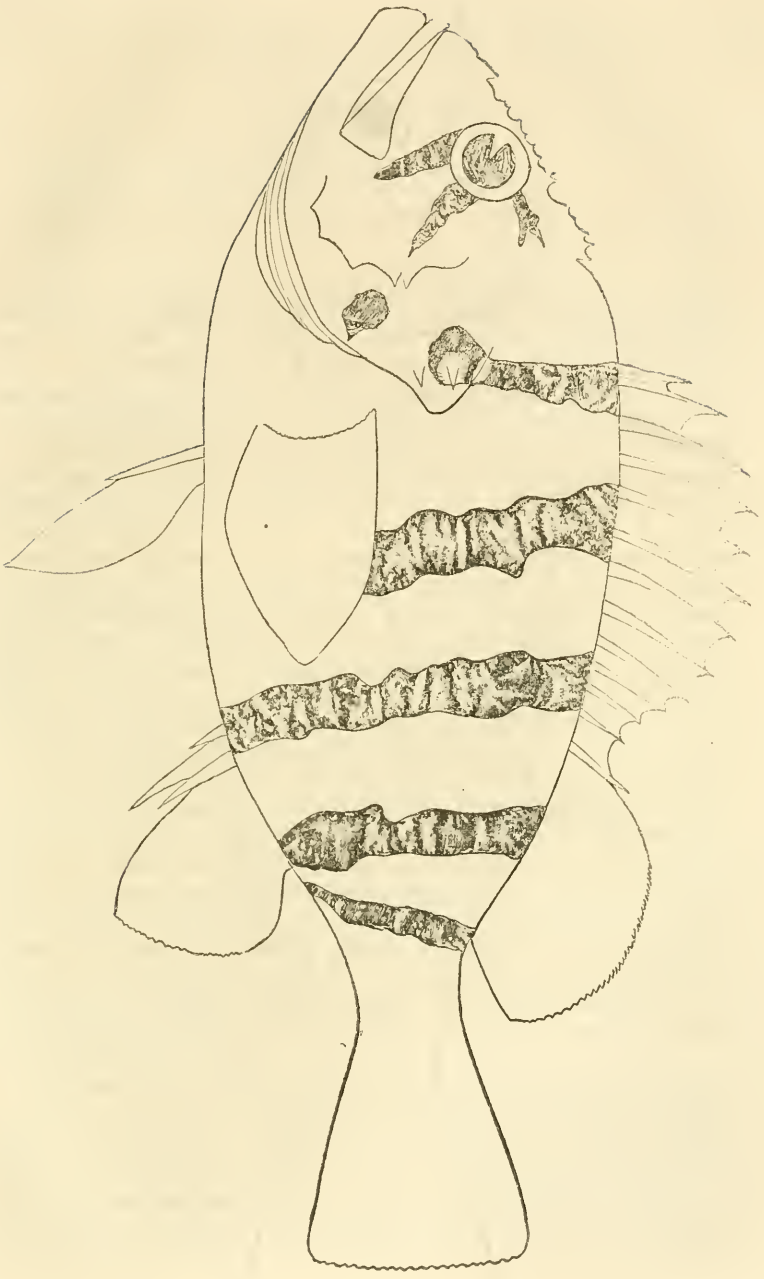
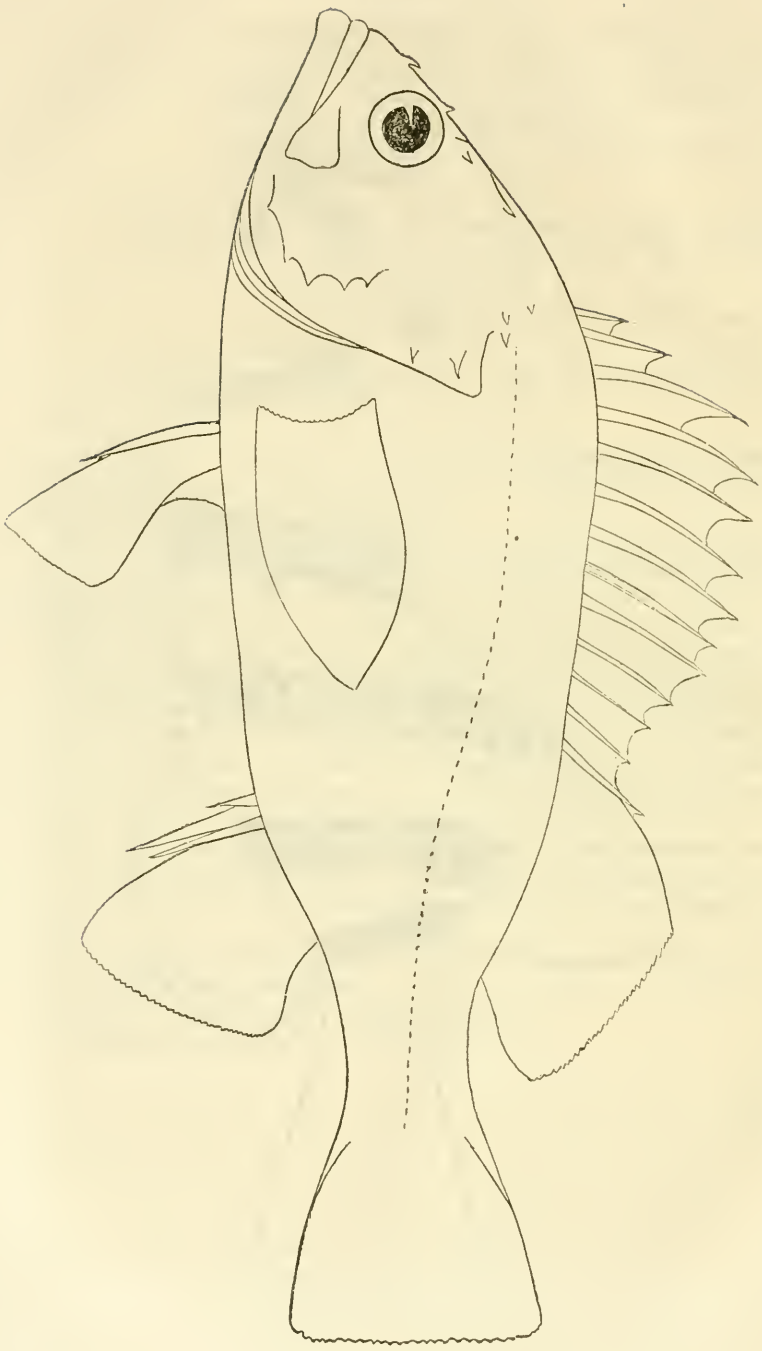


Fig. 68.



December 15th, 1862.

President in the Chair.

Prof. J. D. Whitney read the following paper:

Which is the highest Mountain in the United States, and which in North America?

It is a curious fact, that, up to the present time, the greatest uncertainty exists as to the height of the loftiest mountain peaks, not only of the United States, but of the North American Continent. The greatest errors are being constantly repeated in our school geographies; and, on looking farther back into our Gazetteers and Encyclopædias, we find the same condition of things.

The object of this communication is to set forth, as far as can be done from materials accessible in California, what is known in regard to the height of the dominating peaks of the mountain ranges of North America.

It is well known that the elevations of the loftiest portion of the Appalachian chain are but trifling compared with those of the Rocky Mountains, and the Sierra Nevada and Cascade range, or of the ranges intermediate between these two great chains. The highest point of the Appalachian chain, as determined by Guyot, is Black Mountain, or the Black Dome, in North Carolina, which is 6,707 feet above the sea level, or less than half the height of several of the peaks of the Sierra Nevada and Cascade range.

In the Rocky Mountain chain proper, by which term I designate the group of ranges having a general north and south direction, extending from the southern boundary of the United State to latitude 43° north, and lying between the 105th and 107th meridians, the culminating points are Pikes', Long's and Laramie peaks; but it is not known that either one of these has been accurately measured. Dr. Parry has recently given the names of Torrey, Gray, and Engelmann, to three peaks in the range east of the Middle Park; but he has not measured their height. In his interesting paper on the botany of this region, he speaks of the highest points as being over 12,000 feet.

At present the culminating points of the Rocky Mountain ranges, using the term here to include all the groups of mountain chains east of Salt Lake, are believed to be in the Wind River Mountains; the highest point of this chain was ascended by Fremont and measured barometrically, and is now known as Fremont's Peak. It was measured, however, by a single barometer, not in perfect or-

der, so that the result (13,570 feet) can only be looked on as an approximation, which may vary several hundred feet from the truth.

The culminating points of the Sierra Nevada and Cascade range are believed to be the highest mountain elevations within the limits of the United States; but to which of these points the supremacy is to be given is not yet absolutely known; although, as will be attempted to be shown in this communication, it is at least highly probable that Mt. Shasta has the honor of standing at the head.

These lofty peaks, all volcanoes, either extinct or active, sentinelled along a granite range and towering far above it, enumerating them from south to north, are as follows:

Mt. Shasta,	California.
Pitt,	Oregon,
Diamond Peak,	Oregon,
Three Sisters,	Oregon,
Mt. Jefferson,	Oregon,
Hood.	Oregon,
Mt. St. Helens,	Washington Territory.
Adams,	Washington Territory.
Rainier,	Washington Territory.
Baker.	Washington Territory.

In regard to the height of the first of these, namely Mt. Shasta, there is at present no uncertainty. A careful and elaborate series of barometrical observations by the State Geological Corps, made in September, 1862, has fixed the elevation of this mountain at 14,440 feet. Previous to this, the height of Shasta had been variously estimated at from 13,905 to 18,000 feet. The number 13,905 was the result of a barometrical observation made by Mr. W. S. Moses, August 20th, 1861; 18,000 feet was the height as estimated by the Pacific Rail Road expedition, under Lieut. Williamson; Fremont's estimate was 15,000 feet, which is much nearer the truth than Williamson's. It is a very curious fact, that the height of Mt. Shasta, as given by the editor of Colton's Atlas and author of the article on California in the New American Cyclopædia, is 14,390 feet, which is a very close approximation. Where these figures were obtained, I have been unable to ascertain.* It is pretty certain that they were not the result of any actual measure-

* Wilkes says "it is said to be 14,350 feet; but Lieut. Emmons thinks it is not so high."

ment, as it is known that Mr. Moses was the first person to ascend the mountain with a barometer.

The heights of Mt. Pitt, Diamond Peak, the Three Sisters, and Mt. Jefferson, are usually given at 10,000 to 11,000 feet, from guess, as none of them have ever been measured, so far as can be ascertained. It is clear that neither of them is as high as several of the peaks farther north. The Pacific Rail Road party in charge of Lieutenants Williamson and Abbot, although circulating for sometime through that part of the Cascade range, never ascended any of those peaks, neither have they given any estimates of their heights.

Mt. Hood, the peak or cone next north of Mt. Jefferson, and about twenty-five miles south of the Columbia River, has been the object of more speculation as to its height than any other of the high points of the range, unless it be Mt. Shasta. As far as can be ascertained, it has never been ascended with a barometer. Many persons have considered it the highest point of the chain; while others, whose opinions seem more reliable, have asserted that it is inferior in height to Shasta, Rainier, Adams, and perhaps others. Thus Lieut. Abbot speaks of Mt. Shasta as the "largest and grandest peak of the Cascade range," while Dr. Newberry of the same expedition, calls Mt. Hood the "loftiest peak in the chain." The statements in the books with regard to the height of Hood, vary from 7,710 to 18,360 feet. Grewingk, in his usually exact work on the Orography of the Northwest Coast of North America, gives 1,203 toises, or 7,710 feet, as the result obtained by Gardner for the height of this mountain; but there is certainly some great error here, as there can be no doubt that the mountain is much higher than that. Berghaus gives 16,500 feet, and another German authority 18,360 feet. The New American Cyclopædia and Colton's Atlas give 13,000 feet. It is certain that no barometer has ever been carried to the top of Mt. Hood, and there is no published record of any accurate trigonometrical measurements of it. It was not ascended by Wilkes' expedition, although he several times speaks of intending to do so; nor by any of the Pacific Rail Road Surveying parties. The story current in the newspapers of the mountain having been ascended by a party to a height of over 18,000 feet, is believed, on enquiry, to be without foundation. It is this newspaper account which seems to have led the German authority above referred to (*Zeitschrift für Allgemeine Erdkunde*) into error. I learn from Dr. J. G. Cooper, however, that a rough trigonometrical measurement of Mt. Hood was made, at the Dalles, by Dr. Vansant, U. S. A., in 1860, which gave the height of Hood as 11,934 feet. It was done by measurement of the angle

of elevation of the mountain (by a sextant, probably) and taking the distance of the summit from Williamson's map. Dr. Cooper, who is familiar with the mountains of Oregon and Washington Territory, considers that there is no doubt that Mt. Hood is not as high as some other peaks of the same range. Other experienced observers have stated the same thing to me.

On the whole, then, we conclude that Mt. Hood, although undoubtedly a grand object, is not as high as Mts. Shasta, Rainier, or Adams, and by no means entitled to the supremacy of the chain, although one of the highest points in it.

Mt. Adams, the next high point north of Hood, was made by Dr. Vansant, with the same instrument by which Hood was measured, 13,258 feet high.

Mt. Rainier was measured by Capt. Wilkes trigonometrically, from Fort Nisqually. He gives the height resulting from his observations at 12,330 feet. As the mountain is nearly sixty miles from Nisqually, and, if 12,300 feet high, would only subtend an angle of a little over two degrees at that distance, the observation can hardly be considered as more than an approximation,—but there is here a margin of 2,000 feet, before the height of Shasta would be reached.

Mt. Baker, the most northern of these volcanic cones, is given by Simpson at 12,500 feet; and by Davidson, in the Coast Survey Report for 1858, at 10,500 feet. In neither case are any data furnished, by which it may be inferred whether these figures are estimates or the result of actual measurement.

From the above review of what is known in regard to the heights of the culminating points of the Sierra Nevada and Cascade range, it will be seen that there is little doubt that Shasta is entitled to the prećminence among them, and that it may perhaps be a thousand feet, or more, higher than either Rainier or Adams.

Of the prominent points in the Sierra Nevada chain, south of Shasta, none have been measured accurately. There are so many which are nearly of a height, that they are not easily distinguished from each other, except in a few cases. The highest portion of the range is supposed to be that between Lake Bigler and Mono Lake, in which are believed to be several summits over 12,000 feet in elevation. Castle Peak, near Mono Lake, is put down on Goddard's map at 13,000 feet. I am informed by Mr. Goddard, however, that its height was measured with an aneroid barometer, the observations being taken at a point supposed to be 1,000 feet below the summit.

Lassen's Butte is also variously estimated at from 10,000 to 12,000 feet. Prof. Brewer thinks it cannot be less than 12,000 feet high.

If, then, Mt. Shasta is the highest mountain of the Cascade and Sierra Nevada range, it is almost certainly the highest point within the limits of the United States, as we have reason to believe that there are no peaks in the chains to the East of this as high as those which form the Western border of the Continent. The volcanic cone of San Francisco, which is given by Humboldt at 16,000 feet, on the authority of Marcou, is in reality only between 12,000 and 13,000 feet high.

The question, which is the highest mountain in North America? may here be briefly touched on. It will be remembered by every one, that in the school geographies and books of a popular kind relating to geographical science, Mt. St. Elias is always mentioned as claiming supremacy over all the mountains of America. It is curious to see how this really quite erroneous statement, in regard to a point of so much interest, has been handed down from generation to generation by the book-makers; even in the latest editions of the best Atlases, Cyclopædias and Gazetteers, we find this statement in regard to the height of Mt. St. Elias repeated without qualification. The height usually assigned to St. Elias is 17,854 feet, and is derived from measurements made by Malespina, in 1791, as discovered by Humboldt from Malespina's manuscripts in the archives of Mexico. Were this height correct, it would be almost beyond doubt that St. Elias is the highest mountain in North America, although even then less than one hundred feet lower than Popocatapetl; but the following circumstances will, I think, justify us in believing that Malespina's measurements were, in all probability, grossly incorrect. In the first place, La Perouse measured this mountain in 1786–8, and made it only 12,661 feet high: again, on the English Hydrographical Charts, it is given at 14,970 feet. But, secondly, Vancouver, in his description of the mountain, says expressly that the snow line does not descend very far down its sides, which would be an absurdity, if it was really 17,000 feet high in a latitude of sixty degrees. It is probable that the height given by the British Charts, probably from Captain Denham's measurement, is nearer the truth; and, if so, then St. Elias is nearly 3,000 feet lower than Popocatapetl, and also lower than several other points in Mexico, and lower than Mt. Brown and Mt. Hooker, in British Columbia, according to the usually adopted figures, viz: 16,000 and 16,750 feet. But, it may be said with truth, that these figures given by Douglas are of little value, and that they are considerably above the real heights.

In regard to the height of the Mexican volcanoes, there is no uncertainty. They have been carefully measured by Somtag, whose barometrical observations agree with the trigonometrical ones of Humboldt, made more than fifty years before. According to

Sonntag, Popocatapetl is 17,783 feet in height, and must, therefore, be allowed the honor of standing at the head of the mountains of the North American continent.

Dr. Kellogg read the following description of new species of plants:

Collinsia septemnerva.—(Kellogg.) Fig. 69.

Stem simple, erect, sub-glabrous or puberulent below; short somewhat wooly pubescent above.

Leaves cordate-oblong, acute, entire, (or sub-entire?) sub-sessile, sub-glabrous above, (only a few remote hairs along the nerves) very short pubescent beneath, margins scabrous and short pubescent, seven-nerved.

Flowers creamy yellow, streaked with dark purple lines, in whorls of six to eight.

Calyx segments lanceolate, acute.

Corolla slightly scabrous and pubescent, thrice the length of the calyx, gibbosity of the tube large, prominent and obtuse, lateral wing-lobes long, and somewhat ligulate, apex emarginate; upper lip-lobes very short, entire.

Allied to *C. tinctoria*, but the stem is not "glabrous," nor upper leaves sessile, nor the floral leaves two to three inches long, nor are they "coarsely dentate"; the calyx, also, is not "glandular," etc. The color of the flower is similar, but the form is long and slender. The seven-nerved character of the leaf is worthy of note.

Œnothera Nevadensis.—(Kellogg.) Fig. 70.

Stem robust, sub-decumbent, six to eight inches high, glabrous below, minutely strigulose pubescent above, strongly decurrent angled.

Lower leaves oblong-lanceolate, irregularly and also coarsely crose-repand-dentate, petioles short, sub-winged and expanding at the base, sparsely strigulose throughout, veiny, upper bractoid leaves lance-linear, entire, corneously acute, on very slender petioles, about the same length as the lamina, or three or four times the length of the ovary; slightly scabrulose and minutely strigulose throughout.

Flowers small, white, in a dense, obtuse terminal leafy spike, neither circinate nor drooping. Calyx tube linear-funnel-form, somewhat ridged, scarcely shorter than the ovary, segments carinate, (or from a closely reflexed base erect beyond the middle) as long as the tube; petals ovate or obovate on a short claw; stamens somewhat unequal, mostly slightly exsert; anthers oblong, fixed by the middle, versatile; stigma sub-capitate scarcely a little longer.

Fig. 69.

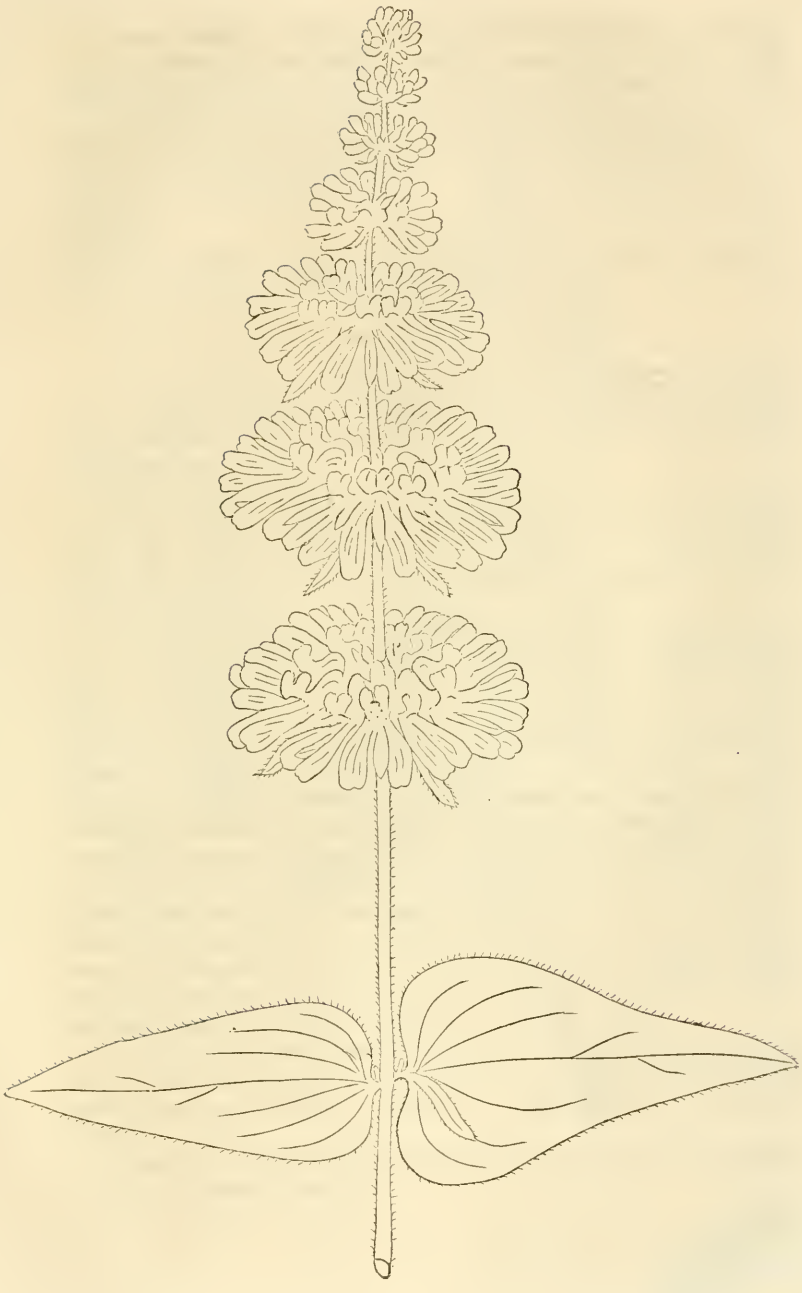


Fig. 70.

Capsules sessile, subulate tapering from a broad base, quadrangular or strongly four-ridged, valves one-nerved, scabrulose and strigulose puberulent, arcuately tortuous; seeds oblong ascending.

This plant belongs to the subdivision *Sphærostigma*, and is closely allied to *Œnothera gauræflora;* but that has linear-lanceolate veinless leaves, and yellow flowers: the bracts, also, are shorter than the ovary, and linear or subulate. The ovary, also, is said to be glabrous.

We have not seen the base of the stem; the leaf only accompanying the spike, as exhibited in the figure.

Œnothera cruciformis.—(Kellogg.) Fig. 71.

Stem perennial (?) leafy, erect, sub-glabrous or puberulent, decurrent angled, fistulous, succulent (?) six to eight inches in height, many-flowered in a nodding somewhat secund terminal spike, elongating in fruit.

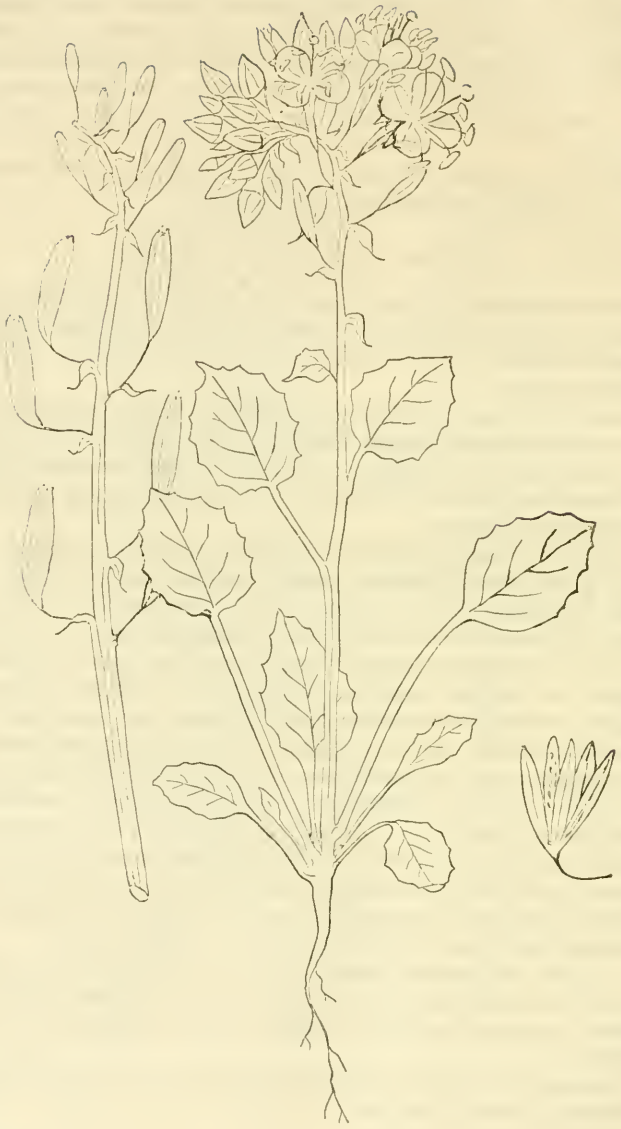
Leaves alternate, fleshy, veiny, glabrous, subcordate-ovate, acute, or short acuminate, repand-denticulate, the lower ones on long petioles; the upper at length much shorter; the uppermost bractoid sub-sessile and sessile, obliquely ovate, acuminate, sometimes adhering to the pedicels.

Flowers a pure bright lemon or straw yellow unchanged in drying; petals broadly obovate, entire, (or rarely sub-ocordate) longer than the sepals, four in number (in one instance five, with ten stamens); alternate stamens a little longer (as long or longer than the petals); anthers linear oblong, (about two lines long) attached below the middle, versatile; style exsert, (villous at the base,) stigma capitate, calyx tube broadly obconic or funnel-form, early deciduous, about half the length of the segments; segments ovate or oblong, acute, reflected, somewhat twisted, puberulent, colored yellowish, capsules linear-oblong, sub-cylindrical or somewhat subfour obtuse angled and strongly four-nerved; valves one-nerved, membranaceous (similar to the cruciferæ), apex sub-acute, base acute, on spreading ascending pedicels about half an inch in length, or about half as long as the capsules, bracted at the base, or the pedicel bracteolate a little above by the adnate bract.

A plant with mostly radical leaves; in depauperated specimens only a few small leaves are seen just above the base; in its normal state, however, the plant exhibits the leafy character seen in the figure.

Growing in beds of silicious deposit on the top of Steamboat Springs, Nevada Territory.

Fig. 71.



Viola chrysantha var. Nevadensis. (Kellogg.) Fig. 72.

Stem short, partly subterranean, slightly pubescent, cespitose.

Leaves both radical and cauline, on long petioles, bipinnatifid, segments linear-lanceolate, acute, glabrous above, pubescent or scabrulose beneath, margins scabrous and sometimes also pubescent, points tipped with a gland.

Stipules linear-lanceolate, falcate, entire or sparsely dentate, often half to three-fourths of an inch in length, and when thus fully developed, sub-lobed and similar to the leaves. Peduncles longer than the leaves, sub-glabrous, rarely a few scabrous elevations and scattering hairs. Bracts minute, lanceolate, acuminate; margins subscarious, swelled or produced at the base on the back, situated above the middle; sepals ovate-oblong, acute, produced and emarginate at base, margins naked or scabrous, (rarely a few scattering hairs on the back), three nerved.

Flowers very large, petals obovate-cuneate, the two upper yellowish in front, purple on the back, claw also purple in front, (a variety with smaller flowers has the upper petals deep indigo on both surfaces); lateral petals somewhat papillose bearded from a little *mons* nearer the upper margin; lower petals brightly yellow, with dark purple veins at the base, lowest with a short spur. Style clavate, curved, sub-rostrate, sub-lipped, compressed, short bearded below the summit, foramen large, nearer the somewhat protuberant obtuse beak.

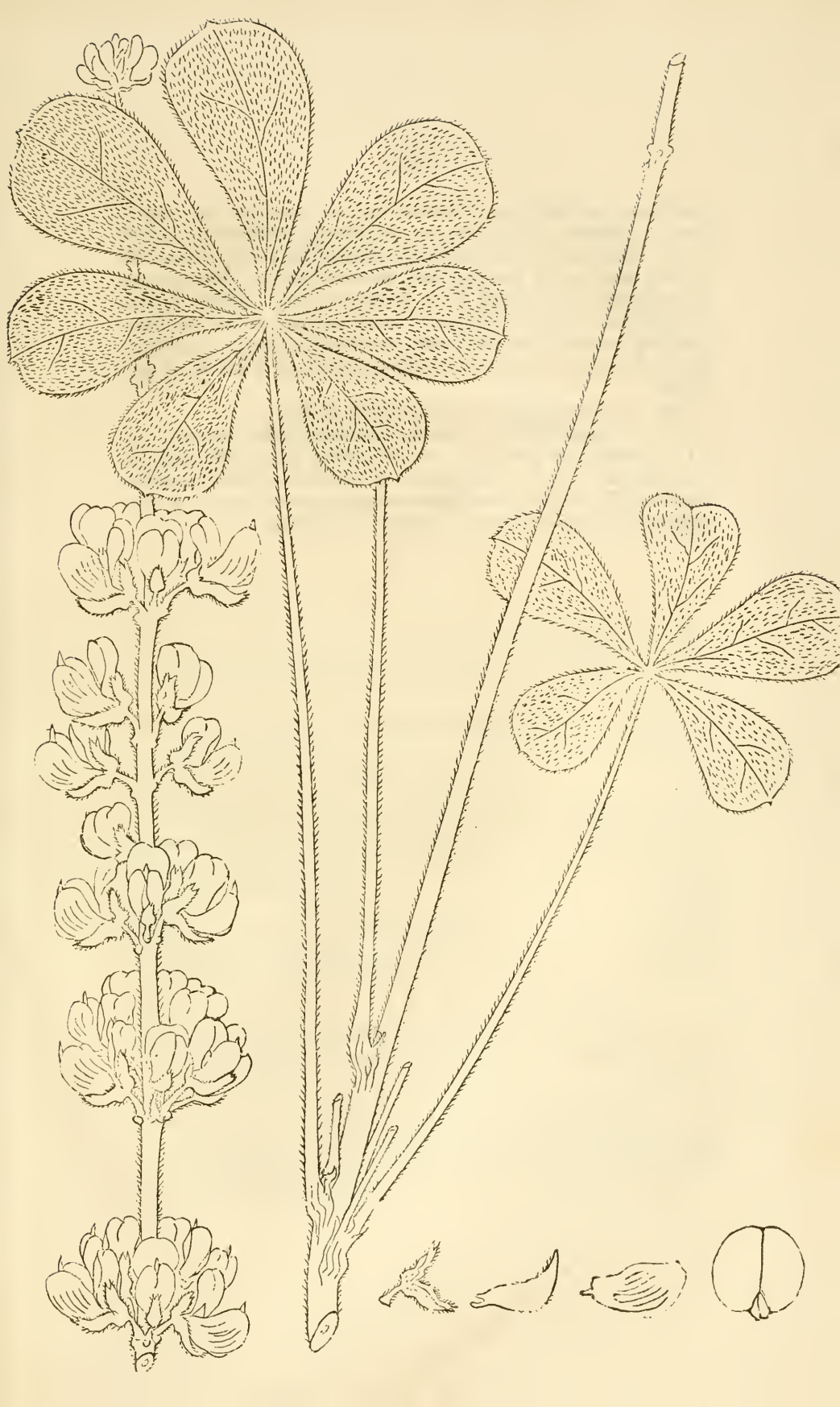
In no specimens of this plant from the interior have we been able to find all the stipules "entire," as *V. chrysantha* is described by Sir Wm. Hooker; the sepals also are not "cilliate," nor the lateral petals "glabrous;" the spur, although short, is not wanting, certainly not "slightly saccate." The scabrous and glandular leaves, it would seem, are features worthy of notice.

Lupinus cervinus. (Kellogg.) Fig. 73.

Stem herbaceous, silky appressed pubescent throughout, with short fulvous villi. A robust plant of a pale greenish, ocherish hue, six inches to one foot high.

Leaves large, petioles stout, strongly three to five nerved at the somewhat clasping base; stipules very short, subulate, adnate, (about one-quarter of an inch in length). Leaflets large, (one to two inches long, or one-quarter to one-third the length of the petiole) six to seven, obovate, cuneate, obtuse, (rarely sub-acute) acutely mucronate, mid rib thickened, more ferruginous satiny beneath; flowers pale blue, (?) somewhat verticillate in an elongated pedunculate spike; bracts very short, subulate from a broad base,

Fig. 72.



caducous; pedicels short, (about half the length of the calyx) much thickened at the base or sub-clasping, attenuated upwards to the calyx; calyx very minutely bracteolate, (often a mere tuft of villi marking its locality) base saccate above and below, upper lip sub-equal two toothed, lower lip three toothed, middle tooth a little longer; wings very broad, naked, as long as the vexillum; vexillum orbicular, without spots, sparsely pubescent externally; keel sub-cilliate, with a few scattering appressed hairs above and below.

Embryo legume, fulvous villous, seven seeded.

The specimen is from the Randall purchase of the Academy, No. 119, collected by Mr. Lobb, on the Santa Lucia Mountains, in piney woods. The proper stem is low, and the leaves somewhat clustered by the condensed internodes; fistulous below. A very marked, fine, robust species, worthy of cultivation.

INDEX OF AUTHORS.

1858–1862.

GENERAL INDEX.

COMMITTEE ON PUBLICATION, 1873.

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