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OF

SCIENCES.

VOLUME IV.

1868–1872.

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Part I, p. 1–32, for 1868, printed in November, 1868.
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☞ Some of the papers in Part V were printed in advance, as per dates in foot-notes.

MEMOIRS, QUARTO:

1. "Pacific Coast Mosses," by Leo Lesquereux, pp. 38, price in gold........$1 00
2. "Natural System of Volcanic Rocks," by F. Baron Richthofen, Dr. Phil. Price.. 1 50

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OFFICERS FOR 1873.

☞ **The Regular Stated Meetings of the Academy are held on the FIRST and THIRD MONDAYS of each month.**

PROCEEDINGS

OF THE

CALIFORNIA ACADEMY

OF

SCIENCES.

Annual Meeting, January 4th, 1868.

President in the Chair.

Thirty-three members present.

B. M. Hartshorne was elected a life member. W. W. McFarland, Wm. Bailey, George S. Allardt, A. F. Sawyer, M.D., and Isaac Rowell, M.D., were elected resident members. W. C. S. Belcher and W. Christie, corresponding members.

The President delivered an address exhibiting the history and progress of the Academy.

The Treasurer and the Curators of Botany and Conchology presented reports which were accepted.

The new Constitution was then read, section by section, and various amendments adopted. It was then adopted as a whole.

Adjourned Meeting, January 13th, 1868.

President in the Chair.

Thirty-one members present. The following officers were elected for the ensuing year:

Regular Meeting, January 20th, 1868.

President in the Chair.

Twenty-three members present.

A motion was adopted to print five hundred copies of the new constitution, list of members, and annual address of the President.

It was stated by the President that the Council had appointed the following Curators:

General Zoölogy—Dr. J. G. Cooper.
Conchology—W. G. W. Harford.
Radiata—Dr. J. B. Trask.
Entomology—R. H. Stretch.
Geology—W. A. Goodyear.
Botany—H. Bloomer.

Donations to the Library: "Concentration and Chlorinization of Ores," by G. Kustel. "A History of the Fishes of Mass.," by Dr. D. H. Storer, from the authors.

A fine photograph of the skull of the Siamese Tiger from Boston. Copies of the second memoir of the Academy were distributed to members. It is an original paper by Baron Richthofen on the Natural System of Volcanic Rocks, comprising ninety-four pages.

Dr. Cooper presented the following paper:

Some Recent Additions to the Fauna of California.

BY J. G. COOPER, M. D.

In Vol. II, p. 118, of our Proceedings, there is published a list of animals discovered by me while stationed as surgeon at Fort Mojave, Colorado valley, three of them undescribed before, and twenty others new to this State. I may here remark that all the species there mentioned were actually collected by me and preserved for the State Museum, except two included in brackets, [ ] which I have since obtained also. Yet some authors have referred to them as only "observed" by me, and even ignored entirely my notice of some of them while referring to others mentioned in the same article. One or two names will need correction in the present paper.

I now present the additions which I have been able to make to our lists of the two highest classes since then. Those collected by aid of the Geological Survey are distinguished by a *, new species by a †. Some were obtained during my service in the army, or by friends whose names are duly mentioned.

The chief authorities for the previous discovery of species in this State are the volumes on mammals and birds of North America by Baird, Cassin and Lawrence, of which the text forms the 8th and 9th volumes of the Pacific R. R. Reports, besides a few collected here by Gambel, Heermann and others, not mentioned therein. Many are mentioned by authors as having been *seen* in this State, but have not been confirmed by collections.

Full information on all our species has been prepared for the Reports of the Geological Survey, now nearly ready for publication, and to be profusely illustrated.

Besides those here mentioned, there have been added to our fauna since 1859 the following numbers of species in the lower classes of vertebrates:

Reptiles and Batrachians.—Ten or twelve species, of which three or four are probably new, mostly obtained through the Geological Survey.

Fishes.—About fifty species, collected by myself while in the Survey, or by Dr. Ayres, Mr. Hubbard, and other members of our Academy, who obtained them chiefly in the San Francisco market. Many of these were described in these proceedings.

Having recently furnished a complete enumeration of the vertebrata of this State for Mr. Cronise's "Natural Wealth of California," I find the number of species known to me to be as follows. In order to show the progress of our knowledge on this subject, I add the number of each class believed to inhabit California in 1862, when I made the estimate published by Prof. Whitney in his Annual Report, and in our Proceedings, Vol. III, p. 23, with other statistical items—

Species known.	Mammals.	Birds.	Reptiles, etc.	Fishes.
1862....................	77.	320.	45.	133.
1868....................	115.	353.	85.	196.

Still greater progress has been made in the invertebrate classes, but most of them being still in the hands of other naturalists I can only give the numbers relating to the mollusca. In 1862 there were believed to be about 400. The well-determined species now known are 598, (omitting varieties, etc.) to which will probably be added 20 or more still undescribed, and about 200 species and varieties found west of the Rocky Mountains, between latitudes 32° and 49°, but which have not yet been detected within our limits. (See "Geographical Catalogue.")

Class MAMMALIA—Order Pinnipedia.

1 Phoca Pealii Gill—Leopard Seal?—*Hab.* Whole coast of California.

As I have found but one species of *Phoca* along the coast, well known here as the Leopard Seal, I suppose it to be the one named (without description) by Gill in his "Prodrome" in the Proc. Essex Inst. V. 1, April, 1866.

It is quite distinct in dentition from the "Leopard Seal" of most books, a species of *Stenorhynchus*, but seems to resemble that closely in colors.

2 Halicyon Richardi Gray, (Gill)—Fur Seal?—*Hab.* Farallone Islands and north, British Columbia, Alaska.

I have been quite unable to obtain specimens from the Farallones to determine what is the "Fur Seal" occasionally killed there, or if it be the same hunted on the coast of Alaska. The nature of the hair would indicate a genus distinct from *Phoca*. So far, none of this order have been found identical in the two oceans except the walrus, *Rosmarus obesus* Illiger, (Gill) which lives near the Arctic circle.

3 Macrorhinus angustirostris, Gill—California Sea Elephant. This huge beast formerly abounded at certain seasons on the islands along our southern coast, but seems to have been exterminated, or driven to Lower California by the reckless persecution of the sealers, who will probably entirely destroy the species in a few years. It is said to grow twenty feet long and of immense bulk, like the Walrus. I could never obtain more than a single broken skull, nor did I see the animal during a long residence southward. A full account of this and the Whales is however being prepared by my friend Capt. C. M. Scammon, of the Revenue Service.

4 Arctocephalus ursinus F. Cuvier—Sea Bear. *Hab.* Coast of Washington Territory and north. I mention this as probably a visitor to the Farallone Islands in winter.

5 Eumetopias Californianus Lesson, (Gill)—Northern Sea Lion. (= *Otaria Monteriensis* Gray, and perhaps *O. Stelleri* Müller, according to Gill.)

6 Zalophus Gillespiei Macbain, (Gill)—Southern Sea Lion.—Whether there is more than one species of Sea Lion on our coast is still doubtful, although naturalists who have had little more than skulls to study have made four species and three genera from them! I have been unable to identify those from the Farallone and Santa Barbara Islands with either of the above to my entire satisfaction. The differences in the animals of the two groups are chiefly in size, (depending on age?) and the two sexes always differ so much that skulls alone of various ages might easily mislead those who never saw them alive. It

appears as if each breeding-place produces a local variety somewhat peculiar, and that they never resort to any other islands for breeding than those where they were born.

Order Insectivora.

7 †Sorex ——. A species apparently new was obtained by me at Kern River, the most southerly point at which the genus has been found on this coast. Prof. Baird has it for determination.

Order Cheiroptera.

As this order is omitted in the latest general works on the animals of North America, I insert a list of those so far determined to inhabit this State, taken from Allen's "Monograph of North American Bats," published by the Smithsonian Institution, with some additions and corrections made by him in the Proc. Phil. Acad. Nat. Sc., 1864 to 1866. Several of the species are in the State Collection.

8. Macrotus Californicus Baird—Leaf-nosed Bat. Ft. Yuma, to Cape St. Lucas. *See* U. S. & Mex. Boundary Survey Report, II, 2, p. 2, pl. 1, fig. 2.

9 Nyctinomus nasutus Spix, (Tomes)—Sharp-nosed Bat. Texas to Ft. Yuma, and south to Brazil. *See* Annals N. Y. Lyceum N. H., IV, 65, pl. iii, *f.* 1, *M. cynocephalus.*

10 Lasiurus Noveboracensis Erxleben, (Tomes)—Red Bat. Whole United States and south to Chili. *See* Nat. Hist. of N. Y., Zoöl., p 6. pl. ii.

11 Lasiurus cinereus Palisot, (Allen)—Hoary Bat. All of America. *See* same work.

12 Scotophilus fuscus Palisot, (Allen)—Brown Bat. Whole United States to Vera Cruz, Mexico.

13 Scotophilus noctivagans Leconte (Allen)—Silver-haired Bat. Hudson's Bay to Washington, D. C., and Ft. Reading, California.

14 Scotophilus hesperus Allen—Western Bat. Posa Creek, (Visalia) to Ft. Yuma, California.

15 Vespertilio subulatus Say—Little Brown Bat. Nova Scotia to Sonora, Mex., and Arizona (=*V. Californicus* Bach.?) Very near or identical with the next.

16 Vespertilio evotis Allen—Oval-eared Bat. Nebraska and Washington Territory to Cape St. Lucas.

17 Vespertilio lucifugus Leconte—Blunt-nosed Bat. Hudson's Bay to Aspinwall, N. G., and Fort Reading, California.

18 Vespertilio obscurus Allen—Obscure Bat. Oregon? to Cape St. Lucas. Proc. Phil. Acad. Nat. Sc., 1866, p. 289. (= *V. Oregonensis* Leconte, Mss?)

19 Vespertilio Yumanensis Allen—Gila Bat. Fort Yuma, California.

20 Vespertilio nitidus Allen—Shining Bat. Lat. 49° W. T., to Cape St. Lucas and Texas.

21 Vespertilio macropus Allen—Long-footed Bat. Near Fort Mojave, Colorado Valley, Dr. Coues, U. S. A. Described with *obscurus*, 1866.

22 SYNOTUS TOWNSENDII Cooper, (Wagner)—Townsend's Bat. Nebraska and Washington Territory to Utah, (and Cal. ?) *See* Ann. N. Y. Lyceum Nat. Hist. IV, 73, pl. 3, f. 6.

23 ANTROZOUS PALLIDUS Leconte, (Allen)—Pale Bat. Columbia River to Cape St. Lucas and Texas. *See* U. S. Mex. Bound. Rep. II, 2, p. 4, pl. 1, f. 1. For other illustrations see Allen's work.

Order RODENTIA.

24* SPERMOPHILUS ELEGANS Kennicott—Elegant Ground Squirrel—Proc. Phil. Ac. Nat. Sc., 1863. *Hab.* near Salt Lake, Utah, to Johnson's Pass, Sierra Nevada, where I found it in 1863. Pitt River?

25* SPERMOPHILUS LATERALIS Say, (Rich.)—Say's Ground Squirrel—Near summits of the Sierra Nevada, lat. 38° common.

26 PTEROMYS OREGONENSIS Bachman—Oregon Flying Squirrel—Sent from Mendocino County to Mr. Lorquin.

27* LAGOMYS PRINCEPS Richardson—"Little Chief Hare"; Rat-rabbit—I obtained specimens near the snow line, above Johnson's Pass, Sierra Nevada, which I cannot distinguish from the descriptions and figures of the above, which is found in the Cascade Range, near lat. 49° and the Rocky Mountains, lat. 42° See our Proceedings for October, 1863, p. 69, for record of its occurrence so far south.**

Order CETACEA.

The Pacific species of this order, not found in the Arctic Sea, are all distinct from those of the Atlantic Ocean, but some have been described in costly foreign works as from Japan, and therefore, it has been impossible so far, to name ours with any certainty. From the notes and drawings of Capt. Scammon, I have recognized species of the following genera :

28 BALÆNA————California Gray.

29 BALÆNA————Right Whale. Probably not *B. mysticetus.*

30 RORQUALUS————Humpback Whale.

31 RORQUALUS————Finback Whale.

32 RORQUALUS————Sulphur-bottom.

33 PHYSETER————Sperm Whale. Probably *P. macrocephalus.*

34 GLOBICEPHALUS————Black Fish.

35 PHOCÆNA————Bay Porpoise.

36 DELPHINUS————Dolphin Porpoise. Apparently two or three species.

37 ORCA————Killer.

Dr. Gray's catalogues of the British Museum also mention species of the following genera as found on the "Northwest coast" of America, but they probably never or rarely approach our shores :

** Mr. Gabb, in his late journey through Lower California, found this interesting animal "on a mountain near the boundary, about 10,000 feet above the sea."—[See Proc. Acad. Nat. Sc. Philad., 1868.]

NOTE.—There has been no record of the occurrence of the Muskrat, (*Fiber zibethicus*, Linn.) in California, but skins are brought from Nevada, and I think I once saw one killed near the coast.

Megaptera, (=Rorqualus No. 31?); *Lagenorhynchus*, Bottle-nosed Porpoise or Whale; *Delphinapterus*, and *Beluga* or White Whale—the last probably only an Arctic species.

Class BIRDS. Order SCANSORES.

38 COCCYGUS AMERICANUS Linn. (Vieill.)—Yellow-billed Cuckoo. Obtained in Sonoma or Napa County by Mr. F. Gruber, and observed by me to be quite abundant in summer, at Sacramento. Mentioned by Nuttall, Newberry and others, but I believe, never before collected on this coast.

39* PICOIDES ARCTICUS Swainson, (Gray)—Arctic Three-toed Woodpecker. I found this species common near Lake Taho and the summits of the Sierra.

Order RAPTORES.

40 ASTUR ATRICAPILLUS Wilson, (Bonap.)—Goshawk—Collected at Michigan Bluffs, Placer County, by Mr. Gruber in summer, and seen by me on the Sierra Nevada.

41* BUTEO ZONOCERCUS Sclater—Contraband Hawk—See Proc. Zool. Soc., London, 1858, p. 263—COUES, in Proc. Philad. Acad. Nat. Sc., Jan., 1866. Obtained by me at San Diego, Cal., in March, 1862; the first found in the United States; Arizona, *Coues*; Mexico, *Sclater*.

† *Athene Whitneyi* Cooper, Proc. Cal. Acad., II, 118, 1861, has been made the type of a new genus MICRATHENE by Coues, l. c. supra. A second specimen marked, "Mexico," is in Mr. Woodward's Museum in this city.

Order STRISORES.

42 CALLOTHORAX CALLIOPE Gould—Calliope Humming-bird—Obtained at Fort Tejon by J. Xantus, (Baird in lit.)—See Proc. Acad. Nat. Sc., Philad., 1859.

43* SELASPHORUS PLATYCERCUS Swainson, (Gould)—Broad-tailed Humming-bird—I obtained a female specimen at Lake Tahoe, this making the sixth Californian species of Humming-bird.

Order PASSERES.

Empidonax Traillii Aud. (Baird)—Traill's Flycatcher—See vol II, p. 122. As the existence of this species west of the Rocky Mountains has been doubted by Prof. Baird and Dr. Coues, (Proc. Philad. Acad., Jan., 1868) I made a new comparison of my male specimen with the description, and found it to agree in every detail, except in having the primaries only half an inch (0.50) longer than the secondaries, instead of 0.70, and the tail 0.10 inch shorter, the bird being however smaller than Prof. Baird's Pennsylvania specimen. The color is probably a little more gray than in Eastern birds, as in all the species of Colorado Valley. It differs from *E. pusillus*, as described by Baird, in all the essential points, and is in excellent spring plumage. The lower mandible was yellowish instead of "dusky flesh color," the feet brownish, not black as in the *E. pusillus* of Coues.

44* REGULUS SATRAPA Lichtenstein—Golden Crowned Wren.—Found by me near the summit of Johnson's Pass, Sierra Nevada.

*† *Vireo belli* Cooper, (not Aud.) Proc. Cal. Acad. II, 118, 1861, is now the VIREO PUSILLUS Coues—Little Vireo.—Proc. Acad. Nat. Sc., Phila., Jan. 1868—I observed it at Sacramento also.

Vireo gilvus Vieill. (Bonap.) — A specimen obtained at Alameda by Mr. Holder, has the quills as in Eastern specimens, not as in the "*V. Swainsonii*" from Arizona, supposed by Coues to replace *gilvus* entirely on this coast. It has however the greyish tint, while one from San Diego, collected in spring, has a good olive color, with the quill formula of *V. Swainsonii.*

45* HESPERIPHONA VESPERTINA Cooper, (Bon.) — Evening Grosbeak—Forest Hill, Sierra County, in summer, (Gruber,) and south to Santa Cruz in severe winters, where I saw them in one out of two seasons.

46* PINICOLA CANADENSIS Brisson, (Cab.)—Pine Grosbeak—I found them at Johnson's Pass in September.

47 PYRRHULOXIA SINUATA Bonap.—Texan Cardinal-bird—Has been recently obtained at Ft. Yuma. (*Coues.*)

Icterus cucullatus Swainson — Hooded Oriole. — Mentioned in the list of 1861, was afterwards obtained by me near San Diego.

48* PICICORVUS COLUMBIANUS Wilson, (Bonap.)—Clarke's Crow.—Abundant in the high Sierra.

Order GRALLATORES.

49* HÆMATOPUS PALLIATUS Temminck—Pied Oyster-catcher—San Diego and the southern islands in summer, two specimens. Before reported doubtfully from this coast.

50 ACTODROMAS MACULATA Vieillot, (Coues.)—Jack Snipe—Not rare at San Francisco Bay in winter. Specimens preserved by Mr. W. H. Holder.

51 PORZANA NOVEBORACENSIS Gmelin, (sp.)—Yellow Rail—Collected at Martinez by E. Mathewson, and at S. F. Bay by Gruber.

52 PORZANA JAMAICENSIS Gmelin, (sp.)—Black Rail—Farallone Is., *Gruber*, Martinez, *Mathewson*, Alameda, *Holder* in winter.

Order LAMELLIROSTRES.

53 ANSER ALBATUS Cassin—White Brant.

Proc. Phila. Acad. Nat. Sc., 1856, 41 and 1861, 72. *Baird*, Birds of North America: Pacific R. R. Reports, IX, 760, 925.

SPEC. CHAR. Smaller than *A. hyperboreus*, being about equal in size to *Bernicla Hutchinsii.* White, ends of primaries black, bill and feet red. Young, dull, bluish cinereous. Length of dry skin 25 inches, wing 15.50, tail 5.75, bill on cumen 2, tarsus 3. Brought from "Oregon" by the U. S. Exploring Expedition, (Cassin).

This small breed or species appears to be not rare in California some winters. It bears the same relation to the Snow "Goose," (*A. hyperboreus.*) that *B. Hutchinsii* does to *B. Canadensis.*

N. B. Mr. Lorquin has a specimen which appears to be a hybrid of the Snow Goose with Gambel's Goose, (*A. Gambelii.*) It is white, the back and neck irregularly mottled with brown, the head brown, except the white forehead characteristic of the latter species. The bill approaches nearest to that of the Snow Goose, being larger than in the other species, but the other proportions are like those of the adult *A. Gambelii*. *See* Richardson's Arct. Exped., p. 303.

The Black Swan (*Chenopsis atratus*,) may become naturalised here if hunters will give it a chance, as several raised here in confinement have escaped, though five or six of them have been already brought back dead to the taxidermists as great curiosities.

54 Bernicla nigricans Lawrence—Black Brant—Large numbers winter in San Diego Bay, where I obtained one. First described from Youkon Valley, Alaska, in Richardson's Arctic Expedition, (Harpers 8 vo. ed., 1864, p. 305).

55 Mareca Penelope Linnæus, (Bonap)—European Widgeon—Mr. Lorquin has obtained several specimens in the market in winter, which were probably stragglers from Asia instead of Europe.

Mr. Lorquin has a specimen of the American Widgeon, (*M. Americana*,) which has the sides of head nearly pure white instead of buff, the black spots existing only on the back part of crown and sides of neck, the green crest unspotted, and lateral tail coverts glossed with green, the breast paler than usual, but otherwise normal. It seems merely a highly developed specimen, with the specific characters uncommonly well marked.

The Pheasant-tailed Duck, (*Dafila urophasianus* Vigors,) has been reported as occurring on our coast as well as in South America. Vigors' description and figure resemble our female Mallard or domestic duck, except in the pointed tail, and if the specimen described was really a female it might reasonably be expected that the male should resemble the male mallard. Two such specimens have been obtained here which I will describe, though they may very probably prove to be only hybrids between the Mallard and Pintail, possibly raised in some barnyard where a Pintail has been domesticated, and doubtless of one brood. A domestic hybrid of the latter and the European Widgeon is mentioned by Nuttall. Mr. Lorquin exhibited here last winter a supposed hybrid of the same with a Teal, which was sent to San Jose before I could see it. Mr. Lorquin's specimen, now described, was exhibited here Feb. 4th, 1867, and the other was killed and stuffed about the same time by Mr. Homer Lynch, of Alameda. This latter has somewhat more of the characters of the mallard.

Description. Head dark green, forehead purplish, a white collar nearly encircling neck, half an inch wide in front, an inch on sides, where the ends run upward to a point; back and wing-coverts waved with brown and white lines, tertiaries plain brown; breast dark brown fading to white below. From the Pintail is inherited the bill, a quarter inch shorter than the Mallard's, the nape of neck nearly black, the shorter upturned points of the collar wider, and more general wavings of the back and sides, nearly white abdomen. The rump and tail feathers are intermediate in mixture of the gray center with white edges. The speculum is of a fine emerald green, that of the Mallard being violet, of the Pintail greenish purple. There is a brown band in front of it, with a black anterior margin, wider than that of the Pintail. (In the Mallard it is *white*.) Upper tail-coverts elongated, but two inches shorter than in the Pintail and their ends *turned upward*. Middle tail-feathers exactly as in Pintail, and sides of the rump pure white as in that bird.

Order Longipennes.

56 Larus Hutchinsii Richardson—Hutchins' White Gull.

Fauna Boreali-Americana, II, 419, 1831—Coues, Proc. Phil. Acad. Nat. Sc. 1862, 294.

"? *Larus glacialis* Benicken, (not Macgill). *Glaucus* and *Laroides glacialis* Bruch, 1853 and 1855. *Leucus arcticus* Bonap. 1856, (not Macgill.) excl. syn." (Coues.)

SPEC. CHAR. *Adult.* Bill flesh color at base, blackish on terminal third. Entire plumage pure white, shafts of feathers straw-yellow. Feet light flesh-color. *Young.* Head, neck and upper parts mottled light reddish brown, appearing on the latter as irregular patches, and on the rump as more or less obsolete transverse bars. Under parts a nearly uniform very light reddish brown, the under tail-coverts transversely barred with white. Wings and tail pure white.

Length 27.50, extent 60, wing 17.75, bill above 2.46, gape 3.20. Tarsus 3.40, middle toe and claw 3.50. (*Coues.*)

Hab. Arctic America. A straggler was shot in Washington County, N. Y., in winter, and presented to Smithsonian Institute by Mr. P. Reid.

A specimen in perfect plumage was shot at the Farallone Islands, last year, by Mr. Tasker, the light-keeper, who presented it to Mr. Gruber. He says they are not rare visitors there in winter. This specimen agrees exactly with the description except in being a little smaller, (wing 16.75, bill along gape 3.) I have added descriptions of this and other birds not given in the Pac. R. R. Reports. It may have been the "*L. eburneus?*" mentioned by Newberry, Pac. R. R. Rep. VI. ii, 105. as killed on Des Chutes R. Or. 1855, but lost. I have seen many immature specimens about San Francisco Bay the past winter.

57 LARUS BRACHYRHYNCHUS Richardson—Short-billed Gull.

= *L. Suckleyi* and *Rissa septentrionalis* Lawrence, Birds of N. A. 848, 851, but not *L. brachyrhynchus* of Gould nor of most American authors, *teste* COUES, Proc. Phil. Acad. Nat. Sc. 1862.

Mr. Lorquin has a young specimen shot in this bay, probably in the cold season. This is the most southerly occurrence both of this and the next.

58 RISSA KOTZEBUEI Bonaparte—Kotzebue's Kittiwake—(="*R. brevirostris*" Lawrence, not of Brandt, *teste* COUES l. c. supra.) A specimen in nearly perfect plumage is in Mr. Lorquin's collection, shot in this bay. As Mr. Lawrence only quoted Bruch's description which was "from the type," the error should be charged to Bruch, if it is one.

59 THALASSEUS ELEGANS Gambel—Elegant Tern—The first specimens I have seen from this State were shot by Mr. Lorquin in S. F. Bay, and are in fine plumage.

60 OCEANODROMA FURCATA Gmelin, (Bonap.)—Fork-tailed Petrel—Mr. Lorquin presented a specimen to the State Museum, which he says he shot at San Pedro, Cal. I never saw it on our coast, but it was before obtained on the coast of Oregon.

61 CYMOCHOREA HOMOCHROA Coues—Black Petrel—Proc. Phila. Acad., Mch., 1864, 77—"*Thalassidroma melania* Bonap.," Lawrence, P. R. R. Rep., IX, 1858, 830, and Bds. of N. A., plate. Farallone Is., June, 1863, *Gruber*. There is a possibility that this may be the immature young of Bonaparte's species, obtained off "California" coast by Delattre, and at Cape St. Lucas by Xantus. Baird, Cassin and Lawrence were so certain of their identity as to figure the Farallone specimen as "*melania*," after comparison with one admitted to be that species by Coues, and the differences the latter indicates are all such as belong to the young. The evident growth of bill, feet, etc., in birds of this

family, for some time after the wings have become fully fledged, may explain many difficulties in determining the species of the older authors. *Procellaria fuliginosa* Vieillot, and perhaps of Latham, may thus prove to be the same as this, described as long since as 1790. Another noticeable fact in these birds which breed on islands, especially the Gulls, is that forms so nearly alike as to be distinguished with difficulty, appear to belong to each locality where they are raised, often many hundred miles apart, and under quite different conditions of climate and food, no suitable locations occurring between. These various broods all come to pass the winter on our coast, and are called *species* by modern naturalists, while the old authors would have called them *races* or *local varieties*. I have also found differences in size both of birds and their eggs to prevail in specimens of this and other orders from various localities, *without* any differences of plumage.

62 OCEANITES OCEANICA Kuhl, (Coues)—Wilson's Stormy Petrel—(*Thalassidroma Wilsoni*, Bonap. and of most authors.)—I saw a bird flying near San Nicolas Is., Cal., in July 1863, which had a white rump like this species, but no specimen has recently been obtained on our coast, though the Museum of the Phila. Acad. Nat. Sc. contains one presented by Dr. Gambel about 1849, as from "California." Dr. Townsend also gives it as an Oregon bird, and Kuhl described it as from near Australia. The species certainly inhabits both oceans.

63*† PUFFINUS CREATOPUS Cooper—Red-footed Puffin—*See* Coues, Review of Procellaridæ in Proc. Phila. Acad. 1864, 131. Discovered near San Nicolas Island, in July, 1863, and I have seen them since then near the Farallones in June.

64* PUFFINUS FULIGINOSUS Strickland—Sooty Puffin—Found by me with the preceding. Is probably the "*P. obscurus*" of Nuttall from the "northwest coast," but has not before been proved to inhabit the Pacific ocean.

65 DIOMEDEA BRACHYURA Temminck—Short-tailed Albatross—An adult specimen in white plumage found dead on the beach at San Diego agrees with the description, except that the tail is proportionately longer than usual either in this or *D. nigripes* Aud. The following table shows the comparative measurements of various specimens. The three young in black plumage were shot by me in San Diego Bay.

Specimen.	Length.	Extent.	Wing.	Tail.
Adult, white, fresh	35.50	98	21.50	8
Young, black "	35.75	94	23.50	
" " "	33	90	21.50	6.50
" " "	36	93.50	22	
Adult, dry, (Cassin)	28		20	6
D. nigripes " "	26		19	5
" dry (Lawrence)	33	84	20	5.50
" (Coues)			19 to 20	6.50
D. gibbosa (Gould)	30.		21.	7.

Dr. Coues, in his review of the family in the Proc. Phila. Acad., May, 1866, restores *D. nigripes* as distinct from *brachyura*, but possibly young of *D. gibbosa* of Australia, or of some form unknown in the adult plumage. As above shown, the dimensions when fresh do not differ much, and I am inclined to think that those he indicates in the bill are merely due to immaturity, as I have seen some caught near the Columbia river having the characters of the bill distinguishing *D. nigripes*, but evidently still growing, the bill soft and flexible, and the quills imperfect. I agree with Peale, (as quoted by Cassin,) that they require several years to become mature, and grow during nearly all that time, the plumage gradually changing, so that those of different ages might pass for distinct species of which the "*D. gibbosa*" may be merely a form. Coues himself is doubtful to which to refer Audubon's type specimen.

D. culminata? Gould—According to Coues, Audubon's specimen named by him "*D. chlororhyncha*," obtained in 1835 by Dr. Townsend "not far from the Columbia river," is really Gould's Australian species. I believe a skull of one of these has been found on the beach near this city but cannot now verify the fact.

Order Steganopodes

66 Tachypetes aquilus Linnæus, (Vieillot)—Frigate Pelican. A skull obtained by Mr. Gruber at the Farallones is the first evidence of the occurrence of this bird within our limits or so far north.

67 †Graculus Bairdii Cooper—Baird's Cormorant. See Proc. Phil. Acad. Nat. Sc. 1864. (=*G. violaceus var?*) Was obtained by Mr. Gruber at the Farallones and afterwards by myself. Differs from *G. violaceus* in having a large white patch on each side of the rump, but I am doubtful whether it is more than the adult of that species, though Prof. Baird is confident of their distinctness. At any rate, young birds of this species have only a few white feathers and are then undistinguishable from *violaceus* as described by Lawrence, in the P. R. R. Report. Both forms occur together on the Farallones and at Cape Disappointment, where I obtained one of the latter in 1854. The true *violaceus* of Gmelin may however be distinct and from a more northern region. In that case, Audubon's name *resplendens* still has priority over *Bairdii*, being applied to the form without the white patches. The *violaceus* is said to have a thicker bill, but this may be merely from immaturity, as in *Diomedea*, etc., in which the bill grows more slender and longer with age.

Order Brachypteri.

68 *Cerorhina Suckleyi Cassin—Suckley's Auk. From Cassin's description I formerly supposed this to be merely the young of *C. monocerata* Pall., but have found dead ones on the beach at Santa Cruz in winter which seem to indicate its distinctness. Others which I obtained at San Diego are also united to this by Coues, though there is still room for doubt as to their identity. The type was from Steilacoom, Washington Territory.

69 *Brachyramphus hypoleucus Xantus—White-bellied Auk—*See* Proc. Phil. Acad. Nat. Sc. Nov. 1859. I found this species breeding on Sta. Barbara I. but rare. The type was from Cape St. Lucas.

70 Brachyramphus marmoratus Gmelin, (Brandt)—Marbled Auk. In January, 1866, I found a dead one on the beach at Santa Cruz, which seems to be near the limit of their migration southward in winter.

Other additions previously made.

The following birds were also obtained in California before 1859, but are not mentioned in the "Birds of North America," etc., as inhabitants of this State.

Nyctale Acadica Gmelin, (Bonap.)—Saw-whet Owl. Monterey, *Gambel*, and found by me at Santa Cruz.

Chætura Vauxii Townsend, (Dekay)—Western Chimney Swallow. "California," *Delattre*, and I have shot it in Santa Clara County.

Tetrao obscurus Say—Dusky or Blue Grouse. "Bodega," *Delattre*. Common north of lat. 38° in the coast range, and south to 37° in the Sierra Nevada. (*Hepburn.*)

Centrocercus urophasianus Bonap. (Swains.)—Sage Fowl. Common on the eastern frontiers of California, and I have seen a fine specimen obtained as far south as the Mojave River.

Macroramphus scolopaceus Say, (Lawrence)—Long-billed Snipe—San Francisco, *Stimpson*. Fort Tejon, *Xantus*; Santa Barbara in May, a fine specimen in adult plumage, shot by myself. Abundant on the Los Angeles Plains in winter, (none of *M. griseus*).

Histrionicus torquatus Linn. (Bonap)—Harlequin Duck. "Bodega" *Delattre*, "San Francisco," *Stimpson*.

Hydrochelidon fissipes Linn. (Gray)—Blackbellied Tern. Given by Dr. Heerman as a Californian bird under the name of "*Sterna nigra*," though he apparently furnished no specimens for the authors of the "Birds of North America," etc. Is the "*H. plumbea*" of my former list, and I have ascertained that they migrate abundantly along the interior valleys in spring and fall.

Several are mentioned by Coues as merely "observed" in California along the Colorado River, but there is reason to doubt the identity of the species. They are:

Ceryle Americana Gmel. (sp.)—Green Kingfisher.
Phalaropus Wilsonii Bonap.—Wilson's Phalarope.
Chræcocephalus atricilla Linn. (sp.)—Hooded Tern.
C. Franklinii Rich.—Franklin's Tern.
Sterna Antillarum Lesson—Least Tern.
Podiceps cornutus Latham—Horned Grebe.

Mr. Theodore A. Blake read the following:

Notes On Alaska.

Like other continental coasts in high latitudes, north and south, this is bordered by high mountain ranges, and presents a most intricate and rugged shore, though grander than some others cited. This is mainly due to the mighty erosive action of glaciers, the formation of which is the natural result of atmospheric humidity and low mean annual temperature, due not only to geographical position, but to high elevation. The published, and glaringly inaccurate, charts of the northwest coast, north of Vancouver Island, fail to give an adequate idea of the vast archipelago of islands and network of channels with which the whole coast of British Columbia, and that of the lower and eastern part of Alaska, below 59°, are fringed. The Straits of Fuca are the southern point of this complex system of labyrinthine channels, which afford peculiar facilities for inland navigation. After describing graphically the bold and picturesque shore lines of this region, and of Washington Territory, with its snow peaks rising from 8,000 to 11,000 feet above the sea, Mt. Baker being the highest, and mentioning the mild climate of Victoria, which shows a mean annual temperature of 50° and about 200 fair days, Mr. Blake sketched the appearance of the coast further north. Reaching Sitka Island, he described it as a mass of unexplored rugged mountains, many of which are capped with eternal snow. The town (a good drawing of which he exhibited) is situated at the head of Sitka Bay, the entrance to which is marked by the symmetrical volcanic cone of Edgecomb, the second of a series of volcanic peaks bordering the coast and culminating in Mounts Fairweather and St. Elias, the heights of which are variously stated. The latter is visible in clear weather at a distance of 150 miles. The rock in the vicinity of Sitka is a hard grit, sometimes coarse, often passing into digillite. The trend of this formation seems to be parallel to that of the coast. It extends as far south as "the deep sea," a remarkable fresh water lake, twelve miles southwest of Sitka, on the opposite side of which syenetic granite occurs. Limestone, highly crystalline, is found north and within a few miles of the town. The vegetation and general appearance of the coast is very similar to that southward, though the beautiful Sitka spruce, which is remarkable for its grace, and the mathematical regularity with which its branches grow from the central stem, replaces the Douglas spruce of lower latitudes. Trees grow to large size, many being seen from six to ten feet in diameter. Little was known of the geology of the country. It is only along the shores that the rock can be investigated. The roughness of the country, and the thick growth of timber, and masses of fallen and decaying trees covered with thick moss, always saturated with water, almost preclude geological investigation. Mr. Blake said he had yet to learn of a man, white or Indian, who had crossed from one side of Sitka Island to the other, a distance of not over twenty miles in some places. Russian meteorological observations show, as a mean of twelve years, the mean temperature to be about 42°, the extremes being very small. The same observations show a mean annual rain fall of 83.3 inches, the maximum being 105 inches. Along Chatham Straits, east of Sitka, the rocks are metamorphic, stratified mica schist, standing almost vertically, and showing a parallelism in their trend to the line of the coast and of upheaval. Glaciers are common along the inland waters north and back of Sitka Island. Three of these sweep grandly from the mountain gorges and rush to the water's edge, generally terminating in a low crescent-shaped flat, formed by the wash from their terminal moraines. In Icy Straits, north of Sitka Island, the ice from them falls into the sea, and so great is the accumulation as to render navigation dangerous. In latitude 59°, along Chatham Straits, every marked depression has its glacier of greater or less extent. These glaciers are to be seen at points as far south as the mouth of the Stickeen river, and the lowest known limit on the coast is about latitude 54° in British Columbia, east of Port Simpson.

At the head of the Peninsula of Alaska is the commencement of another great line of volcanic action, which extends to the southwest, forming the peninsula, and then curving to the westerly the long chain of Aleutian Islands, stretching far towards the Kamschatka line, stepping stones, as they have been aptly called, between the two continents. The rocks on the Island of Kodiak, east of the peninsula, metamorphic slates and sandstones, also show a general parallelism in their trend to that of their line of upheaval, trending N. E. and S. W. instead of N. W. and S. E., as on the coast of the mainland.

During the time spent by the recent expedition at Captain's Bay, Island of Ounalaska, Mr. Blake, Dr. Kellogg, and two of the officers of the Lincoln, made the ascent of Makuskin, an active volcano on the northern end of the island. The height was determined approximately at 5,600 feet, that of the snow-line at 3,168 feet, that of no vegetation at 2,500 feet, except the "red snow," which occurred at from 4,000 to 4,500 feet. An incipient glacier curves gracefully around a gorge on the east flank of the mountain. This island is marked by the entire absence of trees, though the hills are covered with a thick growth of grass. It is apparently almost wholly made up of volcanic rocks. Perhaps the most remarkable view of volcanic cones and peaks, snow-covered and rising from the sea, to be found in the known world, is that of Unimak Island, with its volcanic peaks of Shihaldin and Pogroumaja, both conical peaks of unbroken symmetry, rising to heights of between 9,000 and 10,000 feet. Between them is Destruction Peak, comparatively low and irregular in its outline, showing it to be a volcano in its early stage of development. In 1863 its eruption caused the loss of many lives, and hence its name. The mountains are entirely snow-covered, and between them are vast fields of snow. Only in limited areas along the shore is snow absent. The angles of slope vary from 30° to 35°.

Mr. Blake confirmed the previous statements as to the meagre knowledge of Alaska mineralogy. Good coal and paying quantities of gold are yet to be discovered. Copper abounds on the dangerous Copper River, and magnetic iron ore and galena are reported. Fossils of the carboniferous age occur at Cape Beaufort on the Arctic coast; of the jurassic period on the east coast of the peninsula; tertiary fossils on Kodiak Island, and several other points.

Prof. Whitney read an interesting paper on the method pursued by the Geological Survey in the naming of mountain peaks in California.

Dr. Kellogg presented one hundred models of crystalline forms, a gift to the Academy from Mr. Moore, late of Virginia City. He also exhibited specimens of Siberian plants, interesting from their connection with the botany of our Northern Territory, with which they meet and mingle. Among the most marked species were forms of Rhododendron, from Ounalaska; of Campanula, and Linnea* borealis; besides a new species of the gooseberry family, combining in its fruit the qualities of the gooseberry and currant.

Regular Meeting, February 3d, 1868.

President in the Chair.

Thirty-five members present.

Mr. George Lette, P. Huerne, Ottakar Hoffman, Chas. Beseler and Dr. Justus Fuchs were elected resident members.

Donations to the Cabinet: A wild duck's gizzard containing food, gravel and grains of gold mixed, said to have been found so when opened. A specimen of the Pulu Fern, by Dr. Lansweert.

Prof. Whitney exhibited and described some maps now being constructed by the Geological Survey.

Dr. Kellogg exhibited the stem of the *Panax horridum* of Alaska, allied to the Ginseng.

Regular Meeting, February 17th, 1868.

President in the Chair.

Dr. Thos. M. Logan, Rev. A. Williams, R. B. Swain and Wm. Hayes were elected resident members.

Donations to the Library: "Index to Vols. 1 to 11 of Observations on the genus Unio, etc., by Isaac Lea, L.L.D.," from the author.

Dr. Parry of the Southern Pacific R. R. Expeditions gave by request an account of some of the natural features and productions of the route near Lat. 35°.

Mr. Clarence King, chief of the Survey along the Central Pacific R. R. route, gave some interesting information on that region.

Regular Meeting, March 2d, 1868.

Col. Ransom in the Chair.

Nathan Porter, Emile Sutter and H. D. A. Schieffler were elected resident members.

Prof. Bolander delivered an interesting address concerning the value of botanical gardens. He did not consider the youth of our State and city sufficient excuse for the failure hitherto to do something for experimental agriculture. He instanced what has been done in this direction at Melbourne, Australia, where a public botanical garden is in successful operation which embraces an area of three hundred and thirty-eight acres, and contains a great variety of forest trees, among which are no less than 10,000 conifers. The experimental ground contains various kinds of cotton, arrow-root, ginger, tobacco, coffee, tea, grass-cloth, and many other useful plants. Foreign and indigenous grasses, hedge plants, and such as are suitable for edgings, are subjected to experiment to test their value. The seeds of no less than one hundred and seventy grasses have been harvested in the garden and distributed. Of 40,000 stone pines raised at one time, and 7,000 Deodar cedars at another, all were distributed to the public except a few for the use of the Department. A great variety and number of seeds and plants are annually distributed. No less than two hundred and nine institutions have been supplied during the past planting season. All vegetable products, whether commercially, medicinally, or technologically important, are eagerly collected and experimented upon. Besides its work in introducing new plants, the Melbourne institution has published many valuable reports, four publications having issued in the past year. The herbarium comprises about 286 000 specimens of Australian and extra-Australian plants. More than three hundred genera, either not indicated before or specifically not elucidated, have been for the first time introduced into the systematic vegetation of that part of the globe. Ninety-five of these represent generic types new to science. The phytochemical department of the institution has experimented with a great variety of vegetable products to test their value as new sources for the employment of labor and capital, and the utilization of districts now barren. These experiments have shown that fibers for paper-making, volatile oils, tar, acids and potash, may be profitably produced from many native trees and plants. The report gives facts which show that some portions of the less secluded ranges of Australia, having singular facilities for irrigation, will yield olives, vines, oranges, and an almost endless variety of other fruits.

Considerable discussion followed concerning the utility of plants that have been or may be introduced in California.

Gregory Yale offered a resolution for the appointment of a commitee to prepare a succinct recommendation for the continuance by the Legislature of the Geological Survey. The resolution was adopted after a brief discussion by a unanimous vote. A very strong feeling was manifested in favor of the survey, and of the retention of Prof. Whitney at its head, as necessary for the material interests, the culture, and the good name of the State, no less than for the general interests of science. The following gentlemen were appointed a committee under the resolution: Gregory Yale, R. E. C. Stearns, Dr. A. B. Stout, Dr. H. Gibbons, and John A. Veatch.

Regular Meeting, March 16th, 1868.

President Whitney in the Chair.

The committee appointed at the last meeting presented the following resolutions, which were adopted:

Resolved, As the sense of the members of the Academy, that the State Geological Survey should be continued and completed, as an imperative necessity demanded by the material interests of the State, and by the cause of education and science, and as a just exposition of the sentiments of the people of the State.

Resolved, That a copy of the proceedings of the committee be signed by them, and by the presiding officer and secretary of the meeting of the second instant, and forwarded to the delegation of the City and County of San Francisco, to be presented to the Legislature for its action.

Gregory Yale, Robt. E. C. Stearns,
H. Gibbons, John A. Veatch,
Arthur B. Stout, Committee.

Leander Ransom, President *pro tem.*

Theodore Bradley, Rec. Secretary.

The President read a communication from J. W. Foster, of Chicago, giving an interesting account of a stone implement received there recently from California. The material is syenite, very much like the Quincy granite, symmetrical in shape, not quite circular on the cross section, ground and polished so as to exhibit in marked contrast the pure white of the feldspar and the deep green or black of the hornblende. The blunt end is pierced with a hole, whose outer edges are rimmed out, so that it looks very much like a plummet. It was found in digging a well, thirty feet below the surface, on or near the premises of Lafayette Nealy, in the town of Woodbridge, San Joaquin County, about eleven miles from Stockton.

After the reading of this communication, which was accompanied by a drawing of the object, considerable discussion ensued relative to similar objects known to have been found in this State, and to the habits of the Digger tribes, who seem to have advanced no farther than the stone age.

In connection with inquiries on the early records of the human race in this State, Professor Whitney stated that he was preparing a paper giving new light on the famous Calaveras skull. He also exhibited a fossil sent to the Geological Survey by Roger S. Day; a rare species of ammonite, apparently, found in a hill-top in the mines seven miles east of Folsom, and interesting for the additional evidence it presents of the secondary age of the California gold formation.

Acknowledgments of the receipt of the Academy's *Memoirs* were received from the Smithsonian Institution and other scientific sources, and the letters contained high praises of the matter and typographical execution of the *Memoirs*.

Donation to the Museum: Prof. Bolander presented to the Academy a large collection of ferns and grasses, in number about 1,500, of which one hundred and thirty-five are Californian: also, many from the East, Europe, Australia and Chili, fully identified. Dr. Kellogg stated this collection could not be gathered *de novo* for less than $2,000. The thanks of the Academy were voted to the donor, and a subscription of forty or fifty dollars taken up to procure a case for its proper care and disposal.

Regular Meeting, April 6th, 1868.

Dr. J. Blake, Vice President, in the Chair.

Messrs. H. S. Craven, A. J. Bowie, and H. Crittenden were elected resident members. Col. E. Jewett was elected a corresponding member.

Donations to the Museum: Mr. Clayton called attention to some specimens of a new genus of coral taken from the Silver Peak

Basin, in Nevada.* One of the rocks contained a new trilobite, or at least, one the description of which he could not find in the books. He proceeded to describe the formation of the country in which these fossils were found. He then presented a specimen of salt rock, taken from the same locality, and stated it as his opinion that the origin of the salt found in Nevada was not, as was commonly supposed, oceanic, but was to be found in saline rocks.

Dr. Ayres called attention to a very beautiful specimen of the sponge family, donated by Mr. W. G. Sherman, together with some Indian weapons, all being from the Phillippine Islands. Sponges were found in all seas, from the Arctic to the Tropical, and were in abundance on the coasts of New England and California. This one belonged to a genus first discovered on the coast of Great Britain. It was known as "Venus' Flower Basket," (*Euplectella speciosa*) and was a most beautiful specimen, consisting of a series of little straight rods, forming a tube. This tube was woven all over with fine threads, looking more like the work of man's hands than of nature. Each little thread resembled spun glass, but when placed under the microscope, every one was found to comprise a series of concentric layers. Outside of these were a number of little ridges, to give it strength. At the bottom was a mass of loose flocculent fibres, and it was probable that these were imbedded in the ooze or mud of the ocean where the animal dwelt.

A committee of five, consisting of Messrs. Stout, Logan, Yale, Ayres and Stearns, was appointed, on motion of Dr. Stout, to draw up a report on the subject of the abrupt discontinuance of the Geological Survey.

Regular Meeting, April 20th, 1868.

The President in the Chair.

The committee on the discontinuance of the Geological Survey made a report strongly condemning it, which was accepted by the Academy.

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* *Ethmophyllum gracile* and *E. Whitneyi*; Meek, in Amer. Jour. Science and Arts, Jan. 1868.

Donations to the Cabinet: Indian relics from graves near the Presidio at Mazatlan, Mexico, large barnacles from Callao, and crystals of salt from Carmen I.; presented by Dr. Geo. Woods, Asst. Surgeon, U. S. N., through Dr. H. Gibbons, Jr.

Prof. Whitney presented his resignation as President, on account of departure for the East.

Regular Meeting, May 4th, 1868.

Dr. Blake, Vice President, in the Chair.

About thirty members present.

The following gentlemen were elected resident members: Dr. C. T. Deane, Joseph Paxson, Gen. J. J. Miller, A. Roman, Theodore Mudge, John B. Felton, Dr. I. Bluxome, Thos. A. Barry, Dr. R. B. Cole, Calvin Brown, F. M. Pixley, H. L. Davis, Julius Bandmann, Thos. M. Cash, John Hucks, J. F. Lohse, J. W. Willard, Benj. A. Patten, Justin P. Moore, August Emory, A. Harpending.

Dr. James Blake was elected President in place of Prof. Whitney, resigned.

Mr. Stearns presented his resignation in consequence of his approaching departure for the East.

Donations to the Cabinet: A seahorse (*Hippocampus ingens*) and a centipede from Mexico, both presented by Mr. C. A. Eastman through Dr. H. Gibbons. A large piece of wax from the Clatsop beach near Columbia River, supposed to be from an ancient Japanese or Spanish wreck; presented by Capt. C. M. Scammon.

Donations to the Library: A Japanese work with illustrations of the native fishes; presented by Mr. Joseph Tilden through Dr. Gibbons.

Mr. R. D'Heureuse read a paper on the "proper use of air with reference to industry and medicine."

Regular Meeting, May 18th, 1868.

President, Dr. Blake, in the Chair.

Dr. J. G. Cooper was elected Vice President.

Donation to the Cabinet: Specimens of an insect found only on a species of pine at Monterey, by E. W. Burr. Referred to Dr. Behr for examination. A discussion ensued on parasitic insects.

Dr. Kellogg presented specimens of the Holly-leaved Cherry (*Cerasus ilicifolia*) and also of the Choke Cherry (*C. Virginiana*) both from near this city. He remarked that the Indian name of the former was *Islais*, and had given name to a creek near the city. It was stated that cattle eat the leaves when fresh, with impunity, but die if they eat them when wilted, from the production of hydrocyanic acid in the leaves after cutting off a branch.

Regular Meeting, June 1st, 1868.

President in the Chair.

The committee appointed to make arrangements for a course of lectures, reported the following: Lecture to be delivered by Dr. James Blake, on the third Monday in June; by Dr. Henry Gibbons, on the first Monday in July; by Dr. Cooper, on the third Monday in July; by Mr. L. Falkenau, on the first Monday in August; by Prof. Bolander, on the third Monday in August; by H. G. Bloomer, on the first Monday in September; by Theodore Bradley, on the third Monday in September.

Milton S. Latham, Frederick Townsend, Dr. B. D. Dean and Dr. W. A. Grover were elected members of the Academy.

A resolution formally reported from the Council, for reduction of Life Membership fee to one hundred dollars, was adopted as an amendment to the Constitution.

Mr. H. G. Bloomer was elected Director of the Museum.

Donations to the Cabinet: Sponge from the Caroline Islands, by H. C. Dunn. Specimens of *Astacus Trowbridgii* Stp., from the

Columbia River, by Capt. Scammon, through Dr. Cooper. Wood bored by the *Teredo*, from Panama and from San Francisco Bay, by Gregory Yale; also, ornamental shell work.

Further business was suspended in order to hear an address by Mr. R. W. Raymond, U. S. Commissioner of Mining Statistics, upon the relations of the Government to the mineral lands and mining interests of the country.

Regular Meeting, June 15th, 1868.

President in the Chair.

Donations to the Cabinet: A nest of a species of Oriole from Central America, by Captain Blethen, and a Japanese zoophyte, from Dr. I. Rowell, both through Dr. Stout.

Mr. L. Falkenau read a paper entitled "The Part we should take in furthering the Mining Interests of the Pacific Coast."

Adjourned Meeting, June 22nd, 1868.

President in the Chair.

Eighteen Members present.

Dr. Victor Fourgeaud was elected a resident member.

The fifth and last number of Vol. III of the Proceedings of the Academy was laid on the table for distribution.

Mr. Bradley presented his resignation as Recording Secretary, from want of time to attend to the duties of the office.

Donations to the Cabinet: A jar of Crustacea from Victoria, V. I., by Capt. Phœnix, through Dr. Blake. A specimen of Metamorphic Rock, by G. Yale.

Donations to the Library: "British Ferns, popularly described and illustrated, by G. W. Johnson," 1 vol., 12mo, London, 1857; "Conchological Manual, by G. B. Sowerby," 1 vol., 8vo., and "British Museum Catalogue of Ichneumonidæ," 1 vol., 8vo., presented by Mr. Stretch.

Adjourned Meeting, June 29th, 1868.

President in the Chair.

Twenty members present.

Messrs. H. T. Livermore, James Deering, J. S. Phillips, E. R. Howes, and Dr. R. H. Macdonald, were elected resident members.

Elisha Brooks was elected Recording Secretary.

Donations to the Cabinet: A Skull found in Arizona was presented by Dr. Gibbons on behalf of Dr. P. W. Randall. The skull was obtained from a grave near extensive ruins at the junction of the Salt and Gila Rivers. The ruins are quadrangular in form, and are estimated to cover an area of three hundred by two hundred and fifty feet. When the grave was opened, the lower section of an "ojo," or earthen water jug, was found inverted over the skull. It seems to have served the purpose of preserving it, for the rest of the skeleton was so decayed as to render it almost impossible to trace it. Dr. Randall states that the skull bears no resemblance to those of any of the Indian tribes in that region, and he is of the opinion that it is several centuries old. The Indians who examined it said that it was not of their tribes, but was a "Montezuma," though their opinion in the matter is of little value.

Dr. Kellogg presented a fine specimen of the long spike, or fruit stem of the celebrated grass tree, (*Xanthorrhea hastilis*) from Hon. George Hobler, of Alameda. The aborigines of Tasmania beat off the heads of these singular trees or plants, by striking them with a pole near the top of the trunks. They then strip off the outer leaves, etc., leaving about an inch and a half of white, tender, milky portion, next the trunk. This is eaten raw, or roasted, and has a nutty, balsamic flavor. The fibers of the leaves are exceedingly strong, but have failed in rope making, as they refuse to remain twisted like flax, etc.

The President then stated that this meeting was called for the special purpose of considering the advisability of accepting a block of land offered by the Paul Tract Homestead Association, on the condition that the Academy expend $15,000 in putting up a building or otherwise improving the same. After considerable discussion, it was voted inexpedient to accept the proposed donation. The land was considered to be too far out of the city to be of any value to the Academy for the purpose proposed. The Secretary was instructed to address a letter to the Association, thanking them for their liberal offer, but declining to accept it for the reasons stated.

Regular Meeting, July 6th, 1868.

President in the Chair.

Twenty-five members present.

G. A. Treadwell was elected a resident member.

Donations to the Cabinet: Rock perforated by boring shells, and fossils from Santa Cruz, by Mr. Yale; A Cabinet of Ores from the interior of Mexico, by Mr. Harpending; Crabs, found floating in great numbers forty or fifty miles from land, and supposed to be a new species, by Dr. Willard; A Scorpion from Santa Cruz County, by Mr. Bosqui.

Donations to the Library: "Patent Office Reports for 1866," 3 vols. 8vo., and "Congressional Globe," from Senator Conness, 1 vol. 4to.; "Bulletin de la Soc. Imp. des Nat. de Moscow, 1867," 2 vols. 8vo., from the Society.

Dr. Blake read an interesting paper on the "Chemistry of Digestion."

Dr. Ayres reported on the Sponge from Japan, presented June 15th, that it is a species of *Hyalonema*. Under the microscope it appears jointed, and is parasitic, growing on another species of sponge at the bottom of the sea. Both this and the *Euplectella*, presented April 6th, are very rare and valuable specimens.

Regular Meeting, July 20th, 1868.

President in the Chair.

Twenty-two members present.

Wm. J. Shaw and E. J. Schellhouse were elected resident members.

Donations to the Library: Proc. Essex Inst., Salem, Mass., Vol. 5, No. 7, July, 1868; Condition, etc., of Bost. Soc. N. H., 8vo. pamph., 1867; Ann des Sciences Nat., Vol. VIII, Nos. 5 and 6, 1867; Beitrag zu einer Moncg. der Sciarinen, von Joh. Winnertz, Wien, 1867, 8vo.; Verhandl. des naturhist. Vereins, etc., Bonn, 1867, 8vo.; Oversigt. Videnskab Selskabs, Kjobenhavn, Nos. 4 and 5, 1867, 2 parts, 8vo.; Verhandl. naturforsch, Vereins, V Band, Brunn, 1867, 8vo.; Proc. Bost. Soc. Nat. Hist., sheets 2, 3, 4 and 5, for May, 1868.

Donation to the Cabinet: A Metamorphic Rock, from Santa Cruz Mountains, by Mr. Yale.

Dr. Cooper gave a lecture on the Edible Mollusca of this State, illustrated by the specimens in the Academy's Cabinet.

Regular Meeting, August 3d, 1868.

President in the Chair.

Sixteen members present.

L. L. Treadwell was elected a life member. A. L. Wolf and A. Warren were elected resident members.

Donations to the Library: Verhandl. der k. k. Geolog. Reichs-Anstalt, Wien, 1867 and 8, 2 vols. 8vo.; der Physik-ökon. Gesell. Koningsburg, 1867; Osterreich Gesell. fur Meteorologie, Wien, 1867; Transactions of the Chicago Acad. Sc., Vol. I, part 1, 4to., 1867, through the Smithsonian Institution.

The President stated that the Council had thought it best to appoint Dr. Kellogg special assistant to the Secretaries and Treasurer, with a small salary, to be raised by subscription.

Donations to the Cabinet: An *Octopus*, found near Fort Point, by Mr. Lorquin. Fossil pine cones, from lignite beds near the Ocean House, by S. A. White.

Dr. Gibbons gave a lecture on Microscopic Parasites, illustrated by magnified drawings.

Regular Meeting, August 17th, 1868.

President in the Chair.

Fifteen members present.

Mr. J. Silver, C. L. Houghton, and H. S. Crane were elected resident members.

Donations to the Cabinet: Black Oxide of Manganese, from Calaveras County, by Dr. Gibbons; A Herbarium of eastern Medicinal Plants, by Dr. McCormick, U. S. A.

The thanks of the Society were voted to Dr. McCormick for his valuable donation.

Donations to the Library: The Northwest Boundary, a Geographical Memoir of the Islands in dispute, by Hon. Archibald Campbell, U. S. Commissioner, 8vo. Wash. 1868, from W. P. Blake. Physical Geography of the Kansas Pacific Railway. Annuaire de la Societé des Sc. Nat. de Neuchatel. Notes on parts of South Devon and Cornwall. Amer. Jour. of Sc. and Arts for July, 1868. Journal Roy. Horticul. Soc. of Lond., II, 5, 1868, 8vo. Annual of Bost. Soc. N. H. for 1868–9, 8vo.

Mr. Bolander then delivered a lecture on the Flora and Agricultural resources of the country around Eureka, Humboldt Bay.

Regular Meeting, September 7th, 1868.

Col. Ransom in the Chair.

Seventeen members present.

Dr. Lorenzo Hubbard was elected resident member.

Donations to the Cabinet: Seed of the "Guinea Palm," from New Mexico, by Dr. H. Gibbons. He stated that the Teredo never attacks the logs of this tree, and it might therefore be used for piles in this city. A Collection of Plants, from New Caledonia, by Prof. Meissner, of Basle, through Dr. Kellogg. A Collection of Plants, by René Le Normand, of Viré, France.

The thanks of the Academy were voted for these valuable collections.

Donations to the Library: Sitz. Bericht. der Naturwiss Gesell. Isis, Dresden, 1865–66. Kon. Norske Universit., Christiana; Zoöl. Garten, Frankfort a M., from the various societies through the Smithsonian Institution.

Mr. Bradley exhibited a stone image of an eagle nearly two feet high, found by Mr. Victor, on the shore of the Willamette River, two miles above St. Helen's, Oregon, where it was imbedded in clay, covered by eight feet of alluvium. There were also faint traces of ancient ruins near by, with parts of pavement and bones. The image resembles the work of the Aztecs more than of any present race of Indians.

Mr. Yale introduced Capt. E. G. Fast, who has been for nine months making collections in Alaska of Indian antiquities, implements of war, hunting, fishing, etc., illustrating the territory and present condition of the country. He is now about to take them to Washington, D. C.

Mr. Bloomer then delivered a lecture on Classification.

Regular Meeting, September 21st, 1868.

President in the Chair.

Twelve members present.

Mr. E. N. Baynton, J. M. Buffington and M. Andrews were elected resident members.

Donations to the Cabinet: A Crab, from Alaska, by Capt. E. Moody. "Pele's Hair" a variety of obsidian from Mauna Loa, S. I., by Dr. Logan.

Donations to the Library: Meteorology and Hypsometry, by Col. R. M. Williamson, U. S. Eng. Corps, from the author. A manuscript catalogue of the library prepared by the Recording Secretary, Mr. E. Brooks.

The thanks of the Society were voted for these valuable works.

The President, Dr. Blake, made some remarks on the peculiar state of the atmosphere which has prevailed for several days.

Viewed from Martinez, the sun presented a pale pink color, spotted with puce-colored patches, and varying to violet as the density of the mist varied. A discussion ensued as to the cause of the haziness. It was generally conceded that the obscuration could not have proceeded from the burning of forests in Oregon or in Marin County, although several interesting facts were cited tending to establish that origin, as the sun, viewed through smoke alone, assumes a red color. The more favorite opinion seemed to attribute the phenomena to the existence of saline or silicious matter floating in the atmosphere. The dryness of the air had probably absorbed the moisture from the fog, leaving the saline particles suspended, as particles of ice frequently are, by which the sun's rays were acted upon. This condition of "dry fog" is common in northern Europe, where similar appearances are observed.

The following was also quoted in explanation:

A correspondent of the Sacramento *Union*, writing from Owens Lake, gives an interesting account of a succession of earthquakes that took place in that region, among the mountains, on the 13th, 14th and 15th of September. The shocks were severe enough to rattle down rocks from the mountains into the valleys, and to excite great alarm among the few inhabitants. They were counted, too, by the score. About the same time there was an earthquake in Alpine county which was quite severe, showing that the commotion must have extended over hundreds of miles. The air soon after became darkened by the unnatural haze or smoke, which a day or two later made its appearance all over the State, from San Francisco to Nevada, and even as far east as the Humboldt desert. The past year has been the most remarkable for earthquake and volcanic phenomena ever experienced by man.

Dr. Stout offered to the inspection of the Society the dissected parts of a specimen of octopus, or cuttle-fish, for which he was indebted to Mr. Aztredo, of this city. He alluded to the terrific but exaggerated description of this animal in the "Toilers of the Sea," by Victor Hugo, who, although considered to be a naturalist, had evidently never viewed the animal he described, and never properly understood the beauty of its physical construction. The Doctor exhibited a number of large and beautiful illustrations of the animal, and proceeded to explain its position in the family of the octopidæ. While treating of the inaccuracies and misconceptions of the nature of the animal by Victor Hugo, he fully confirmed that author's estimate of the deadly power of the devil-fish, and remarked that the specimen which he was now exhibiting could easily seize upon and destroy a swimming man with whom he might come in contact. The Doctor gave a long and interesting description of the animal, which measured eleven feet between the tips of the arms.

Mr. White described a similar specimen, caught some years since at Victoria, Vancouver's Island, the arms of which were as thick as a man's leg, and fourteen feet in length, which would make it about thirty feet between the tips of the arms.

Regular Meeting, October 5th, 1868.

President in the Chair.

Fourteen members present.

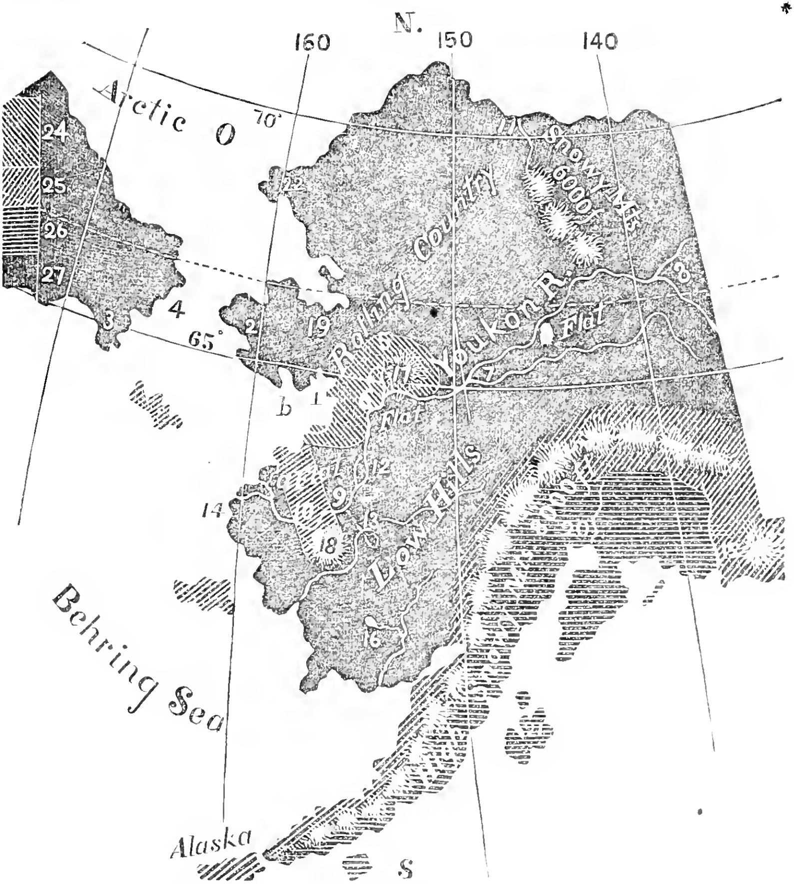
Mr. W. H. Dall, who had just arrived from Alaska, being present, the regular proceedings of the Academy were postponed in order to listen to an account of his explorations in that country. Mr. Dall has resided there during the last two years, and has been engaged in studying the geography, geology, climatology, natural history and ethnology of the country; he and his companion were the first white men that ever penetrated some of the interior regions. The Academy is indebted to the *Mining and Scientific Press* for the following report of Mr. Dall's remarks, and also for the wood-cut illustrating them:

To distinguish this far northwestern country from Sitka—a thousand miles nearer to us and on the southern side of the mountains forming the back bone of Alaska—it is named, after the great river which flows through it, the Youkon Territory.

The line of explorations carried on was, especially from the mouth of the Youkon to the junction of that river with the Porcupine; the coast from its mouth to seventy-five miles north of St. Michael's and thence to the Youkon, across a portage of perhaps seventy-five miles, more or less, in length. Also, as careful an examination as possible was made of the various sloughs or divisions of the river itself; particularly one, a slough of fifty miles in length, called the Shàgeluk Slough.

GEOGRAPHICAL ERRORS.

In an article on the geography of Youkon Territory it is first necessary to correct a few very old and flagrant errors. 1st. In most atlases we find a large river, named the Colville, emptying into the Arctic Ocean. This is an error.



It is an insignificant stream of no length worth mentioning. 2d. The coast between Cape Romanzoff and the head of Norton Sound is laid down with gross errors, and is utterly unreliable even in the best charts. 3d. The Esquimaux name of one small mouth of the Youkon Delta is Kwichpak. This name is erroneously applied to the whole river, on which for a thousand miles the Indians call themselves the Youkonikatána, or "Men of the Youkon." 4th. The general course of the river, when laid down at all, is much too far to the south and west, except near the mouth. The junction of the Porcupine and Youkon is near the boundary line, a little north of the Arctic Circle. There is one large river which has been confounded with the Youkon, emptying into the Youkon half way between the English Fort and the Russian Fort, called by the natives the Tanana, or River of Mountains. It is usually supposed, and so represented on maps, that the Rocky Mountains extend to the Arctic Sea; but this is erroneous, for the mountains end at about the headwaters of Porcupine River, and a level plain or disconnected hills make up the remainder of the landscape northward.

FORTS.

The Russians have posts at the head of Bristol Bay; at Nulato, St. Michael's, Andreaffsky, and the Mission; also one at Unalakleet, and a solitary house at the mouth of the river. There are no more in the Youkon Territory. The Hudson Bay Company has one post at the mouth of the Porcupine River, some fifty miles west of the boundary, which is called Fort Youkon.

MOUNTAINS AND TOPOGRAPHY.

There are no high mountains north of the backbone of the Peninsula—the range which almost skirts the southern coast—except a short, isolated chain, containing some seven peaks, which is visible in a northwesterly direction from Fort Youkon, trending in the same general direction. These are the only mountains in Youkon Territory that have snow upon them throughout the summer.

There are two isolated mountains noted as landmarks on the Youkon River; one of them is just above Nulato, and is called by the Russians Koyoukuk Sopka, or "Volcano-like Mountains;" it is not very high—about 5,000 feet—but a marked feature nevertheless in going up the river; and the other is as great a landmark for the Lower Youkon as that just named is for the Upper, being situated at the lower bend and called the Kusillvak "Gora," or Mountain; it is about 6,500 feet in height. The rest of the mountains are mere hills that cannot be distinguished from one another.

The country in general cannot be called either marshy or mountainous; it is a mixture of marsh and low, rolling, rocky hills, covered with moss and with very little earth, except in the valleys, which are always very wet in summer; and it is wet then even on the tops of the mountains. Leading characteristics of the country are, that it is wet and foggy.

VEGETATION.

On the coasts there is scarcely any trace of vegetation whatever. As the traveler advances inland, particularly along the small rivers and up the valley of the Youkon, he soon comes to a very densely wooded country. The trees are of medium size, and are white spruce, willow, poplar, and birch, preponderating in the order named; the diameter ranging from eight inches to two and a half feet, a very common average being one and a half feet. A strip of about one hundred miles only, along the coast is bare. Grasses grow in the interior in great profusion and to a luxuriant height. Vegetables cannot be raised, except turnips, radishes and lettuce. Potatoes grow to about the size of a pea. At Fort Youkon they live on moose meat, chiefly. Flowers are not abundant, and are quite scentless. This is the land of berries, for here in profusion grow the cranberry, raspberry, heathberry, salmonberry, currant, etc., and a species of wild cherry is found, but it is simply a seed without a pulp.

ANIMALS.

Along the coast the principal animal is the reindeer, which frequents the hilly country, but at certain seasons descends into the plains. The moose frequent the low country in the interior, and are never found in the mountains.

On going up the Youkon they are not found until after passing the great bend at Nulato. Towards the mountains eastward from Fort Youkon, the mountain goat is found; besides which there are found throughout the Territory the black, red and brown bear; the black, red, gray, blue and white fox; the mink, otter, martin, muskrat, Arctic hare and Arctic rabbit. Ermine are scarce. Esquimaux dogs, are used to draw sleds.

BIRDS.

Aquatic fowl are common on the coast, and some of them go up the rivers, marking different zones. In spring there is always a great accession of water fowl. The land birds are chiefly summer birds, but there are some species that remain during the winter, as the pine grosbeak, the red-poll, woodpeckers and crows. There are three kinds of grouse, the black, white and gray, and various hawks, which remain in the winter. Ducks and geese are innumerable along the Alaskan Coast, but they are never seen flying northward of the main land. Butterflies are very plentiful, and many of the species found in the Atlantic States are common.

A VAST AREA OF AZOIC ROCKS.

With the exception of the coast south of the great snowy range, and a basin of which the Koyoukuk Mountain may be called the center, the entire Territory of Alaska is azoic; the rocks exhibiting no fossils,—being chiefly crystalline schists containing a great deal of quartz. Granite is a very rare rock. It was observed only in one place, at the mouth of the Tanana, and there it contained mica, which was the only mica found in the country.

The snowy mountains near the Arctic Ocean are probably azoic, as the streams coming down from that direction into the Youkon were well searched for pebbles, and nothing but the crystalline azoic rocks could be discovered.

Volcanic rocks take a pretty important position in the geology of Alaska, the great snowy ridge being itself a volcanic outburst, and having numerous craters and volcanoes that are active and constantly smoking. The line of volcanic action extends out into the Pacific, forming the middle or backbone of the peninsula of Alaska, and the Aleutian chain of islands; being a link in the great circle of volcanic activity which Humboldt traced around the entire confines of the Pacific Ocean. Most of the northerly islands, or at least their foundations, are composed of true volcanic lava, as is also the coast between the Youkon and along Norton Sound. In many places it assumes a rude columnar form, resembling the rocks of the Giant's Causeway in Ireland, as at the beach near Fort St. Michael. The islands of St. Paul's and St. George's in Behring's Sea are composed of amygdaloid lava which separates into six-sided columns of a basaltic character, but having the appearance of being very much crooked. They have frequent earthquakes in that country. Though nothing has been reported quite so terrible as the memorable convulsions of St. Thomas, the waters in the southern harbor of Ounga Island became excited in the midst of an earthquake on the fifteenth of May last, and suddenly diminished from a depth of twenty-four feet to four feet, in part of the harbor; the bottom remaining at the latter position permanently. Perhaps owing to similar causes, the Isanotsky Pass in the Aleutian Islands, which was heretofore marked in the charts as navigable, is now impassable, the schooner Francis L. Steel having been nearly wrecked on the sand-bars in attempting the passage on her voyage up to Behring's Straits.

CARBONIFEROUS FORMATION.

After leaving the lava country near the mouth of the Youkon, the traveler, on going to the northward, soon enters a large basin, showing blue sandstone strata, probably belonging to the lower carboniferous era. The rocks contain fine vegetable fossils apparently related most nearly to that era. Above the carboniferous sandstone, and overlying it, there is a formation, the original strata of which have been denuded and replaced by some tertiary strata containing lignite or fossilized wood, but not in quantities to be of any economical value. The rocks that were denuded belonged probably to the upper carboniferous series, as in going up the Youkon there is a point found just below the Koyoukuk Mountain where they are observed in position, and where they contain true bituminous coal. A small vein of it crops out near Nulato, the greater part of which, however, has likewise been denuded. At Clantilinten, one hundred and fifty miles below Nulato, on the Youkon, there is another small seam of coal, discernible in the blue sandstone.

TERTIARY FORMATION.

South of the Alaska volcanic ridge of mountains, extending eastward so far as known from observations, to Cook's Inlet, and westward so far as to include part of the coast and Kodiak, Ounga, Ounalaska, and possibly other islands of the Aleutian group, there are fossiliferous strata containing lignite, the geological age of which is not yet determined with certainty—but it is probably Eocene Tertiary. At all of the places named, coal has been reported. There has been some "blowing" about valuable deposits, which is scarcely warranted by the true facts. At Coal Harbor, Ounga Island, which was surveyed by Mr. Dall, the coal was carefully examined, and additional information was acquired from the Russians, all of which tended to prove the known deposits as but poor in quality, and deficient in quantity.

THE POST PLIOCENE AGE.

All over the Azoic country to the north of the peninsula of Alaska, and the principal ridge of mountains, there are scattered post Pliocene fossils. In swamps and bogs, and alluvial deposits, there are frequent relics of the mastodon, the extinct hairy elephant, the musk ox, etc.; and in some places there are strata of post Pliocene marl containing fossil fresh-water shells, as at Fort Youkon particularly. These animals continued to exist down to the end of post Pliocene times, since which the contour and level of the country have not materially changed.

The waters of the Tanana, or River of Mountains, had never before been disturbed by the paddles of a white man, and away in the interior was a small stream which the Indians would never approach on account of a superstition concerning it. If they should shoot arrows at a certain hill there, the arrows would disappear in the air, and great evils would come upon them. Into this country Mr. Dall ventured, not having the fear of the Indian gods before his eyes, and found great numbers of fossils. So abundant were they that it seemed as if some commotion or convulsion had driven the animals there—the mastodon, elephant, deer, musk ox—and suddenly destroyed them. So many huge bones may have frightened the Indians and given rise to their superstitions.

GOLD AND OTHER MINERALS.

Gold has been found at the mouth of the Porcupine or Rat River, the branch which comes in from the north at Fort Youkon. It is fine scaly gold, like iron filings, but there is scarcely a color to the pan. The country is accessible only for three months in the year, during which time, however, the mosquitoes will extend a demonstrative welcome to sweet-blooded adventurers. Stains of copper were observed in the rocks near Cape Prince of Wales, on Behring's Straits. Micaceous iron ore, magnetic oxide of iron, and hematite, are found all over the country, and are made use of by the Indians for paints. Obsidian, pumice-stone, and a mineral which might be lazulite, are also found. On St. George's Sound, Behring's Sea, the ruby, or light-red spinel, has been found nicely crystallized in a form similar to the diamond, which it approaches in hardness.

ETHNOLOGY.

The coast tribes of Indians on all of the coasts from Sitka to Mackenzie River, come under the general name of Esquimaux, though they are not by any means like the Esquimaux Indians of the eastern side of the continent and the shores of the Hudson Bay. They are tall, fine, athletic people, very intelligent, and superior to the genuine American Indians of the interior. They are ingenious in the use of the knife, and in making things. Any northwestern Esquimaux will draw from recollection a good map of the country that he may have traveled over. Though they belong to the same general race as the little eastern Esquimaux, having words that are the same, they are evidently later comers. The language and appearance of the Esquimaux Indians are almost exactly the same on the American side of Behring's Straits as they are on the Asiatic side. When they meet they can converse and understand each other perfectly. In Asia they go under the name of Tchuktchis. On the American side they are known under different names; at Grantley Harbor as Kaviaks; towards the interior as Mahlemuts; around the mouth of the Youkon and Norton Sound as Unalcets; further to the south as Aleuts.

The Kaviaks and Mahlemuts go up annually to the north coast as far as Point Hope, and Point Barrow, and beyond, fishing, etc. They are fond of traveling, and seem to go with the intention of having a fine time, just as the New Yorkers go to Saratoga or the White Mountains. They cannot go through the country, on account of the interior Indians, and therefore go around.

The Indians of the interior of Alaska are the true race of native American Indians. They call themselves the Youkonikatana or "men of the Youkon," and have the same general appearance and characteristics as other American Indians. They are fine looking, and many of them tall; have aquiline noses, whereas the coast Indians have flat noses. They are wilder and more warlike than the coast Indians; they wear great bushy heads of hair (inhabited and unattractive), while the coast Indians have a fashion of cutting off a portion of the top hair, so as to resemble the monastic tonsure. They cannot understand each other; and as the interior Indians seem to own the most difficult language, the result is that they frequently acquire the coast dialect to some extent, or a kind of trading jargon which serves for international communications. They are not friendly to each other, but do not fight much. They are all dying out of asthma and lung complaints, caused by tobacco, which they get from the Russians, and the fumes of which are drawn incessantly into the lungs. It does not appear that the interior, or true American Indians, have any relationship whatever to tribes in Asia.

The coast and interior Indians build houses alike, the latter having borrowed their ideas from the coast, if they have any houses at all. Winter houses are half underground, and covered with earth, having a hole in the roof. Fire is made about twice a day. They get into their houses by an underground passage ten or fifteen feet long, on their hands and knees, the exit being vertical like a ground-hog's hole, and framed over to keep out the snow. Communistic principles are in vogue as to dwellings, and general property. Both the coast and interior Indians are honest, and do not steal nor murder except where they have been supplied with whiskey by the traders.

He has compiled a vocabulary of the language of the various tribes, by which he is enabled to deduce some interesting facts regarding their history. He has also visited Kamtschatka and the islands of the vicinity, and from the similarity in language and customs of the coast tribes of Alaska to those of Kamtschatka, he concludes that they are recent immigrants from Asia, and indeed, that they are still coming over. They carry on quite an extensive commerce across Behring's Straits in skins, frames for boats, hunting and fishing equipments, etc. The Asiatic immigrants, however, are confined to a few leagues of country along the coast and large rivers, while a totally different people inhabit the interior. The boundary line between these two races is very marked, and encroachments on each other's territory are never tolerated. If a hunter passes the line in the chase and kills any game, he can take the carcase away, but must leave the skin at the nearest village. They are as strict as the Jews in preserving purity of blood, for they never intermarry.

CLIMATE.

In summer the thermometer rises to eighty degrees, and in winter ranges from thirty-five to forty-five degrees below zero. The last season was the coldest known for eighteen years.

The Aurora Borealis was often seen, and Mr. Dall says it appears as if caused by some substance borne along in the air which reflects the light. The Esquimaux will never look at it, for they believe it is supernatural, and fear it. They say also that it affects the eyes. After a careful study of the question of an open Polar Sea, Mr. Dall is firmly convinced that it does not exist. He believes that an unbroken sea of ice stretches over from America, past the North Pole, to Asia. Evidences in support of the open sea theory failed to present themselves to his observation. In the Youkon region, no traces of glaciers were discovered, and it is believed none ever existed north of the Alaska backbone.

South of that, along the entire coast, the deep inlets and fiords, resembling the Norwegian fiords, are supposed to have been caused by glacial action, as there is always a glacier at the upper end of them. Two feet beneath the surface there is eternal ice.

EXPLANATION OF MAP.—*a*, Kwichpak River; *b*, Norton Sound; 1, St. Michael's Island; 2, Grantley Harbor; 3, Plover Bay; 4, Behring's Strait; 5, Kotelkargut River; 6, Nulato; 7, Nuklukahye and junction of Tanana River; 8, Ft. Youkon; 9, Russian Mission; 10, Andreoffsky; 11, Colville River; 12, Shageluk Slough; 13, Kollmakoffsky Redoubt on the Kuskoquin River and portage to the Mission; 14, Cape Romanzoff; 15, Mt. St. Elias; 16, Nushergak Lake and Chulitma River; 17, Koyoukuk Mountain; 18, Kusillvak Mountain; 19, Country of the Mahlemuts; 20, Cook's Inlet; 21, Kodiak Island; 22, Ft. Hope; 24. Carboniferous formation; 25, Volcanic; 26, Tertiary; 27, Azoic.

The thanks of the Academy were voted to Mr. Dall for his very interesting address.

REGULAR MEETING, OCTOBER 19th, 1868.

President in the Chair.

Nine members present.

Mr. Bradley delivered a lecture on the "Value of the Study of Science in its Historical Relations," and illustrated some scientific principles by experiments with hydrostatic apparatus.

REGULAR MEETING, NOVEMBER 2d, 1868.

President in the Chair.

Twelve members present.

Mr. Amos Bowman was elected a resident member.

The President stated that Mr. Falkenau was unable to deliver the lecture appointed for this evening.

He then gave some account of his observations on the effects of the earthquake of October 21st, at various places around the bay, and promised a fuller description at some future meeting. A general discussion ensued on the subject of earthquakes, which occupied the rest of the evening.

REGULAR MEETING, NOVEMBER 16th, 1868.

President in the Chair.

Nineteen members present.

Donations to the Cabinet: A fossil bone taken from a well at a depth of twenty-six feet, also teeth resembling those of the elk from a depth of twenty feet, five miles south of Antioch and two miles from the coal mines near Mount Diablo, presented by W. C. S. Smith, of Napa, through Dr. H. Gibbons. A fine cast of a large shell in asphaltum, found in a lump brought from Santa Barbara, and resembling *Priene Oregonensis*, by Mr. S. D. Symonds. Quicksand thrown out of a fissure made by the recent earthquake at Hayward, Alameda County, by G. Yale.

Mr. Louis Falkenau gave a lecture on Analytical Chemistry, illustrated by experiments.

A discussion on the recent earthquake followed preliminary to some future and full reports on the subject.

REGULAR MEETING, DECEMBER 7th, 1868.

Vice-President in the Chair.

Eighteen members present.

Emile Grisar and J. J. Owens were elected resident members.

Donations to the Cabinet: Two species of *Trilobites* of silurian age, one from Silver Peak, the other from near "White Pine," fifty miles southeast of Egan Cañon, Nevada, by J. E. Clayton. Two specimens of insects, resembling the genus *Mantis*, from La Paz, by Oscar White. Some luminous larvæ, resembling that of an *Elater*, found in gardens in this city, by Mr. Lorquin. Specimens of the fibrous stems of *Malva rotundifolia*, showing their great strength; also of cord made from it, by W. Frank Stewart, of San José, through Mr. Bowman.

Donations to the Library: Flore et Pomone de Java, par Madame Bertha Hoola Van Hooten, deux. ed. folio, finely illustrated with colored plates, Bruxelles, 1865, by J. B. Caldbeck.

Mr. Clayton read the following paper:

Earthquakes on Kern River, in the Central Portion of the Sierra Nevada.

BY J. E. CLAYTON, M. E.

In October last I was at Independence, in Owens Valley, and had a conversation with Dr. A. Farnsworth, in relation to the earthquakes that occurred on the head-waters of Kern River, in the early part of September last. The doctor is a man of intelligence and fully competent to give the facts in a reliable manner. The following are the main facts taken from his notes, made at the time the phenomenon was observed.

On Monday, August 31st, Dr. A. Farnsworth, David Webb and Mr. Alexander left Independence for Kern River, on a fishing excursion. Taking the Hacket trail, some six miles southwest of Lone Pine, they ascended the Sierra at a point opposite, and west of Owens Lake (the trail leading westward to Visalia). After crossing the summit they struck the northern branches of Kern River, and followed them down the western slope to where they formed a strong, rapid stream, at which point they crossed on a natural bridge, made by a stream of lava that appears to have issued from near the summit and run down a distance of several miles. The waters subsequently cut a channel underneath the lava, and left it arching above as a natural bridge. (The doctor does not state how high the bridge is above the water, its width, or the length of span; but as the stream is small, the bridge is probably not very remarkable in height or extent.)

The party reached the ford of the main branch of Kern River on the evening of September 2d, and camped in the narrow valley by the river bank. Dr. Farnsworth describes the gorge of the main river as being grand and imposing in the extreme; the mountains on either side rising in bold cliffs and steep slopes several thousand feet above the river-bed.

On the third of September another party of seven persons, from Lone Pine, joined them, and they all moved up the river about one mile above the crossing and camped. During the night the party were frequently awakened by a "rumbling noise" and a tremulous motion of the earth. Next day (September 4th), the morning meal had just been completed, when at eight o'clock, precisely, the earth was shaken terribly. The tall trees swayed, and even the grass was observed to wave back and forth. Immense masses of boulders and earth were detached from the surrounding cliffs, and came thundering down to the narrow flat along the river.

Consternation filled the minds of the whole party, principally from fear of the boulders and loose earth that came down the steep sides of the mountain, for being completely hemmed in on each side, they had no place of safety to flee to. Fortunately the principal land slide came down on the side of the river opposite to the camp, so that by close watching and active dodging, the whole party escaped unhurt.

From eight to nine o'clock, forty-one distinct shocks were felt, some of which were quite severe, but nothing like the first one. The party gathered up their camp equipage as soon as possible and moved down the river a short distance, where a wide flat would give them more protection from the loose stones of the mountain sides.

During the remainder of the day the shocks continued, at intervals of five to ten minutes, and during the night the party were kept awake by the frequent shocks and rumbling noise. Light shocks continued until the morning of the sixth of September, when the party concluded to move to a less disturbed locality. As before stated, the first shocks felt on Thursday evening, the third of September, were light but distinct. The heavy crash was at eight o'clock on the morning of the fourth, and up to Sunday morning, the sixth, at nine o'clock, there had been in all about five hundred shocks felt.

The party divided on Sunday (September 6th), and a portion moved a few miles to the north branch of the river, where they remained six days. They state that the shocks continued to be felt one or two every hour up to the time they left the neighborhood, on the eleventh of September.

Another party, composed of citizens of Owens Valley, went to the same locality, arriving there on the seventeenth of September, and remained in the neighborhood, hunting and fishing, until the twenty-eighth of the same month. The first three days after their arrival, which were the seventeenth, eighteenth, and nineteenth, the shocks occurred about one every hour. The next three days the shocks were much more frequent and severe; then their frequency and violence abated again, but continued at intervals of an hour or so up to the time they left on the twenty-eighth of September.

The vibrations all appeared to be in southeast and northwest directions, and the tremblings were almost invariably preceded by a rumbling noise.

The country rock, where the earthquakes occurred on Kern River is granite, with occasional dikes of trap and volcanic fissures from which a dark-brown and black lava has been ejected. Having never been at the locality myself, I cannot give any facts from my own observation, but from my knowledge of the gentleman who gave me the foregoing facts, I have no doubt of their general correctness. [See note on earthquakes, p. 29.]

A discussion ensued on the various theoretical opinions as to the igneous, chemical, and magnetic causes of earthquakes.

Regular Meeting, December 21st, 1868.

President in the Chair.

Eleven members present.

Donations to the Library: Smithsonian Contributions to Knowledge, Vol. XIV., 4to. American Naturalist for October; Amer. Jour. Science and Arts, November.

Mr. Lorquin stated that a male and female of the Chinese Mandarin Duck (*Aix galericulata*), recently shot in the bay, had been brought to him to be stuffed. Dr. Cooper remarked, that as this bird is often imported in cages, they had probably escaped from confinement.

Dr. Blake exhibited a map, showing the direction of the shocks of the earthquake of October 21st, as determined east of the bay, and remarked that they all tended towards a center near Hayward. Investigations on the subject are still in progress.

Annual Meeting, January 4th, 1869.

President in the Chair.

Twenty members present.

The President read his annual report, giving the progress of the Academy during the past year.

The Treasurer reported that the receipts for the past year had been $1,760, the expenditures $1,636, leaving a balance of $124. The present indebtedness is $440.

The Librarian reported that the Library had been increased during the year by the donation of thirty volumes, of which the titles and contributors are published in the records of each meeting. Also the following periodicals had been regularly received for the last three years, and were still continued, having been subscribed for at first by a club of the members and since 1867 by the Academy:

Magazines.—*English*—Quar. Jour. of Science; Ann. and Mag. of Nat. Hist.; The Student; Athenæum; Popular Science Rev.; Quar. Jour. of Geolog. Soc. Newspapers—Civ. Eng. and Architect; Scientific American; Amer. Jour. of Mining; The (English) Mining Jour.; Chemical News. *French*—Ann. des Sciences Nat.; Ann. du Genie Civil; Ann. des Mines; Revue Univers. des Mines; Journ. de Conchyl. *German*—Jahrbuch der Mineralogie; Petermann's Geog. Mittheil; Berg-und-Hütten. Zeitung.

The following are received regularly by exchange, besides the proceedings of thirty foreign societies, etc., coming chiefly through the Smithsonian Inst., and recorded by name in previous years:

Amer. Jour. Science and Arts; Amer. Naturalist; Mining and Scientific Press; Proceedings of Acad. Nat. Sci. of Philad.; of Boston Soc. Nat. Hist.; of N. Y. Lyc. Nat. Hist.; Chicago Acad. Sciences; St. Louis Acad. Sciences; Essex Inst., Salem, Mass.; Amer. Acad. Arts and Sciences.

The Director of the Museum reported that the great deficiency of room for the rapidly increasing collections was the chief obstacle to making a better display.

The annual election of officers was then held, with the following result:

PRESIDENT.

DR. JAMES BLAKE.

VICE PRESIDENT.

DR. J. G. COOPER.

CORRESPONDING SECRETARY.

LEO ELOESSER.

RECORDING SECRETARY.

THEO. A. MUDGE.

TREASURER.

ELISHA BROOKS.

LIBRARIAN.

DR. A. KELLOGG.

DIRECTOR OF MUSEUM.

H. G. BLOOMER.

Prof. J. D. Whitney was unanimously elected an honorary member.

G. W. Dunn, elected a corresponding member, was, at his own request, placed on the list of resident members.

Donations to the Cabinet: An Ammonite from Shasta County, found by the donor, Capt. Feshet, in the bed of a creek. Rattles of a snake eight feet long, and containing thirty rings, from Arizona, presented by Dr. P. W. Randle through Dr. Gibbons.

Donations to the Library: Expose des Formations Quaternaries de la Suede, par A. Erdmann, Stockholm, 1868, text 8vo. and Atlas 4to. Proces-verbal van de Gemoner vergad., 1866–7, Jaarboek, 1866–7, Verslag. en Mededeel., 1866, der Koningk. Akad. von Wetenschap. Amsterdam. Archives du Musée Teyler, vol. 1, 1866–8, large 8vo. Path of the total Phase of the Solar Eclipse of August 17th–18th, 1868, from Aden to Torres' Straits. Report of the State Historical Society of Wisconsin, vol. 5, parts 1–3, 8vo. Four Geological Maps and descriptive pamphlets relating to Sweden. Proceedings of the Royal Geographical Society of London, with anniversary address. Catalogue of Birds of Costa Rica, by G. N. Lawrence, 8vo. pamph., N. Y., 1868. The West India Cyclone, of October, 1867, by Prof. J. R. Eastman, U. S. N., 8vo. pamph., Wash., 1868, from the various societies and authors. London Quarterly Review, July, 1868, from G. Yale.

Col. Williamson, U. S. Eng. Corps, exhibited a stone, apparently agate, containing a large drop of water. It was found at the bottom of the Willamette River, Oregon, by dredging.

Regular Meeting, January 18th, 869.

President in the Chair.

Fourteen members present.

W. Frank Stewart, of San José, and Prof. George Davidson, Chief of the U. S. Coast Survey for the Pacific Coast, were elected members.

Donations to the Cabinet: Fossils from the carboniferous formation of Treasure Hill, White Pine District, found in strata dipping 20 degrees toward the west, presented by Dr. Blake.

Specimens of a fungus incorporating acorns in its growth, found near Martinez, by Mr. Mathewson.

Donations to the Library: Catalogue of Terrestrial Shells in the collection of Wm. A. Haines, pam. 8vo., N. Y., 1868. Observations on Genus Unio, etc., Vol. XI, by Isaac Lea, L.L.D., Philad., 1868, 1 vol. 4to., from the authors. Smithsonian Annual Report for 1867; Annual of National Academy of Sciences, Wash., pam. 8vo., 1868; from the societies or publishers.

Regular Meeting, February 1st, 1869.

Col. Ransom in the Chair.

Twenty members present.

Max Waizman was elected a resident member.

Donations to the Cabinet: Petrified wood from the "Kansas Gravel" mine near Grass Valley, by T. A. Mudge. Armor made of wood by the natives of Alaska before its occupation by the Russians, by G. Yale.

Donations to the Library: Manufacturer and Builder for January, 1869, pam. 4to., from publishers. Contributions to the Fauna of the Gulf Stream, by Count L. F. de Pourtales, Assistant U. S. Coast Survey, Cambridge, Mass., 1867, pam. 8vo., from the author.

Mr. H. G. Hanks read an interesting paper on the mineral resources of Owens River and adjacent districts, exhibiting some rich specimens, forming a collection of two or three hundred. Mr. Hanks had explored the Montgomery, Blind Springs, Keyes, Inyo, Russ, Kearsarge, Coso, Alabama, Telescope, Slate Range, Argus, Salt Spring, Washington, and other districts, whence many valuable specimens were obtained. Some of these were labeled as assaying equal to the White Pine ores.

The article referred more especially to the Inyo District, Death Valley, and particularly to the "Gun Sight" lead, the first silver found in California of which any record exists. He stated that an immigrant party in 1849 came in and reported having seen fabulously rich silver mines on their way, and brought in specimens of pure silver. In 1850, Dr. French, at the head of a party went out to search for it, but unsuccessfully, and it has existed in story ever since. The finest specimens exhibited by Mr. Hanks were of argentiferous galena, tetrahedrite, kerargyrite, stromeyerite, and molybdate of lead. There was also a large and rich specimen of partzite, from the "Blind Springs" District. Some of the ores from the Montgomery District, at the northern end of Owens Valley show an abundance of free silver.

Dr. Gibbons made an interesting statement in relation to the swelling and shrinking of adobe land under the influence of rain and drouth, its effect upon buildings, and observed that cracks in walls thus caused were often erroneously attributed to earthquakes.

Regular Meeting, February 15th, 1869.

Vice-President in the Chair.

Twenty members present.

J. W. Hobson, J. J. Stevenson, M.D., and Smythe Clark were elected resident members.

Donations to the Library: Transactions of Albany Inst., Vol. 5, 1868, 8vo.; Smithsonian Miscell. Coll., vols. 6 and 7, Wash., 1868, 8vo.; Jour. fur. Meteorologie, Nos. 13 to 17, 8vo.; Zoolog. Miscellen., No. 9, pam. 8vo.; Abhandl. der Zoolog. Mineralog. Vereins, Regensburg, 1860 and 1864, 2 vols., 8vo.;

Nachricht. von der Kon. Gesell. der Wissenschaft. und der Georg. Augusts. Univers. Gottingen, 1866, 1 v. 8vo., from the societies, etc.; Contribuzione della Fauna dei Mollusche Dalmatie, per Spiridione Brusina, Vienna, 1866, pam. 8vo.; Nachtrage zur Flora von Nieder Oesterreich, von Dr. A. Neilrich, Wien, 1867: from the authors, mostly through the Smithsonian Institution.

Donations to the Cabinet: Specimens of fossils contained in calcareous sandstone from the sea beach, by Mr. Yale; fossils from a coal mine in Mount Diablo, by Capt. John Eckley; and a quantity of alcohol for preserving specimens, by James Dows & Co.

Dr. A. Kellogg presented specimens of the fruit, foliage, and timber of the Cañon Live Oak (*Quercus chrysolepis*) of the coast of California, procured by George W. Dunn, a member of the Academy. This oak, he said, was by some confounded with *Q. Wislizeni*, specimens of which were presented for comparison. The timber is remarkable for its solidity, strength, toughness, and durability, only equaled by our southeastern live oak (*Quercus virens*). He remarked that his attention was many years ago directed to its use in ship frames, knees, etc., by Captain Morgan, of Baulines Bay. It was a "burning shame," in his view of it, to have such valuable timber shipped to San Francisco for firewood, out of sheer ignorance of its value. This species must not be confounded with the ordinary live oak, *Quercus agrifolia*, of Oakland, Alameda, and the suburbs of San Francisco. Dr. Kellogg also read descriptions of a *Turritis*, and of a species of *Aster*, supposed to be new.

Regular Meeting, March 1st, 1869.

President in the Chair.

Fifteen members present.

Dr. George Hewston, Dr. A. Aaronstein, J. F. Breed, and O. W. Easton were elected resident members.

Donations to the Library: White's Nat. Hist. of Selborne, 1 vol., 8vo.; Half Hours with the Microscope, 1 vol., 8vo., by J. Hoogs; Elements of Entomology, by G. W. Dallas, 1 vol. 8vo.;

Catalogue of British Hymenoptera, by F. Smith, M.E.S., 1 vol., 8vo., from R. H. Stretch. Catalogues of the School of Mines of Columbia College, N. Y., for 1868–9, 2 pams., 8vo.; Queries on the Red Sandstone of Vermont, etc., by Rev. J. B. Perry; Ann. Rep. of Trustees of Mus. Comp. Zool. of Cambridge, Mass., 1867 and 1868, from the authors, etc.

The subject of a committee on Meteorology was introduced by the President, having been proposed at the last meeting. Dr. Henry Gibbons stated that no part of the world occupied a position analogous to California, as we had three climates—one in Southern California, near Mexico, one in the Northern portion of the State adjacent to Oregon, and one in San Francisco. It was seldom that so long a mountain range was found parallel to the meridian line. The telegraph, he thought, could be made useful in San Francisco as an indicator of storms. He spoke of an occasion when he was at the Smithsonian Institution at Washington, where daily or hourly reports of the weather are received from all parts of the Atlantic States. On that occasion he sat down with Prof. Henry before a large relief globe and located the storms as they were reported. In this way they traced a storm as it was approaching, hundreds of miles away, until it finally burst upon the city. He said that had he been placed five hundred miles above the earth, looking down upon the atmosphere, he could not have obtained a better view of it than he did on that occasion. The phenomenon of storms was a most interesting one, particularly here, where the prosperity of the whole State depended on rains. An almost certain prognostic of rain was the occurrence of three hot days in succession. We had just experienced three hot days, and the rain he expected would soon be here. Three hot days always followed a Norther, and rain followed the three hot days.

At his request the appointment of a committee was postponed.

Donations to the Cabinet: Specimens of meat that fell "from the sky" at San José recently were presented by Dr. Kellogg. He gave an account of the fall of meat over twenty acres of ground, as learned from an observer, Mr. Houck, and said he was informed that nerves, muscle, and bone were found, some imbedded in the soil, belonging to either small animals or fish. This meat was alleged to have fallen about 3 o'clock P.M., when the sky was clear, and to have struck persons upon the shoulder. Reports were read from persons at San José, in which it was stated that flesh, brains, blood, and bones were scattered over an area of twenty acres. The samples of the flesh introduced had a fishy smell.

Much discussion ensued, the general opinion being that the fragments found had been disgorged by flocks of vultures flying so high in the air as to be almost invisible. The bones found were in too large pieces to have been carried up by whirlwinds, which it was suggested might transport small animals. Mr. Beardsley said that a case occurred at Gold Hill, Nev., in 1862, when a whirlwind took up 4,000 feet of lumber and tore it to shreds.

A specimen resembling coke, strikingly like anthracite, being a residuum of petroleum from Downersville Foundry, at Corey, Pennsylvania, was presented by A. F. Beardsley. A specimen of the *Dendrocygna fulva*, or long-legged duck, recently arrived from Mexico, and found in our market, was exhibited by Mr. Carlton: and another, obtained in December, by Mr. Lorquin.

A letter was read from W. F. Stewart describing a remarkable magnetic storm observed near San José, on February 23d, as follows:

> "A very remarkable disturbance occurred as Mr. A. S. Hermann was surveying, the weather being dry and the sky cloudless, with a light breeze from the north. The needle suddenly began to revolve from west to east alternately, and continued to do so until the thumb check was applied, after which the perturbation ceased."

Dr. Blake stated that when making observations on the recent earthquake, he had seen the needle dip far more in San Ramon Valley, near Mt. Diablo, than near this bay.

Regular Meeting, March 15th, 1869.

President in the Chair.

Donation to the Cabinet: Copper pyrites from an artesian well now being bored on Commercial Street, found at a depth of two hundred and eight feet; by G. Yale.

Donations to the Library: Synopsis of the birds of Vancouver's

Island, by R. Browne, pamphlet, Lond., 1868. Observations on the Miocene beds of Greenland, by same, pamphlet, 8vo. Remarks on two flints from Jubbulpore, India, by G. Haswell. "Newly discovered Universal Science;" pamphlet, 4to.: and, The Sanctity of Marriage, with other poems, by W. E. F. Kranse, from the authors.

Dr. Kellogg read a letter from W. Frank Stewart of San José, on the recent shower of meat at that place, confirming the theory that it was disgorged by vultures, as he had frequently known them to drop it upon himself and horse when riding below, and had seen flocks disgorge it when rising, after stuffing themselves on dead cattle. In this climate the fresh appearance of the muscles is retained long after death.

Mr. Yale announced the discovery of a nearly entire skeleton of a mastodon, near Petaluma.

The President mentioned that a slight shock of earthquake occurred on the 11th instant, at 10 P. M., preceded for some minutes by a rumbling sound; and also observed at San José.

Regular Meeting, April 5th, 1869.

President in the Chair.

Dr. W. F. McNutt was elected a resident member.

Donation to the Cabinet: A stalagmite, from a cañon in Mt. Diablo range near San José, by W. F. Stewart, through Dr. Kellogg. A letter accompanied it stating that some years since a tunnel was run into the hill in search of coal without success, and recently this stalagmite was found in the tunnel, which was near a remarkable soda spring.

Donations to the Library: A package of stereoscopic views of Indian inscriptions on the rocks near Cisco, on the Central Pacific Railroad line, six thousand feet above the sea, from Charles Crocker, Superintendent. The thanks of the Academy were voted for this valuable donation. Also, the Canadian Naturalist and Geologist, Vol. 3, Nos. 1 to 4, 8vo., Montreal, 1866; Proc. Portland Acad. Nat. Hist., Vol. I, part 2, 1869; Memoirs of Peabody Acad. Science, Vol. I, No. 1, Salem, Mass., March, 1869, 1 vol. 4to;

Address of L. P. Smith before Alumni of Haverford Coll., Philad., pam. 8vo, 1869, from the societies and publishers. Catalogue of Reptiles and Batrachians found near Springfield, Mass., by J. A. Allen, from the author; 1 vol. 8vo.

Professor George Davidson described his operations for the determination of longitude by telegraph. The former mode was by chronometers carried to different points; also by eclipses or the moon's declinations. After repeated experiments, Mr. Davidson made the circuit between San Francisco and Cambridge, Massachusetts, and back, in eighty-two hundreths of a second, the distance being seven thousand two hundred miles. The calculations of former moon determinations were found to have been nearly correct by the electric observations, the difference being only one second —equal to a quarter of a mile of longitude. The exact difference in time was found to be three hours and twenty-five minutes.

Regular Meeting, April 19th, 1869.

President in the Chair.

L. A. Gould of Santa Clara, and Capt. Edward Pinnor, were elected resident members.

Donation to the Cabinet: Saline incrustations from Mono Lake, by T. A. Mudge.

Donations to the Library: Bulletin of Essex Institute for 1869, 1 vol. 8vo.; Trans. of Edinburg Geol. Society, 2 vols., 8vo., 1868: from the publishers. Catalogue of the Meteorites of Yale College Museum, pam., 8vo., 1868; Address of the President of Peabody Institute, Baltimore, Feb., 1869, pam., 8vo.

Dr. A. Kellogg exhibited and remarked upon several new and beautiful plants discovered by him near the mouth of the San Joaquin River.

A letter from W. F. Stewart on "sun dogs" as seen in San José caused a discussion on this phenomenon, as to whether it is from refraction as usually believed, or magnetic influence as Mr. Stewart suggested.

On the subject of the photographs of Indian inscriptions lately presented, Mr. Hanks stated that he had seen similar ones along Kern River painted in two colors. Dr. Blake had seen such near Salt Lake, which he thought had been cut in the rocks, presenting the forms of circles, stars, etc.; also broken pottery, of which the present race of Indians there know nothing.

Regular Meeting, May 3rd, 1869.

President in the Chair.

Rev. Siegfried Simon, Hermann Simon, and Eugene Arnstein, were elected resident members.

Donations to the Library: Catalogue of California Minerals, Sacto., 1868, 8vo.; Gen'l Notes on Stickeen River Country, pam., 8vo.: Reports on the Precious Metals, etc., in the Paris Exposition: by W. P. Blake, Commissioner from State of California; Bulletin of U. S. Sanitary Comm., 1860 to '65, Washington, 3 vols. large 8vo.: from the authors.

Mr. H. P. Carlton read the following paper:

Shells of Antioch, Cal., and Vicinity.

BY H. P. CARLTON.

The following list of land and fresh-water mollusca is interesting, as coming from a locality which has furnished the largest number, so far as known, from any one place in the State. Part of them were collected by myself; but many were sent to me by Miss Ward, a teacher at the locality, and formerly a pupil of mine. These were collected by her scholars.

Antioch is situated at the junction of the San Joaquin and Sacramento rivers, on the south bank; and Miss Ward's school is eight miles east of the town, in Iron District, on the bank of a slough connected with the San Joaquin. Her collection was the first received, and contained the largest number of species. The Rev. J. Rowell next obtained three of the same species, and five more at Eden District, on Marsh's ranch, in a creek of the same name, four miles southeast of Iron District. Mr. G. W. Dunn found one at Antioch not in former lists.

Numbers 5, 6, 13, 22, 25, and 26, are new additions to the shell-fauna of California.

The whole country near the streams is "tule" land, inundated in winter. It is easy to see that the living shells, or their eggs, brought down by the great rivers converging here, are likely to be caught by the rank growth of these gigantic rushes, especially as the water must be much checked in rapidity of flow by the meeting rivers, and by the sudden bend, at a right angle, toward the west. Thus, they are compelled to remain, but probably many of them do not increase in this region, as it is hundreds of miles distant from the points where most of them were discovered, or have been before found.

West of Antioch the marshes seem to become rapidly too brackish for their existence; and none live in those around Benicia—while Walnut Creek, emptying nearly opposite there, is known to produce but ten species, of which three are distinct from those of this list.

It is possible that some of those obtained from a duck's stomach do not live in the immediate neighborhood of Antioch.

1. Succinea Oregonensis *Lea*, rare.

2. S. Sillimani *Bland*. More common, (Rwl.)

3. Arianta ramentosa *Gld*. Eight living on edge of marsh, large but thin, approaching var. *reticulata* Pf. in form, (Rwl.)

4. Aplodon Columbianus *Lea*, common, a thin, smooth variety.

5. Limnea stagnalis *Linn*. Rare, but large and strong, living.

6. L. lepida *Gld*. Rare, but exactly agrees, except rather darker in color than types. A miniature of *stagnalis*, and may, perhaps, be only a dwarfed race.

7. L. humilis *Say*. Common, and nearly imperforate, probably the var. called *ferruginea* by Haldemann, (Rwl.)

8. L. Nuttaliana *Lea*. Common, very large and fine, apparently quite different from *élodes* Say (*palustris Mull.?*).

9. L. Tryoniana *Lea*. Rare and perhaps only a var. of *Traskii* Tryon, (Rwl.)

10. L. desidiosa *Say*. Common, and seem identical with Eastern types, but usually more sculptured with revolving grooves, (Rwl.)

11. Physa diaphana *Tryon*. Common, living in all the creeks running from near Mt. Diablo.

12. P. distinguenda *Tryon*. Rare, but large and perfect.

13. P. Carltonii *Lea*, (Proc. Phil. Acad. Sc., 1869). Described as new from these specimens, and not found elsewhere. Approaches nearest to *osculans* Hald., of Mexico, *plicata* Dekay, of New York, and *nitens* Phil. of Mexico, (*Bulinus nitens* W. G. Binney). Though very lustrous, the animal proves it to be a *Physa*.

14. Planorbis subcrenatus *Cpr*. Common and of good size.

15. P. tumens *Cpr*. Rare, but easily recognized.

16. Helisoma ammon *Gld*. A few young specimens, not easily distinguishable from the last.

17. H. tenuis? *Phil*. (*H. trivolvis* from west coast, of authors.) Referred to *tenuis* by Tryon with doubt, and seems different.

18. Gyraulus vermicularis *Gld*. Common.

19. Carinifex Newberryi *Lea*. A few very young ones, perhaps a dwarfed southern var., like those from Clear Lake.

20. Goniobasis occata, *Hds.* Six young ones—none over half an inch long—are beautifully and strongly sculptured, with the apices perfect, (Ward). Others an inch or more long, and often perfect at tip, show that it is common living, on Marsh's ranch; but these were collected in the preceding dry season, (Rwl.)

21. Valvata virens *Tryon.* A few good-sized specimens.

22. Bythinella? intermedia *Tryon.* Two specimens, differing only in paler green color. The types from Southern Oregon were described as "Pomatiopsis;" but the animal is yet unknown.

23. Fluminicola Nuttalliana *Lea.* Two small ones only, though it is the commonest species northward.

24. F. virens *Lea.* A few specimens agree with description except in smaller size.

25. F. nuclea *Lea.* Many small brownish specimens, chiefly from a duck's stomach, are more elongated than *virens*, with one more whorl when perfect, and differ in color.

26. Sphærium patella *Gld.* Rare, only three having been sent, one of which is stated by Prime to be intermediate, between *S. patella*, and *nobile* Gld. The former name has priority if they prove to be one.

27. Pisidium occidentale *Newc.* Rare, and of normal form.

28. Anodonta angulata *Lea.* Rare, or not easily obtained.

29. A. Nuttalliana *Lea.* Not rare, and large at Antioch, (Dunn).

30. A Wahlamatensis *Lea.* Not rare, and everywhere the most numerous species in California.

A discussion followed on the subject of acclimatization of foreign animals and plants in California.

Dr. Gibbons made some suggestions with regard to the possibility of acclimatizing on our coast some of the best Eastern market fish; shad, for example, and other species not now existing here. Collecting eggs of fishes, and their distribution without cost, he said, had been inaugurated in the Atlantic States, and supplies could be obtained by railroad.

Dr. Blake said there was no country in the world where an acclimatization society would be so useful as in California.

Mr. Bolander stated (in reply to Mr. Carlton) that a company had been formed in San Francisco to introduce the shad in California. Among agricultural products worthy of naturalization the Ramie of China, (*Bœhmeria nivea*) and New Zealand flax, (*Phormium tenax*) for paper making, were considered by him well adapted for the extensive "tule" lands of the interior. He spoke of the large size attained by seeds of most cultivated plants in this State, indicating uncommonly favorable conditions for growth.

He also recommended the extensive cultivation of the basket-willow, (*Salix viminalis*) and of the gum trees of Australia, (*Eucalyptus*) several species of which are valuable, either for rapid growth as fuel, or for lumber, and especially piles, being uninjured by the teredo.

Opium and teazle were also mentioned as likely to reward the farmer better than most of the ordinary crops.

Dr. Blake said farmers were raising wheat when they might as well do other things that were more profitable. They would find it out in time.

Professor Bolander said that this State was best adapted to ten-acre pieces of land devoted to these special products. He mentioned a native celery plant which was very good—growing on our hillsides on dry rocks. (Pimpinella apiodora Gray, 1867.)

Regular Meeting, May 17th, 1869.

President in the Chair.

R. Heynemann was elected a resident member.

Donation to the Cabinet: Carboniferous limestone containing Encrinites, from White Pine District, Nev., by G. Yale.

Donation to the Library: Report on the Mines of the West for 1869, by R. W. Raymond, U. S. Commissioner, Wash., 1 vol. 8vo., and Nouveau Plan de la Ville et des Faubourgs de Paris in 1778, 1 vol. folio, from G. Yale.

A discussion was held on the subject of raising a subscription for the purpose of erecting a new building, but most members considered it was not advisable to attempt this at present.

On motion of Mr. Yale, a committee consisting of himself and Col. Ransom were appointed to examine, survey, and report on the lot recently set apart near Lone Mountain by the city authorities, for the purposes of an "Academy of Sciences."

Regular Meeting, June 7th, 1869.

President in the Chair.

Donations to the Library: Observations on the Genus Unio, Vol. XII, by I. Lea, LL.D., Philad., 1868, 1 vol. 4to.; Descriptions of New Cypreas, by S. R. Roberts, Philad., 1869, pam., 8vo.; Report of the 6th Industrial Exhib. of the Mechanics' Inst. of San Francisco, held 1868, pam., 8vo.; Astron. and Meteor. Observ. of U. S. Naval Observatory, Wash., 1866, 1 vol., 4to.; from the authors and publishers. Tillaeg til Aarbogen for Nordisk oldkrydighed og Historie, Kjob., 1867, 1 vol., 8vo.; Antiq. Tijdskrift udgivet af det Kongel. Nordiske Odskrift selskab, Kjob., 1861–3, 1 vol., 8vo.; Om Bygningsmaden af Oldtidens Jaetlestner, af King Fred. VII, til Danemark, Kjob., 1862, 1 vol., 8vo.; another copy in German; Memoirs de la Soc. Roy. des Antiquaires du Nord, 1850–'60, Copenhagen, 1861, 1 vol., 8vo., (part English); Reise der Fregatte Novara, Anthroprologischer Theil, 1 vol., 4to., D. A. Weisbach; Commerciele Theil, 2 vol., 4to., Linguistische, Theil, 1 vol., 4to., Wien, 1864–5, through F. Mueller of Victoria, Australia.

Donations to the Cabinet: Fossil corals, etc., from Treasure City, Nev., by W. H. Sears; crystalized gold quartz from Amador Co., by Mr. Warren, through G. Yale.

Mr. T. A. Mudge resigned the office of Recording Secretary on account of other engagements.

The President stated that he had visited the locality of the mastodon remains near Petaluma, but found that they had been scattered so that none of value could be obtained. He found that the earthquake of last October produced far more effect on those parts of that town built on rock, than on those built on alluvial soil, and described the appearances he observed.

Regular Meeting, June 21st, 1869.

President in the Chair.

Edward Cohn, Hugo Eloesser, Arthur Eloesser, Fred. Reichling, Geo. A. Elliott, and Dr. John Vansant, were elected resident members.

Henry P. Carlton was elected Recording Secretary.

Donations to the Cabinet: A specimen of the large lizard, *Heloderma horridum*, said to be venomous, from Guaymas; presented by Dr. Hubbard through Dr. Ayres. A sandstone concretion found in Pescadero Creek, Santa Cruz County, split open and containing fragments of shells that looked like the skeleton of a lizard: an ancient Indian stone mortar, weighing 35 lbs., from a mound at Raccoon Straits. A specimen of *Ostrea Titan*, said to be from Telegraph Hill, 50 feet below the surface. Imperfect peat from a salt marsh near S. F. Bay. A fossil from White Pine, said to be devonian, and from 9,000 feet elevation; all presented by Mr. Yale. A collection of fossil corals and encrinites from Treasure Hill, Nev., by Guy F. Seeley through Dr. Blake. A fossil impression of a leaf in sandstone, by Gen. J. F. Miller.

Dr. Gibbons presented a bottle of little black crustacean insects looking like fine black sand, which were found crawling out in immense numbers from under a plank sidewalk. A cubic inch would contain a million of them.

Dr. Gibbons read a letter from Dr. E. P. Taylor of Sacramento concerning an appearance resembling a cross lately observed on the face of the moon; or, as he expressed it, the moon "looked as if crucified."

The Asiatic traveler, Robert Schlagintweit, being present, was invited to address the Society, and described many interesting incidents of his journeys in the Himalaya, where sheep are raised at an elevation of 16,000 feet. He also spoke of his discovery of nephrite in Turkistan, where it is quarried in a soft state and cut into pipe-bowls, idols, handles of swords, etc., but afterwards becomes so hard that it will cut glass.

ADJOURNED MEETING, JULY 12TH, 1869.

Vice President in the Chair.

Twelve members present.

A. T. Winn and Isaac Wormser were elected resident members.

Donations to the Library: U. S. Sanitary Commission Memoirs, Statistical, Wash., 1869, pam., 8vo.; History and Development of Races, by H. S. Orton, Madison, Wisc., 1869, pam., 8vo.; Inaugural Report of the Directors of Cincinnati Observatory, May, 1869, pam., 8vo.; Catalogue des Livres, Cartes, et Vues de Venice, etc., pam., 8vo.; Programme de la Soc. Hollandaise des Sciences de Haarlem, 1869, pam., 8vo.; Walker Prizes offered for 1869 by the Bos. Soc. N. H., pam., 8vo.; Catal. of Santa Clara College, 1869, pam., 8vo.

Dr. Behr stated that in a recent invoice of prepared insects which he had received from Acapulco, was a species of Northern butterfly (*Vanessa antiopa*). The specimen was caught at a mine back of Acapulco, at an elevation of 2,000 feet above the sea; and he thought it would be a matter of interest to know how far this Northern species of butterfly went into the tropics.

Professor Bolander gave an interesting account of a trip which he had taken among the Sierras, and a description of Emigrant Gap and Bear Valley, in Nevada County, and the country surrounding. His theory is that this beautiful valley was once a lake; large worn boulders and pebbles gave ample evidence of this. The appearance of the mountains showed the effect of glaciers, and he had no doubt that the cañon was produced by one of these immense fields of ice.

A large collection of plants made by him were then exhibited. They had been prepared with great care, and were exceedingly beautiful.

Mr. H. P. Carlton, who accompanied Professor Bolander, stated that he had made a collection of shells in the mountains, as follows:

Shells of Truckee River and Vicinity.

BY H. P. CARLTON.

1. Pisidium occidentale *Newc.* Truckee River. (Is also "*P. abditum*" from Stanislaus County of Prime.)

2. Pisidium ——? Larger, but young, "like *P. virginicum*" *teste* Prime, from same place.

3. Margaritana falcata *Gld.* Same place, common.

4. Anodonta Wahlamatensis *Lea.* Donner Lake: also a variety approaching *A. Oregonensis* Lea.

5. Succinea Stretchiana *Bld.* Common, near water.

6. Hyalina Breweri *Newc.* In grass and moss, common.

7. Conulus chersinus *Say*, with the last, rare.

8. Patula Whitneyi *Newc* Rather rare.

9. Arianta tudiculata *Binn.* One thin specimen, of middle size, from Bear Valley, 4,800 feet above the sea, the highest locality known near Lat. 39°.

10. Limnophysa Bulimoides *Lea.* Truckee River, common.

11. Limnea stagnalis *Linn.* Same place, common.

12. Physa occidentalis *Tryon*, with last, common.

13. Physa Blandii *Lea*, with last, common, and larger than elsewhere, approaching *distinguenda* Tryon.

14. Planorbis Hornii *Tryon?* A few young ones from Truckee River seem to be this species, which was found large by Mr. S. A. L. Brannan, at about 3,600 feet on the west slope.

15. Amnicola turbiniformis *Tryon.* Same place, common, but smaller than types described.

Dr. Henry Gibbons then presented a communication from J. M. Upham, of Rio Vista, which was read. Mr. Upham stated that the remains of several Indians had been exhumed near that place. One, the body of a woman, was found buried in a sitting posture, while the men were lying on their sides, in a cramped-up position. The skull of the woman had been secured by a gentleman and brought to this city. All of the bones were gathered up by the Chinamen working at the place where they were found, and burned. Mr. Upham mentioned the reclamation of Sherman Island, where forty-seven miles of levee, five feet in height, had been built, at a cost of $80,000. He invited a committee from the Academy to visit that locality, and thought they would be able to collect much valuable information.

The Secretary was directed to acknowledge the invitation with the thanks of the Academy.

The members then entered into a very interesting discussion in regard to the tule lands of California, and the reclamation of them for agricultural purposes.

Regular Meeting, July 19th, 1869.

Vice President in the Chair.

Fifteen members present.

David Hughes, Samuel A. L. Brannan, W. W. Dodge, and Dr. W. H. Titcomb were elected resident members.

Mr. P. T. Van Orden, of Treasure City, White Pine, sent to the Society a singular specimen of carboniferous limestone, which abounds in that locality. The specimen consists of two layers of rock, one having depressions of the size of a buckshot at regular intervals over the entire surface, and the other having corresponding protuberances. Considerable discussion was excited as to the peculiar formation of the rock. Dr. Cooper thought it was fossilized hailstones, or in other words that hailstones had fallen on a body of sand, making deep impressions; that sand had blown into these after melting, and in that condition the mass had become solidified. Others thought that the strange character of the stone was owing to a bunch of berries, or a quantity of seed, having been petrified.

Mr. Plummer of San Antonio, sent to the Society a section of a Puget Sound pine log, in the center of which was found a leaden ounce ball. The log was first used as a pile in one of the wharves in this city. It was removed to make room for the city wall, and taken to San Antonio, where it was again driven as a pile. In sawing off the top of the log the ball was sawed in two. The rings in the body of the log showed that it was 110 years old. All traces of the course taken by the bullet were obliterated. The log was about two feet in diameter at the point where the ball was found. It must have been shot into the tree when it was very young, and as that country was first explored only 65 years since, the ball must have been fired by a hunter long before the time of Lewis & Clark's journey, or even Vancouver's voyage, unless the annual rings were deceptive.

Mr. R. W. Raymond, United States Mining Commissioner, was called upon for an address. He stated that he had been traveling and exploring pretty extensively through mining districts and countries since he last spoke before the Academy, a year ago. He then delivered an able and eloquent address on the subject of mining countries and the laws which govern them. The lecture was extremely interesting, embodying as it did the speaker's experience and research for many years among the mines of this country.

The Society gave Mr. Raymond a vote of thanks.

Regular Meeting, August 2d, 1869.

President in the Chair.

Seventeen members present.

Donations to the Cabinet: A star-fish (*Asterias*) from the bay, and fossils from White Pine District, by G. Yale. An Indian relic of Serpentine, from a gravel bed in Klamath County, five feet beneath the surface; also another of perforated stone from Humboldt County, by Mr. Murray. Apples from Alameda County, the growth of last year, picked up from under evergreen oaks, where they had lain nearly a year, and were still perfectly fresh, by Dr. Gibbons. Specimens of a curious abnormal growth from the Poison Oak, (*Rhus diversiloba*) by Mr. Avery.

Donations to the Library: The Introduction to Illustrations of North American Birds not before figured, by D. G. Elliott, N. Y., folio, 1869, from the author. Bulletin of Essex Inst., Salem, Mass., Vol. I, No. 3, Mch., 1869, pam., 8vo.

Dr. Blake made some remarks upon the Indian relics presented, suggesting that they show great antiquity of the human race in this State.

Regular Meeting, August 16th, 1869.

Vice President in the Chair.

Fourteen members present.

Maurice Dore was elected a resident member.

Donations to the Cabinet: Ten species of shells from Cape Classet, W. T., not before in the museum, by Dr. Cooper.

Donations to the Library: Catalogue of Alaskan Antiquities, etc., collected by Capt. Fast, pam., 8vo.: Circular of Amer. Assoc. Adv. of Science for 1869: First Annual Report of Peabody Acad. of Science, Salem, Mass., 1869, pam., 8vo.: Catal. of rare Conchol. works for sale by E. J. Nolan, Philad., 1869.

A discussion was held on the smoky appearance of the air usual at this dry season, in consequence of fires in the woods along the whole coast northward.

Regular Meeting, September 6th, 1869.

President in the Chair.

Donations to the Cabinet: Specimens of clay and wood from an artesian well in Santa Clara, 288 feet beneath the surface, by Dr. A. W. Saxe. Shells from the west coast of Mexico, by Capt. C. M. Scammon. The jaw of a beaver from a stream in the Sierra Nevada, by Mr. Plummer through Dr. Cooper. Flint pebbles from White Pine District. Jaws of a shark supposed to be about 21 feet long, from Mazatlan; a dried *Hippocampus*, a *Fistularia*, and a *Euryale* from Gulf of California, by Dr. Willard through Dr. Ayres. The fifth molar tooth of a mastodon from Murphy's, Calaveras County.

Donations to the Library: Catalogue of books published by Hurd & Houghton, Cambridge, Mass.: Vick's illustrated Floral Guide for 1869, pam. 8vo.; Anniv. Address to the Roy. Geog. Soc. of London, May, 1869, and Proceedings of same, Vol. XII, No. 3, July, 1869.

With the specimens of wood above mentioned, a diagram was also presented, showing the different strata of mud, sand, etc., passed through in boring the same well to the depth of 328 feet. A discussion followed with regard to these deposits and the manner in which the fibre of the wood presented had been so perfectly preserved, wood found at such depths being usually carbonized.

Dr. Blake called attention to the singular phenomenon, which was generally observed throughout the State a few weeks ago, of a peculiar light in the heavens soon after sunset. The Doctor said he could explain it only by supposing it to have been caused through the agency of a vapor or smoky medium, which, at a high altitude, would reflect the sun's rays in such a manner as to present just such a phenomenon as was then noticed.

Dr. Cooper presented the following paper:

The Fauna of California and its Geographical Distribution.

BY J. G. COOPER, M.D.

COMPARISON WITH OTHER COUNTRIES.

California includes a much greater variety of natural regions and peculiar zoological districts than any other State or Territory of the Union. Lying between Lat. 32° 30′ and 42°, it has a seaboard over 600 miles long, while it extends back about 200 miles from the coast, thus comprising an area estimated at 155,500* square miles. To equal this in the Atlantic States we find will require all the land between the same parallels of latitude, of which the waters run directly into the ocean, or the entire States of New Jersey, Delaware, Maryland, North Carolina, South Carolina, part of New York, half of Pennsylvania and of Virginia, with a seacoast extending from Newport to Charleston. We thus get a region somewhat similarly situated, but with mountains averaging less in height than our coast ranges, and not more than half that of the Sierra Nevada. Besides the much greater variety in regions due to its lofty mountains, California also has in its southeast corner an arid region unparalleled on the Atlantic slope, and including nearly a quarter of its area.

Compared with single States, it is four times as large as New York, and over twenty-four times as large as Massachusetts, the only States of which the zoology has been thoroughly investigated, while its extent in latitude is twice that of New York, thus giving it a far greater range of climate and a correspondingly varied fauna. The bordering ocean is also probably as rich, if not richer, in animal life than the Atlantic, though less is known of the latter within the same parallels. The Californian coast, rock-bound and with a comparatively small influx of rivers, is inhabited by beings suited to entirely different conditions from those of the sandy beaches and brackish bays of the Atlantic coast. Though without the warming influence of the Gulf Stream, the Pacific Ocean along our shores maintains such a uniform temperature throughout the year that we find about as many subtropical forms among its animals as there are on that side.

The same rule applies to the land animals, for while some of the summer visitors in the Atlantic States, especially among birds and insects, have a more

* According to the Census of 1860.

tropical character. the mildness of our winters is accompanied by a constant residence of many such species.

In many of its animals, and still more in its vegetation and climate, California corresponds with the *eastern* shores of the Atlantic in the same parallels. Morocco and Portugal, with part of Spain, would present many interesting points of resemblance, if we had the means of making a complete comparison of their fauna, while Syria and Turkey also furnish corresponding examples. The Mediterranean Sea, which lies partly between the same degrees of latitude, has many molluscous animals considered identical with ours, but also many on its southern shores of a more tropical character.

The eastern shores of the Pacific, though connected with ours by the ocean, correspond more nearly in climate with the eastern shores of the Atlantic, and it may be supposed that the land fauna will also be found to agree more nearly with that of our Atlantic States. The principal islands of Japan, viz: Niphon and Jesso, occupy the degrees of latitude from 33° to 42°, but from their isolated position have a milder climate in winter than the Atlantic States, and their fauna, both marine and terrestrial, is much more tropical, though many of the mollusca are found also on our shores. Of the fauna of the corresponding parts of the mainland little is known. Its distance from California is nearly as great as that of western Europe.

As instances of the parallel representation of the higher animals in California and about the Mediterranean, I may mention the Badger, Civet-cat, (*Bassaris*) Hares, Antelope, and also other mammals represented by species now living only in more eastern parts of Asia, such as the Spermophiles, *Lagomys*, and Mountain Sheep. None of these occur in the Atlantic States north of Lat. 32°, and all of them, except the second, are peculiar to dry, grassy plains or lofty mountains. Among birds we have a species of Swift, a Water Ouzel, Titmouse (*Psaltriparus*), Grosbeak (*Hesperiphona*), Raven, Magpie, Pigeon (*Columba*), all of which have near allies in Europe but not in the Atlantic States in the same latitudes, except the Raven, which occurs rarely on the New Jersey coast. Nearly all of these, also, are birds frequenting mountains, the third and fifth excepted.

Other instances of parallel species, but less nearly allied to those of Europe, or occasional visitors to the Atlantic States, will be noticed in the reports on each class. These occur chiefly among those inhabiting mountains and plains; also among those of the rocky seacoast; while those of the fresh waters and forests are less numerous than in the Atlantic States.

Some of our animals range farther north than on the Atlantic side, and a larger proportion of the birds are constant residents on account of the milder winters.

Of the reptiles, the parallelism is more striking in comparing the orders than the species. Thus we, like Europe, have few TESTUDINATA but numerous SAURIA, which, in the southeastern part of California, much resemble those of northern Africa. The Atlantic States have just the reverse of this, while they excel us also in the number of BATRACHIA. All these differences are in accordance with those of the climate and surface of the country, the Saurians inhabiting the dry regions where aquatic turtles and Batrachians cannot exist.

The fishes, also, show some striking analogies, as might be expected from the rocky character of our shores, more nearly resembling those of Europe than of the Atlantic States. Others will be found among the Mollusca, many of which seem to be identical with European species but not with those of the Atlantic coast, the terrestrial forms excepted.

Compared with other parts of America, our fauna is not so different as it is from that of the Atlantic seaboard. Most of the genera, and many of the species not found in the Atlantic States, occur more or less widely spread over the whole western half of the United States which is characterized by plains and mountains similar to ours. Thus some reach the Gulf of Mexico in Texas; others occur near the eastern borders of the Great Plains in Wisconsin and Indiana. Some extend far to the north, and others far to the south, in Mexico, while a few of the birds are found also on the west coast of South America.

I do not undertake to enumerate any except vertebrate animals here, having already written a "Geographical Catalogue of the Mollusca," published by the State Geological Survey in 1867.

Peculiar Species.

The following are the higher animals believed to be peculiar to California:

MAMMALS.

1. Putorius xanthogenys *Gray*,	Yellow-cheeked Weasel.
2. Vulpes littoralis *Baird*,	Little Gray Fox.
3. Spermophilus Beecheyi *Rich.*,	California Ground Squirrel.
4. Spermophilus Harrisii *Aud.*,	Harris' Ground Squirrel.
5. Thomomys bulbivorus *Rich.*,	California Gopher Rat.
6. Perognathus parvus *Peale*,	Little Pouched Rat.
7. Reithrodon longicauda *Baird*,	Long-tailed Wood Mouse.
8. Hesperomys californicus *Gamb.*,	California Wood Mouse.
9. Neotoma fuscipes *Cp.*,	California Wood Rat.
10. Arvicola edax *Lec.*,	Voracious Field Mouse.
11. Lepus californicus *Gray*,	California Hare.
12. Lepus trowbridgii *Baird*,	Trowbridge's Hare.

BIRDS.

1. Buteo Cooperi? *Cass.*,	Cooper's Hen Hawk.
2. Syrnium occidentale *Xantus*,	Western Barred Owl.
3. Sphyropicus thyroideus *Cass.*,	Brown Woodpecker.
4. Picus Nuttallii *Gamb.*,	Nuttall's Woodpecker.
5. Harporhynchus redivivus *Gamb.*,	California Mocking Thrush.
6. Harporhynchus Lecontii? *Lawr.*,	Leconte's Mocking Thrush.
7. Vireo Huttoni *Cass.*,	Hutton's Greenlet.
8. Melospiza Heermanni *Baird*,	Coast Song Sparrow.
9. Peucæa ruficeps *Cass.*,	Red-capped Finch.
10. Pipilo fuscus *Swainson*,	Brown Finch.

11. Agelaius tricolor *Nutt.*,	Tricolor Redwing.
12. Pica Nuttallii *Aud.*,	Yellow-billed Magpie.
13. Lophortyx californicus *Shaw*,	California Quail.
14. Ægialitis nivosa *Cass.*,	Snowy Plover.

All of these birds, except the last two, are arboreal, and even the last is scarcely a wader. They are all nearly constant residents, and if some migratory species were included, which leave the State only in winter, the list would be considerably increased.

REPTILES.

Of the reptiles, the range is still too little known to state positively which are peculiar. A few, however, are known to be so, being confined to the regions west of the Sierra Nevada.

1. Tapaya coronata *Swains.*,	California Horned Toad.
2. Gerrhonotus multicarinatus *Blainv.*,	Many-keeled Lizard.
3. Crotalus Hallowelli *Cp.*,	Hallowell's Rattlesnake.
4. Contia mitis *Baird & Grd.*,	Gentle Brown Snake.
5. Drymobius lateralis *Hallow.*,	Striped-side Whip Snake.
6. Eutænia elegans *Baird & Grd.*,	Elegant Garter Snake.

Some of these may occur also in Oregon.

BATRACHIA.

1. Rana longipes *Hallow.*,	Long-footed Frog.
2. Rana Boylei *Baird*,	Boyle's Frog.
3. Rana Draytoni *Baird & Grd.*,	Drayton's Frog.
4. Rana Lecontii *Baird & Grd.*,	Leconte's Frog.
5. Bufo halophila *Baird & Grd.*,	Salt-marsh Frog.
6. Scaphiopus Hammondii *Baird*,	Hammond's Spade-Foot.
7. Amblystoma californicum *Gray*,	California Salamander.
8. A. punctulatum *Gray*,	Speckled Salamander.
9. Aneides lugubris? *Hallow.*,	Mournful Salamander.
10. Batrachoseps attennuatus? *Bonap.*,	Slender Salamander.

Still more of these are likely to be found in the damper climate of western Oregon, where but few reptiles have been yet collected.

Of the Fishes too little is known to decide which are peculiar, though most of those resident in the fresh waters are believed to be so, numbering about twenty-six species.

NATURAL REGIONS.

Having now shown the relations of our fauna with that of other parts of the world, I proceed to indicate the principal natural regions into which the State may be divided, each characterized by more or less peculiar species.

Commencing at the southeast, they may be described as follows, viz:

I. Colorado Valley.

The Colorado valley from the Great Bend, Lat. 36°, to the mouth of the river, Lat. 32°. More than half of this forms the eastern boundary of California for a distance of 165 miles in a direct line north and south, the boundary leaving the river at Fort Yuma, Lat. 32° 43′, and Fort Mojave, Lat. 35°. The width of the valley within our limits is not more than ten miles, but towards the mouth it spreads out into a great marshy plain and muddy estuary, bordered on each side by desert.* The elevation above the sea does not exceed 550 feet at Lat. 35° in the proper alluvial bottom land, which is overflowed nearly every summer. The terraces bordering this belong to the Desert Region.

No mammals are believed to be peculiar to this valley, though some, inhabiting the regions eastward, are supposed to extend no farther to the west.

MAMMALS.

1. *Didelphys californicus?* Bennet,	Western Opossum.
2. *Macrotus californicus* Baird,	Leaf-nosed Bat.
3. *Lepus callotis* Wagler,	Texan Hare.
4. *Cervus Mexicanus?* Gmelin,	Mexican Deer.

BIRDS.

1. *Polyborus Auduboni* Cass.,	Audubon's Vulture Eagle.
2. *Craxirex Harrisii* Aud.,	Harris' Vulture Eagle.
3. *Micrathene Whitneyi* Cp.,	Whitney's Dwarf Owl.
4. *Picus scalaris?* Wagl.,	Ladder Woodpecker.
5. *Sphyrapicus nuchalis* Baird,	Red-necked Woodpecker.
6. *Centurus uropygialis* Baird,	Gila Woodpecker.
7. *Colaptes chrysoides* Malh.,	Malherbe's Flicker.
8. *Empidonax pusillus* Coues,	Little Flycatcher.
9. *Empidonax obscurus* Swains.,	Obscure Flycatcher.
10. *Empidonax Traillii?* Aud.,	Traill's Flycatcher.
11. *Pyrocephalus Mexicanus* Sclat.,	Red-crested Flycatcher.
12. *Helminthophaga Luciæ* Cp.,	Lucy's Warbler.
13. *Pyranga Cooperi* Ridgw.,	Cooper's Red-bird.
14. *Polioptila plumbea* Baird,	Lead-gray Gnatcatcher.
15. *Auriparus flaviceps?* Sundev.,	Yellow-headed Titmouse.
16. *Psaltriparus plumbeus* Baird,	Lead-gray Titmouse.
17. *Poospiza bilineata?* Cass.,	Bridled Finch.
18. *Melospiza fallax* Baird,	Arizona Song Sparrow.
19. *Pipilo Abertii* Baird,	Abert's Finch.
20. *Chamæpelcia passerina* Linn.,	Ground Dove.
21. *Lophortyx Gambelii?* Nutt.,	Gambel's Quail.[3]

It will be observed that all of these are land-birds. Others may occur among the waders near the mouth of the river beyond our limits, but they have never been collected or noted. The first sixteen inhabit trees, of which there is a belt lining the river. The other five are more terrestrial, but never found far from the shelter of shrubbery. Those marked with a ? may occur as far west as the Sierra Nevada, but chiefly as stragglers, and have not been collected

*This portion resembles the lower valley of the Nile, allowing for the differences caused by its flowing *south* and not *north*.

west of the valley as far as known, except the *Picus*, which reaches the coast mountains in small numbers.

REPTILES.

1. *Platythyra flavescens* AGASS.,	Yellowish Mud Turtle.
2. *Sceloporus magister?* HALLOW.,	Great Fence Lizard.
3. *Crotalus atrox* BAIRD & GRD.,	Fierce Rattle Snake.
4. *Crotalus tigris* KENNIC.,	Tiger Rattle Snake.
5. *Chionactis occipitalis* HALLOW.,	Banded Snake.
6. *Salvadora Grahamii* BAIRD & GRD.,	Graham's Snake.
7. *Pituophis bellona* BAIRD & GRD.,	Bellona Bull Snake.

And probably others are limited by this valley if not peculiar to it.

BATRACHIA.

1. *Bufo alvarius* GIRARD,	Colorado Toad.
2. *Bufo Woodhousii* GIRARD,	Woodhouse's Toad.

I collected in this valley, while stationed at Ft. Mojave as surgeon. lat. 35°. from Dec. 20th, 1860, to May 28th, 1861. During that time there was very little rain, some frost and thin ice, severe winds from north and south, blowing the sand and dust for days together, and in April some exceedingly hot weather, the thermometer rising to 116° in the shade. According to the observations of those who have observed the climate in summer, there are then occasional violent thunder storms. The whole amount of rain is, however, very small throughout the valley, decreasing towards Ft. Yuma to about 2 inches annually, or less. The heat also increases, and there are several subtropical animals found there which I did not meet with. Only three or four species of fish are known to inhabit this part of the river.

In going there in December, and returning in May-June, I spent 20 days in the region next to be described.

II. Desert Region.

The region bordering this valley on the west may be called the Desert, most of it being destitute of trees, and much of it without any vegetation whatever. Its width at the southern boundary is 75 miles, and a large tract is believed to have been recently a shallow arm of the Gulf of California, rendered dry by evaporation, and yet as much as 70 feet below the level of the sea. Beds of salt, drifting sand, and sterile flats characterize this portion for a distance of 50 miles north. Beyond this point ranges of mountains occur, rising from 1,000 to 5,000 feet, and the intervening country is generally undulating. Vegetation increases in a direct ratio to the elevation, the lowest parts generally consisting of salt or alkaline flats, sand hills or bare rocks, while on the highest summits there is a little herbage and small trees, chiefly *Pinus monophyllus* and *Juniperus occidentalis*. On some of the intermediate slopes there are groves of *Yucca baccata*, various shrubs and Cacti, other desert plants, and, towards the south-west portion, some palms, believed to be the *Brahea dulcis*. Such oases are inhabited by a few birds and other animals from the neighboring regions. Towards the north the elevation and number of mountains increases, but the whole country continues sterile. A similar country extends eastward through a great part of Arizona, and is inhabited by most of the same animals.* Such a region can support but few of the higher animals, and they are consequently scarce, both in species and individuals. The following do not occur west of this region.

MAMMALS.

1. *Spermophilus Harrisii* Aud. & Bach.,	Harris' Ground Squirrel.
2. *Perognathus penicillatus* Woodh.,	Brush-tailed Pouched Rat.
3. *Hesperomys eremicus?* Baird,	Desert Mouse.

BIRDS.

1. *Harporhynchus Lecontii* Lawr.,	Leconte's Mock Thrush.

REPTILES.

1. *Xerobates Agassizii* Cp.,	Agassiz's Land Tortoise.
2. *Dipsosaurus dorsalis* Hallow.,	Sharp-back Lizard.
3. *Uta symmetrica* Baird,	Graceful Lizard.
4. *Uta Schottii* Baird,	Schott's Lizard.
5. *Heloderma horridum* Wiegm.,	Warty Lizard.
6. *Euphryne obesa* Baird,	Fat Lizard.
7. *Phrynosoma regale* Girard,	Regal Horned Toad.
8. *Doliosaurus McCallii* Girard,	McCall's Horned Toad.
9. *Doliosaurus platyrhinos* Girard,	Broad-nosed Horned Toad.
10. *Uma notata* Baird,	Spotted Yuma Lizard.
11. *Stenodactylus variegatus* Baird,	Variegated Lizard.
12. *Callisaurus ventralis* Hallow.,	Beautiful Lizard.
13. *Crotalus cerastes* Hallow.,	Horned Rattlesnake.
14. *Rena humilis* Baird & Grd.,	Sheep-nosed Snake.
15. *Ophisaurus* ——?	Glass Snake.

It is indeed the paradise of Reptiles, especially of Lizards, resembling the deserts of Northern Africa and Syria in this respect. One species of fish is found in the Mojave River (also in the Merced). Of the characteristic productions between lat. 35° and 37° very little is known, as no naturalist has collected there or described it. It may be perhaps considered a distinct region north of lat. 34°, more elevated, and forming part of the Great Basin, but too little is known of its fauna to separate the species

III. Southern Coast Slope.

Next toward the west is the lofty range of mountains which slope down to the ocean, and whose summits are between 4,000 and 8,500 feet above its level. Above an altitude of 5,000 feet there is considerable forest on them, which, as far as known, consists of northern species of trees, and is inhabited chiefly by northern animals. There may be others, but they have not been determined, no opportunity of collecting there having been afforded me. I therefore consider the southern coast slope as forming but one region, extending from lat. 32° 30′ to 34° 30′, 140 miles long, and about 50 wide. The neighboring

* See *Coues* in Proc. Phil. Acad. 1866.

islands are included in the same zoological region, their land animals being identical (except some mollusca, insects, and perhaps a reptile). The surface of this region is mostly hilly or undulating, sparsely wooded, watered by rivers which either dry up entirely, or sink in the dry season before they reach the ocean, (except the Santa Clara) and covered either by grass and low herbage, or shrubbery and trees. The climate is much cooler in summer than that east of it, and milder in winter, with far more rain, confined to three or four cold months. There is of course a close connection between the fauna of this region and that of lower California, but the latter at Cape St. Lucas is very distinct, and, to a great extent, peculiar.

The animals which do not extend north of this region as far as known are as follows:

MAMMALS.

1. *Vulpes littoralis* BAIRD,	Little Gray Fox.
2. *Thomomys umbrinus* RICH.,	Arizona Gopher Rat.
3. *Neotoma mexicana* BAIRD.	Mexican Wood Rat.
4. *Hesperomys sonoriensis* LEC.,	Sonora Wood Mouse.

BIRDS.

1. *Buteo zonocercus* SCLAT.,	Black Hen Hawk.
2. *Panyptila melanoleuca* BAIRD,	White-throated Swift.
3. *Chordeiles texensis* LAWR.,	Texan Night Hawk.
4. *Vireo pusillus* COUES,	Little Greenlet.
5. *Mimus caudatus* BAIRD,	Long-tailed Mocking Bird.
6. *Campylorhynchus brunneicapillus* LAFRES.,	Brown-capped Cactus Wren.
7. *Polioptila melanura* LAWR.,	Black-tailed Gnatcatcher.
8. *Ammodromus rostratus* CASS.,	Long-billed Beach Sparrow.
9. *Icterus cucullatus* SWAINS.,	Hooded Oriole.
10. *Brachyramphus hypoleucus* BAIRD,	Southern Auk.

All of these are land birds except the last, and extend to the Colorado valley, or farther east, except the eighth, a sea-shore species.

REPTILES.

A species of Uta, and a lizard from some of the islands, were not found elsewhere by me, but probably have a wider range. Some reptiles, said to come from San Diego, were probably obtained in the mountains or deserts east and south of there. They are:

1. *Gerrhonotus Webbi* BAIRD,	Webb's Lizard.
2. *G. olivaceus* BAIRD,	Olivaceous Lizard.

But the following probably belong chiefly to this region, or southward:

3. *Crotalus Hallowelli* CP.,	Hallowell's Rattlesnake.
4. *Drymobius testaceus* SAY,	Coppery Whip Snake.
5. *Eutænia Couchii* KENNIC.,	Couch's Garter Snake.

It is so dry that Batrachia are scarce, and are of species more common northward. No species of fresh water fishes are known from this region.

I collected near San Diego from Nov. 4th, 1861, to May 24th, 1862, and also spent seven months at various other points in 1861 and 1863, including every month of the year except September. Though apparently furnishing few peculiar species among the higher animals, this region is the most productive of any in the number of species, most of those of the more northern regions being also obtainable in some part of it. In marine species it is also the richest for the same reason, though it has not yet been sufficiently explored to give the full numbers of these, or their exact range. It is here that the analogy to the Mediterranean fauna is most marked, as will be further mentioned in the report on the Mollusca. There are several localities offering marked differences in their lists of species, especially the islands which have a greater number of southern species than the main land. The points explored are, however, too few for a complete statement of these local faunas. The following is the comparative number of species found in this region and in all those south of Lat. 38° :

	Mammals.	*Birds.*	*Reptiles.*	*Batrachia.*
This region................	48	248	28	6
All South of 38°..........	60	275	74.	13

It is quite probable that the proportion may be increased by further explorations, and also that more of the northern species will be found south of Lat. 38° in the mountains, so that the total number will be greater than is found north of that line. (See the approximate number hereafter.)

IV. Middle and Northern Coast Ranges.

The next region to the north may be considered as embracing the Coast Mountains from Lat. 34° 30′ to about Lat. 38°, or San Francisco Bay. It is similar in character of surface to the preceding, but with more forest, more rain and lower temperature in winter. The following animals are not known to occur north of it; the evidence is, however, to a great extent, negative, as the Coast Range north of the bay has been scarcely at all explored :

MAMMALS.

1. *Putorius xanthogenys* Gray,	Yellow-cheeked Weasel.
2. *Thomomys bulbivorus* Rich.,	California Gopher Rat.
3. *Hesperomys californicus* Gamb.,	California Wood Mouse.
4. *Neotoma fuscipes* Cp.,	California Wood Rat.
5. *Arvicola edax* Lec.,	Voracious Field Mouse.
6. *Lepus Trowbridgii* Baird,	Trowbridge's Hare.

BIRDS.

1. *Calypte costæ* Bourc.,	Coast Humming Bird.
2. *Tyrannus vociferans* Swains.,	Noisy King Bird.
3. *Poospiza Belli* Cass.,	Bell's Finch.
4. *Ægialitis nivosa* Cass.,	Snowy Plover.
5. *Porzana jamaicensis* Gmel.,	Black Rale.
6. *Tachypetes aquilus* Linn.,	Frigate Pelican.
7. *Cymochorea homochroa* Coues,	Black Petrel.
8. *Puffinus creatopus* Cp.,	Red-footed Shearwater.
9. *Nectris fuliginosus* Strickl.,	Sooty Shearwater.
10. *Sterna Pikei* Lawr.,	Pike's Tern.

REPTILES.

1. *Gerrhonotus multicarinatus* Blainv., Many keeled Lizard.

Twelve species of fresh water fishes are known to inhabit this region.

It is also characterized by the southern limit of a number of northern animals along the coast, of which the following are chief:

MAMMALS.

1. *Ursus Americanus* Pall.,	Black Bear.
2. *Putorius vison* Briss.,	Mink.
3. *Vulpes macrourus* Baird,	Long-tailed Fox.
4. *Arctomys flaviventer* Bachm.,	Yellow-bellied Marmot.
5. *Sciurus Douglassi* Bachm.,	Douglass's Squirrel.
6. *Arvicola Townsendii* Bachm.,	Townsend's Field Mouse.
7. *Lepus Washingtonii* Baird,	Red Rabbit.
8. *Sorex vagrans* Cp.,	Wandering Shrew.
9. *Sorex Suckleyi* Baird,	Suckley's Shrew.

BIRDS.

1. *Syrnium cinereum* Gmel.,	Great Grey Owl.
2. *Parus occidentalis* Baird,	Western Titmouse.
3. *Chrysomitris pinûs* Wils.,	Pine Linnet.
4. *Passerculus Sandwichensis* Gmel.,	Large Savanna Finch.
5. *Melospiza rufina* Brandt,	Rufous Song Sparrow.
6. *Pipilo Oregonus* Bell,	Oregon Finch.
7. *Perisoreus canadensis* Linn.,	Canada Jay.
8. *Tetrao obscurus* Say,	Blue Grouse.
9. *Bonasa Sabinii* Dougl.,	Oregon Grouse.
10. *Porzana Noveboracensis* Gmel.,	Yellow Rale.
11. *Harelda glacialis* Linn.,	Long-tailed Duck.
12. *Mergus Americanus* Cass.,	Large Sheldrake.
13. *Buphagus Skua* Brunn.,	Skua Gull.
14. *Larus brachyrhynchus* Rich.,	Short-billed Gull.
15. *Larus Hutchinsii* Rich.,	Hutchin's White Gull.
16. *Rissa Kotzebuei* Bonap.,	Kotzebue's Gull.
17. *Graculus Bairdii* Cp.,	Baird's Cormorant.
18. *Podiceps Cooperi* Lawr.,	Cooper's Grebe.

Probably also some Reptiles and Batrachians. The existence of many of these in the northern coast range of California is only inferred from their abundance at the Columbia River or elsewhere. Probably a careful exploration would discover some new species, and extend the known range of many others.

The Farallones Islands off the mouth of San Francisco Bay, though small and rocky, are very important as the locality where many sea-birds reside during most of the year, and as the southern limit to the range of some.

Though resident much of the time at San Francisco since November, 1860, I have been able to collect in this region for only five months, and much remains to be determined. The vicinity of the city is one of the worst places in the State for zoological observations.

V. Tulare Valley.

The next region of importance is the San Joaquin or Tulare Valley. This is 250 miles long and 60 wide, lying between Lat. 35° and 38°, and nowhere more than 500 feet above the sea, the surface being nearly flat or slightly sloping toward the center. Large lakes and marshes occupy the bottom of this basin, and numerous rivers running chiefly from the east empty into them, those north of Lat. 36° 30′ uniting to form the San Joaquin River, which is navigable south to Lat. 36° 45′. There is very little timber along the streams or in the higher parts of the valley, and much of the dry land is so arid in summer as to be almost a desert, though nowhere quite without vegetation.

I have travelled rapidly through, but had no opportunity to collect in this region, and very little has been done towards developing its natural history. The following species have been found there and not northward:

BIRDS.

1. *Syrnium occidentale* Xantus,	California Barred-Owl.
2. *Stellula calliope* Gould,	Calliope Humming Bird.

Some have been obtained near the northern limit of the valley, Lat. 38° which do not seem to range farther north, as:

1. *Catherpes Mexicanus* Swains.,	Mexican Wren.
2. *Peucea ruficeps* Cass.,	Red capped Finch.
3. *Sphyrapicus thyroideus* Cass.,	Brown Woodpecker.
4. *Tantalus loculator* Linn.,	Wood Ibis.
5. *Dendrocygna fulva* Gmel.,	Brown Tree Duck.

REPTILES.

1. *Sceloporus longipes* Baird,	Long-footed Lizard.
2. *Sceloporus biseriatus* Hallow.,	Two-striped Lizard.
3. *Crotaphytus Wislizeni* Bd. & Grd.,	Banded Lizard.
4. *Cnemidophorus tigris* Baird & Grd.,	Tiger Lizard.
5. *Uta graciosa* Hallow.,	Slender Lizard.
6. *Xantusia vigilis* Baird,	Xantus' Lizard.
7. *Diadophis punctatus* Baird & Grd.,	Spotted Ring Snake.
8. *Eutænia Hammondii* Kennic.,	Hammond's Garter Snake.

I may here remark that I could find no birds in September in that extensive forest surrounding Visalia not seen more abundantly in the richer valleys near the coast, though a longer residence in spring would probably furnish many southern species and interesting waterfowl. Among the immense numbers of waterfowl said to frequent Tulare Lake there will probably be found some new to California, especially among the summer visitors. The other species characteristic of the valley must be such as prefer dry woodless plains to forests and mountains. Seven species of fish have been obtained in the rivers not found elsewhere, and there are probably many more.

VI. Southern Sierra Nevada.

The Region of the Southern Sierra Nevada lies directly east of this valley.

I have not visited any portion of it myself except Copperopolis, which lies near Lat. 38°, and is elevated about 1,600 feet above the sea. It is among the more southern and higher mountains that the most peculiar animals exist, and a great deal remains to be done in collecting them. The only point at which extensive collections have been made is Ft. Tejon, just south of Lat. 35°, and near the lowest pass in the range. There is a species of Hare resembling *L. glacialis* found on the Alpine summits near Lat. 37°, which rise to a height of 12,000 to 15,000 feet, but no specimens have been obtained by naturalists.

The narrow portion of California east of the Southern Sierra belongs in part to the region already described as the "Desert," but Owen's Valley, lying over 4,000 feet above the sea, and close to the mountains, may be considered as part of their eastern slope. Too little is known of it to determine its zoological peculiarities, but there are probably reptiles there (many of them collected by Dr. Horn, U. S. A., and sent to Philadelphia) which are not found elsewhere in California. He states that there is only one small species of fish, probably a Cyprinoid, found in the river. Being a barren region there are probably no higher animals not found elsewhere. Owen's and Mono Lakes are both exceedingly salt and nearly destitute of animal life, the *larvæ* of some insects of the Dipterous order being alone known to inhabit them. The latter, however, is singularly enough the breeding resort of one or more species of Gull, which lay large numbers of eggs on the rocky islands. In the absence of fish, they must live chiefly on the *larvæ* mentioned.

The Southern Sierra are inhabited on their higher portions by several of the animals before mentioned as not found in the coast range south of San Francisco Bay. The number of these, and their range, as well as the peculiar species, remain to be determined.

VII., Sacramento Valley.

The Sacramento Valley, lying between Lat. 38° and 40° 30′, is about 175 miles long and 50 wide, with about the same elevation of its borders as the Tulare, and the river is navigable nearly the whole length of the valley. No collections are known ever to have been made exclusively in this valley, and only five species of fish have been reported as peculiar to its waters, though others will undoubtedly yet be found, besides some which annually visit them for the purpose of spawning. The borders of the river are well wooded with poplars and willows, and so is a large part of the upland with oaks, supplying shelter for many kinds of birds. Reptiles are more scarce than in the more southern regions. It is difficult to determine which should be considered the animals belonging to the valley, on account of the numerous lateral branches of it, and the gradually rising foothills on which many of the species live to various elevations in the mountains. Some of the birds go into the foothills to build, and the rest of the year frequent the moister and more productive river shores. The occasional floods which inundate the lower valley kill most of the small mammals and reptiles, as they seem to have done in the winter of 1861–2, since which time the latter have been scarce near the river.

VIII. The Northern Sierra Nevada.

The whole remainder of California lying east of the Sacramento valley and of the longitude of Mt. Shasta, (about 122° west) may be considered as belonging to this region, although it includes ten or more lakes which have no outlets, and therefore belong to the system of interior basins. Yet Pit River, heading very near the eastern boundary line, flows through all obstructing ranges into the Sacramento, showing a general fall of level towards the west, and Lake Tahoe, Lat. 39°, is the only body of water with an outlet running eastward from near the boundary line. The length of this region, north and south, is 278 miles, with a width of 85 miles near Lat. 38° 30′, and 125 north of the Sacramento Valley, Lat. 40° 30′ to 42°. The mountains are lower than in the Southern Sierra, the passes near the lower end being about 8,000 feet high, and diminishing to 4,500 at Lat. 41°, where Pit River cuts the principal ridge. The highest peaks south of this latitude do not exceed 10,000 feet, though Mt. Shasta, north of it, rises to 14,440, or nearly that of the peaks in Lat. 36°–37°. There are less extensive snow fields in summer, more generally diffused forest, and more abundant streams of water.

I spent twenty days in the month of September, 1863, collecting near the summits in Lat. 39° from an elevation of 5,000 to 8,000 feet, and at Lake Tahoe, which is 6,083 feet above the sea. The results of this short visit were highly interesting, adding sixteen species to the known fauna of California, of which four or five were new. (See "Additions," etc., in this Vol., p. 3.)

I have also visited the foothills in August, up to an elevation of about 3,000 feet, but too briefly to obtain any very important facts. It would be premature to attempt to enumerate the animals characteristic of this region, or limited by it in their range north and south. It may be assumed that nearly all those of the three higher classes found in California, but not mentioned in the preceding lists as limited by certain bounds toward the south, are to be found either in this region or the Sacramento Valley, with the exception of the exclusively marine species. This leaves for these two regions, of Mammals, 80, Birds, 253, Reptiles, 34, Batrachia, 15, supposed to inhabit the northern half of the State, excluding the sea-coast. The marine species, probably found along our northern coast, are 12 Mammals and 48 Birds. Five species of fish are known, and there are probably more, inhabiting the mountain lakes and streams exclusively.

Local Faunas.

It would be useless and unimportant to give lists of all the animals observed or collected at the several points where collections were made; first, because my residence at each was not long enough to determine all those to be found there at various seasons; and secondly, because most of the points were too near together to furnish peculiar species. Two localities, however, are interesting enough in this respect to authorize a special list of their vertebrate animals.

I. Colorado Valley.

Besides those already mentioned as not found west of this valley, the following have been found in it. (Numbers continued from first list.)

MAMMALS.

5. Taxidea americana? *Zimm.*,	American Badger.
6. Canis latrans *Say*,	Coyote.
7. Vulpes velox *Say*,	Swift Fox.
8. Lynx rufus *Raf.*,	Wild Cat.
9. Nyctinomus nasutus *Spix*,	Long-nosed Bat.
10. Vespertilio Yumanensis *Allen*,	Yuma Bat.
11. Antrozous pallidus *Lec.*,	Pale Bat.
12. Castor Canadensis *Kuhl*,	American Beaver.
13. Spermophilus ——?	Ground Squirrel (undescribed).
14. Thomomys fulvus *Woodh.*,	Red Gopher-Rat.
15. Dipodomys Philippii *Gray*,	Kangaroo Rat.
16. Perognathus penicillatus *Woodh.*,	Brush tail Pouched Rat.
17. Hesperomys Gambelii? *Baird*,	Gambel's Woodmouse.
18. Hesperomys Boylii? *Baird*,	Boyle's Woodmouse.
19. Hesperomys austerus? *Baird*,	Dusky Woodmouse.
20. Neotoma mexicana *Baird*,	Mexican Wood Rat.
21. Lepus Audubonii? *Baird*,	Audubon's Hare.
22. Cervus macrotis? *Say*,	Mule Deer.
23. Antilocapra americana *Ord*,	Antelope.

BIRDS.

23. Falco columbarius *Linn.*,	Pigeon Hawk.
24. Falco sparverius *Linn.*,	Sparrow Hawk.
25. Accipiter Cooperii *Bonap.*,	Cooper's Hawk.
26. Buteo calurus *Cass.*,	Red-tail Black Hawk.
27. Buteo montanus *Nutt.*,	Western Hen Hawk.
28. Circus Hudsonius *Linn.*,	Marsh Hawk.
29. Haliætus leucocephalus *Linn.*,	White-headed Eagle.
30. Cathartes Aura *Linn.*,	Turkey Buzzard.
31. Scops Asio *Linn.*,	Mottled Owl.
32. Athene cunicularia *Mol.*,	Burrowing Owl.
33. Geococcyx Californianus *Less.*,	Road Runner.
34. Sphyrapicus Williamsonii *Newb.*,	Williamson's Woodpecker.
35. Colaptes mexicanus *Swains.*,	Red-quilled Flicker.
36. Calypte costæ *Bourc.*,	Coast Humming Bird.
37. Panyptila melanoleuca *Baird*,	White-throated Swift.
38. Chordeiles Texensis *Lawr.*,	Texan Night Hawk.
39. Ceryle Alcyon *Linn.*,	Blue King-fisher.
40. Tyrannus verticalis *Say*,	Arkansas King-bird.
41. Myiarchus mexicanus *Kaup*,	Mexican Flycatcher.
42. Empidonax Hammondii *Xantus*,	Hammond's Flycatcher.
43. Sayornis nigricans *Swains.*,	Black Pewee.

44. Sayornis Sayus *Bonap.*,	Say's Pewee.
45. Contopus Richardsonii *Swains.*,	Richardson's Pewee.
46. Turdus nanus *Aud.*,	Dwarf Thrush.
47. Turdus migratorius *Linn.*,	Robin Thrush.
48. Sialia mexicana *Swains.*,	Mexican Bluebird.
49. Sialia arctica *Swains.*,	Arctic Bluebird.
50. Regulus calendula *Linn.*,	Ruby-crowned Wren.
51. Anthus Ludovicianus *Linn.*,	Titlark.
52. Geothlypis MacGillivrayi *Aud.*,	MacGillivray's Warbler.
53. Helminthophaga celata *Say*,	Orange-crowned Warbler.
54. Icteria longicauda *Lawr.*,	Long-tailed Chat.
55. Dendrœca occidentalis, *Towns*,	Western Warbler.
56. Dendrœca Auduboni *Towns.*,	Audubon's Warbler.
57. Dendrœca æstiva *Gmel.*,	Summer Warbler.
58. Myiodioctes pusillus *Wils.*,	Black-capped Warbler.
59. Hirundo horreorum *Bart.*,	Barn Swallow.
60. Hirundo lunifrons *Say*,	Cliff Swallow.
61. Hirundo thalassina *Swains.*,	Sea-green Swallow.
62. Cotyle serripennis *Linn.*,	Bank Swallow.
63. Ampelis garrulus *Aud.*,	Bohemian Waxwing.
64. Phænopepla nitens *Swains.*,	Shining Flycatcher.
65. Collyrio excubitoroides *Swains.*,	Western Shrike.
66. Vireo solitarius *Wils.*,	Solitary Greenlet.
67. Mimus caudatus *Baird*,	Long-tailed Mocking Bird.
68. Oreoscoptes montanus *Towns.*,	Mountain Mocking Bird.
69. Harporhynchus crissalis *Henry*,	Henry's Mock-Thrush.
70. Catherpes mexicanus *Swains.*,	Mexican Wren.
71. Salpinctes obsoletus *Say*,	Rock Wren.
72. Thryothorus leucogaster *Gould*,	White-bellied Wren.
73. Troglodytes Parkmanni *Aud.*,	Parkman's Wren.
74. Polioptila cœrulea *Linn.*,	Blue-gray Gnatcatcher.
75. Carpodacus frontalis *Say*,	Red Linnet.
76. Chrysomitris Lawrencii *Cass.*,	Lawrence's Goldfinch.
77. Poœcetes gramineus *Gmel.*,	Grass Sparrow.
78. Zonotrichia Gambellii *Nutt.*,	Gambell's Sparrow.
79. Junco Oregonus *Towns.*,	Oregon Snow Bird.
80. Poospiza Belli *Cass.*,	Bell's Finch.
81. Spizella socialis *Wils.*,	Chipping Sparrow.
82. Spizella pallida *Swains.*,	Clay-colored Sparrow.
83. Guiraca cœrulea *Linn.*,	Blue Grosbeak.
84. Cyanospiza amœna *Say*,	Blue Linnet.
85. Pipilo chlorurus *Towns.*,	Green Finch.
86. Molothrus pecoris *Gmel.*,	Cow Bunting.
87. Agelaius phœniceus *Linn.*,	Common Redwing.
88. Xanthocephalus icterocephalus *Bonap.*,	Yellow-headed Blackbird.
89. Sturnella neglecta *Aud.*,	Western Meadow Lark.

90.	Icterus Bullockii *Swains.*,	Western Oriole.
91.	Scolecophagus cyanocephalus *Wagl.*,	Western Blackbird.
92.	Corvus carnivorus *Bart.*,	American Raven.
93.	Zenaidura Carolinensis *Linn.*,	Carolina Dove.
94.	Herodias Egretta *Gmel.*,	White Heron.
95.	Ardea Herodias *Linn.*,	Blue Heron.
96.	Botaurus lentiginosus *Steph.*,	American Bittern.
97.	Nyctiardea Gardeni *Gmel.*,	American Night Heron.
98.	Ibis Ordii *Bonap.*,	American Ibis.
99.	Ægialitis vociferus *Linn.*,	Kildeer Plover.
100.	Ægialitis montanus *Towns.*,	Mountain Plover.
101.	Recurvirostra americana *Gmel.*,	Avoset.
102.	Himantopus nigricollis *Vieill.*,	Black-necked Stilt.
103.	Gallinago Wilsonii *Temm.*,	American Snipe.
104.	Gambetta melanoleuca *Gmel.*,	Yellow-leg Snipe.
105.	Fulica americana *Gmel.*,	American Coot.
106.	Cygnus Americanus *Sharp.*,	American Swan.
107.	Anser hyperboreus *Pall.*,	Snow Goose.
108.	Bernicla Canadensis *Linn.*,	Canada Goose.
109.	Anas Boschas *Linn.*,	Mallard Duck.
110.	Dafila acuta *Linn.*,	Pintail Duck.
111.	Nettion Carolinensis *Gmel.*,	Greenwing Teal.
112.	Querquedula cyanoptera *Vieill.*,	Cinnamon Teal.
113.	Spatula clypeata *Linn.*,	Shoveller Duck.
114.	Aythya valisneria *Wils.*,	Canvass-back Duck.
115.	Bucephala albeola *Linn.*,	Butter Duck.
116.	Graculus dilophus *Swains.*,	Double-crested Cormorant.
117.	Colymbus torquatus *Brünn.*,	Ring-necked Loon.
118.	Podiceps californicus *Heerm.*,	California Grebe.
119.	Podilymbus Podiceps *Linn.*,	Common Grebe.

REPTILES.

8.	Dipsosaurus dorsalis *Hallow.*,	Sharp-backed Lizard.
9.	Doliosaurus platyrhinos *Baird*,	Broad-nosed Horned Toad.
10.	Drymobius testaceus *Say*,	Coppery Whip Snake.

This list would be considerably extended by a longer residence in the valley, and by including species from the neighboring desert mountains, but the above were all observed in the valley proper, chiefly in the cold months.

II. Island Faunas.

The four islands visited present some interesting facts in their zoology, which cannot in all cases be accounted for by their local peculiarities. Their distances from the main land are from twenty to sixty miles, and the climate varies according to their exposure, being mild on the inner and southern parts, but cold, damp, and windy on the outer shores. The last mentioned is always much exposed to the severe sea winds and fogs.

ISLAND FAUNAS.

Species Observed.		Sta. Catalina I...	Sta. Barbara I...	San Clemente I...	San Nicolas I...	Remarks.
MAMMALS.				†		† *Felis domesticus* naturalized.
1. *Vulpes* (two species?)	Foxes	*	*	....	*	Collected.
2. *Enhydra marina* STELL	Sea Otter	*	*	*	*	
3. *Macrorhinus angustirostris* GILL	Sea Elephant	....	....	*	*	Extinct? bones found.
4. *Arctocephalus Gillespiei?* MACB	Southern Sea Lion	*	....	*	....	Collected.
5. *Phoca Pealii?* GILL	Leopard Seal	....	*	*	....	Collected at San Pedro.
6. *Spermophilus Beecheyi* RICH	Ground Squirrel	*	*	....	....	Collected Catalina Island.
7. *Hesperomys* ——— ?	Wood Mouse	*?	....	*	....	Collected Sta. Barbara I.
8. *Arvicola* ——— ?	Field Mouse	....	*	....	....	Burrows seen.
9. *Delphinus* ——— ?	Dolphin	....	*	....	....	Skeleton found.
10. *Balæna* ——— ?	Whales	....	....	....	....	Observed at sea.
LAND BIRDS.						
1. *Falco nigriceps* CASS	Western Duck Hawk	*	....	*	....	Collected, Sta. Barbara I.
2. *Buteo montanus* NUTT	Western Hen Hawk	*	....	....	....	
3. *Haliætus leucocephalus* LINN	White Headed Eagle	*	*	*	....	
4. *Pandion Carolinensis* GMEL	Fish Hawk	*	....	....	....	
5. *Micrathene Whitneyi?* CP	Owl?	....	?	....	....	Owl? heard.
6. *Athene cunicularia* MOL	Burrowing Owl	*	....	....	....	
7. *Geococcyx Californianus* LESS	Ground Cuckoo	*	....	....	....	
8. *Picus Nuttallii?* GAMB	Nuttall's Woodpecker	?	....	....	....	Uncertain.
9. *Colaptes Mexicanus* SWAINS	Red-quilled Flicker	*	....	....	....	

ISLAND FAUNAS—*Continued.*

Species Observed.		Sta. Cataline I...	Sta. Barbara I...	San Clemente I...	San Nicolas I...	Remarks.
LAND BIRDS—*continued.*						
10. *Selasphorus rufus* GMEL	Red-backed Humming Bird	*	*	....	....	Nest found.
11. *Calypte Anna* LESS	Anna Humming Bird	*	....	....	....	
12. *Empidonax Hammondii?* XANT	Flycatcher	?	?	....	....	Species uncertain.
13. *Turdus nanus* AUD	Dwarf Thrush	*	....	....	....	In October only.
14. *Regulus calendula* LINN	Ruby-crowned Wren	*	....	....	....	In October only.
15. *Helminthophaga celata* SAY	Orange-crowned Warbler	....	?	*	....	
16. *Myiodioctes pusillus* WILS	Black-capped Warbler	*	....	....	....	In October only.
17. *Hirundo horreorum* BART	Barn Swallow	*	*	....	....	
18. *Progne purpurea?* LINN	Purple Martin	*	....	....	....	
19. *Collyrio excubitoroides* SWAINS	Western Shrike	*	*	....	....	
20. *Salpinctes obsoletus* SAY	Rock Wren	*	....	....	....	
21. *Thryothorus Bewickii* AUD	Bewick's Wren	*	*	*	*	
22. *Polioptila melanura* LAWR	Black-tailed Gnatcatcher	*	...	....	....	In October only, collected.
23. *Phileremos cornutus* WILS	Horned Lark	....	*	....	*	
24. *Carpodacus frontalis* SAY	Red Linnet	*	*	*	*	
25. *Zonotrichia Gambelii* NUTT	Gambel's Finch	*	....	....	....	In October only, collected.
26. *Poospiza Belli* CASS	Bell's Finch	....	*?	*	*	Collected on S. B. Island.
27. *Spizella socialis* WILS	Chipping Sparrow	*	....	....	....	Collected on Catalina I.
28. *Melospiza Heermanni* BAIRD	Coast Song Sparrow	....	*	*	....	Collected on S. B. Island.
29. *Peucæa ruficeps* CASS	Red-capped Finch	*	....	....	....	Collected.
30. *Pipilo megalonyx* BAIRD	Southern Pipilo	*	*	....	....	Collected on Catalina I.
31. *Sturnella neglecta* AUD	Meadow Lark	*	*	....	*	
32. *Scolecoph. cyanocephalus* WAGL	Western Grackle	*	...	....	....	In October only.
33. *Corvus carnivorus* BART	American Raven	*	*	*	*	
34. *Zenaidura Carolinensis* LINN	Common Dove	*	....	*	....	

35.	*Lophortyx Californicus* Shaw	Quail	*	....	....	....	Collected on Catalina I.
36.	*Ardea Herodias* Linn	Blue Heron	*	....	....	....	
37.	*Aphriza virgata?* Aud	Surf Bird	....	*?	?	....	Seen only.
38.	*Hæmatopus palliatus* Temm	Pied Oystercatcher	....	....	*	....	Collected on S. B. Island.
39.	*Hæmatopus niger* Pall	Black Oystercatcher	....	....	*	...	Eggs obtained.
40.	*Actodromas minutilla* Vieill	Least Sandpiper	*	....	....	....	
	SWIMMING BIRDS.						
41.	*Pelecanus fuscus* Linn	Grey Pelican	*	....	*	....	Said to breed.
42.	*Tachypetes aquilus* Linn	Frigate Pelican	?	....	....	..	Said to occur.
43.	*Graculus dilophus* Swains	Townsend's Cormorant	....	*	*	....	Eggs collected.
44.	*Graculus penicillatus* Brandt	Plumed Cormorant	*	*	*	*	Eggs collected.
45.	*Diomedea brachyura* Temm	Short-tailed Albatros	....	....	*	*	Off shore only.
46.	*Puffinus creatopus* Cp. n.s.*	Red-footed Puffin	....	....	....	*	Collected.
47.	*Nectris fuliginosus* Strickl	Sooty Puffin	....	....	....	*	Collected.
48.	*Oceanites oceanica?* Kuhl	Stormy Petrel	....	....	....	*	One seen.
49.	*Larus occidentalis* Aud	Western Gull	*	*	*	*	Eggs collected.
50.	*Blasipus Belcheri?* Vig	Belcher's Gull	*	*	....	*	Collected.
51.	*Thalasseus regius* Gamb	Royal Sea Tern	?	*	....	*	
52.	*Ptychoramphus aleuticus* Pall	Cassin's Auk	....	*	*	*	Collected.
53.	*Uria Columba* Pall	Western Sea Dove	....	....	*	*	
54.	*Brachyramphus hypoleucus* Baird	White-bellied Auk	....	....	*	?	Collected.
	REPTILES.						
1.	*Saurian*	No. 989	....	*	*	*	Collected.
2.	*Crotalus Hallowelli?* Cp	Rattlesnake	*	....	....	....	Said to occur.
3.	*Lampropeltis Boylei* Baird & Grd	Boyle's Milk Snake	*	....	....	....	Collected.
4.	*Uta* ——— ?		*	....	....	....	Collected.

* I may observe that many of the species not collected are of course somewhat uncertain, and future collections will no doubt obtain more new species among these islands.

Catalina is a rugged, metamorphic, and volcanic ridge, with something of a valley in the middle containing a marsh and running brook, which I was not, however, able to visit. Most of it is covered with herbage, and much shrubbery in parts; the shores are steep and rocky, and there is an almost land-locked harbor on the S.W. side.

San Clemente and Santa Barbara islands are exclusively basaltic, with several terraces. The vegetation is almost wholly herbaceous, and rather abundant. The shores are steep and rocky. Water is scarce on the former and there is absolutely *none* on the latter for two-thirds of the year, except what is deposited by the fogs.

San Nicolas Island is very different from the rest, being exclusively sandstone, of very recent elevation, and covered with light herbage. The shores are chiefly sandy and the surrounding water shoal.

The islands having been visited for only a short time, few of the migratory species were observed, except on Catalina Island in the last days of October. Santa Barbara Island was visited for six weeks in May and June; Catalina again in June and July; the others for a few days only about the first of July. The results can therefore be considered only an approximation to a comparison of the faunas.

Summer and Winter Migrations.

As before stated, the majority of the birds of California are constant residents in some part of the State, but each locality has some which come there only at certain seasons. The collections have not, however, been made at any one point in the two extremes of the year, but a list can be given of those observed at San Pedro and thence to San Diego from June 1st to August 1st, compared with those seen from October to April 1st, omitting the constant residents.

SUMMER.

1. Selasphorus rufus *Gmel.*
2. Panyptila melanoleuca *Baird.*
3. Chordeiles Texensis *Lawr.*
4. Tyrannus verticalis *Say.*
5. Myiarchus Mexicanus *Kaup.*
6. Contopus Richardsonii *Swains.*
7. Empidonax flaviventris *Baird.*
8. Geothlypis trichas *Linn.*
9. " MacGillivrayi *Aud.*
10. Icteria longicauda *Lawr.*
11. Dendrœca æstiva *Gmel.*
12. Myiodioctes pusillus *Wils.*
13. Pyranga ludoviciana *Wils.*
14. Hirundo horreorum *Bart.*
15. " lunifrons *Say.*
16. Progne purpurea *Linn.*
17. Vireo gilvus *Vieill.*

WINTER.

1. Falco polyagrus *Cass.*
2. Accipiter Cooperii *Bonap.*
3. Accipiter fuscus *Gmel.*
4. Archibuteo ferrugineus *Licht.*
5. " lagopus *Gray.*
6. Sayornis Sayus *Bonap.*
7. Turdus migratorius *Linn.*
8. Sialia arctica *Swains.*
9. Regulus calendula *Linn.*
10. Anthus Ludovicianus *Gmel.*
11. Dendrœca Audubonii *Towns.*
12. Ampelis cedrorum *Vieill.*
13. Sitta aculeata *Cass.*
14. Parus montanus *Gamb.*
15. Passerculus alaudinus? *Bonap.*
16. Zonotrichia Gambelli *Nutt.*
17. " coronata *Pall.*

18. Vireo pusillus *Coues.*
19. Spizella socialis *Wils.*
20. Melospiza Lincolnii *Aud.*
21. Guiraca melanocephala *Swains.*
22. " cœrulea *Linn.*
23. Cyanospiza amœna *Say.*
24. Icterus cucullatus *Swains.*
25. " Bullockii *Swains.*
26. Ardetta exilis *Gmel.*
27. Ibis Ordii *Bonap.*
28. Hæmatopus palliatus? *Temm.*
29. Himantopus nigricollis *Vieill.*
30. Chrœcocephalus philadelphiai *Ord.*
31. Hydrochelidon fissipes *Linn.*
32. Sterna Pikei? *Lawr.*

18. Junco Oregonus *Towns.*
19. Passerella megarhynchus *Baird.*
20. Pipilo chlorurus *Towns.*
21. Xanthocephalus icterocephalus *Bon.*
22. Columba fasciata *Say.*
23. Grus Canadensis *Linn.*
24. Garzetta candidissima *Jacq.*
25. Ægialitis montanus *Towns.*
26. " semipalmatus *Bon.*
27. Squatarola Helvetica *Linn.*
28. Hæmatopus niger? *Pall.*
29. Strepsilas melanocephalus *Vig.*
30. Recurvirostra americana *Gmel.*
31. Phalaropus hyperboreus *Linn.*
32. Gallinago Wilsonii *Temm.*

The remainder of the water birds, including waders, are either winter residents only, or seen in July as well as in winter, and therefore considered constant residents, though most of them probably retire to the mountains to breed. Besides those mentioned, about forty species of water birds and sixty land birds occur in the localities mentioned. Many of the winter birds doubtless frequent the neighboring mountains in summer, and this list does not, therefore, show the species occurring throughout the Coast Slope, but only for ten to twenty miles inland.

The names of all the vertebrated animals in California are too many to be given in this article, but the other species may be ascertained by reference to "The Natural Wealth of California," (San Francisco, 1867) or to the catalogues in Baird, Cassin, and Lawrence's Reports, (Pacific Railroad Series, Vols. VIII, IX, and X) with the additions given in this volume, (p. 3) and in the Proc. Phil. Acad. Nat. Sc., 1869, p. 12, where the following Cetaceans of California are described, viz:

ADDITIONAL SPECIES.

Balæna Cullamach? *Chamisso,*	California Right Whale.
Rachianectes glaucus *Cope,*	California Gray Whale.
Megaptera versabilis *Cope,*	Pacific Humpback Whale.
Balænoptera velifera *Cope,*	California Finback Whale.
Sibbaldius sulfureus *Cope,*	Sulphur-bottom Whale.
Physeter macrocephalus *Linn.,*	Sperm Whale.
Globicephalus Scammonii *Cope,*	Pacific Black Fish.
Phocæna vomerina *Gill,*	California Bay Porpoise.
Delphinus Styx? *Gray,*	Finback Porpoise.
Delphinapterus borealis? *Peale,*	Right Whale Porpoise.
Orca rectipinna *Cope,*	Long-finned Killer.
Orca ater *Cope,*	Short-finned Killer.

Regular Meeting, September 20th, 1869.

President in the Chair.

Sixteen members present.

W. H. Haskell was elected a resident member.

Donations to the Cabinet: Part of the jawbone of the Petaluma Mastodon, by Mr. White through G. Yale. Rocks, earth, and shells from an Indian mound near San Quentin, by G. Yale, who stated that this mound seemed to have been caused by upheaval. The larva of a Cicada from Tepic, Mexico, killed by a growth of fungus (*Spheria*) from its head, by Dr. Holland through Dr. Behr. A specimen of a new mineral from Mexico, called by Prof. Brush *Durangite;* also of *Ilmonite* from Mariposa County, by Mr. Hanks.

A discussion on shell mounds occupied the rest of the evening.

Regular Meeting, October 4th, 1869.

President in the Chair.

Fourteen members present.

W. H. Collie and Geo. Hobson were elected resident members of the Academy.

Donations to the Cabinet: Specimens of the root called "Wild Parsnip" by the miners in Nevada, and the dried plant with it, by Dr. A. L. Stout. Iron ore, felspar, coal, and shale, from Chilchat, Alaska, Lat. 59° 25′, by Prof. Davidson.

Donations to the Library: On Hydrofluoric Acid, by G. Gore, F. R. S., pam., 4to., from the author. Catal. of the Library of Dr. B. F. Shumard, pam., 8vo.

Dr. Stout read a letter from Lieut. D. L. Carpenter, U. S. A., now at Ruby Valley, Nev., giving an account of the poisoning of two miners by eating the root called "Wild Parsnip." Dr. Stout had prepared a concentrated tincture of the root, and found that it had no effect on a frog when introduced beneath the skin, but when put into the stomach caused complete paralysis in one minute.

The plant was referred to Mr. Bloomer for scientific determination.

Prof. Davidson gave an account of his recent observation of the eclipse of the sun, made in Alaska. He stated that the most important point he had determined was that the appearances called "Bailey's Beads" was not to be seen at the place of observation.

Regular Meeting, October 18th, 1869.

President in the Chair.

B. Christensen was elected resident member.

Donations to the Cabinet: The jaws of a "Thrasher" Shark (*Alopias vulpes?*) recently caught in this bay, by G. Yale. Broken implements and skulls from an Indian mound near San Rafael, by Mr. F. Davis. Leaves of a mulberry tree from Japan, apparently *Morus alba*, by Dr. Gibbons.

Mr. Carlton exhibited fine specimens of miocene fossils obtained by him in the ridge running through Pacheco, Contra Costa Co., and already in the Academy's museum.

Mr. Davis stated that the mound opened by him, out of a dozen or more in that vicinity, was about 300 feet long, 175 wide, and 20 high. Skeletons at various depths showed a great antiquity, being often in successive strata of ashes, soil, etc., slowly accumulated. Flints, more or less worked, circles of hearthstones, ornaments of the Abelone shell, (*Haliotis*) and bones, were the only relics discovered.

Dr. Cooper stated that while the relics so far found in California indicated that the natives had never advanced beyond the "Stone Age," and that they were of the same race as the "Diggers" of the Great Basin east of the Sierra Nevada, yet the tribes north of California, as well as in Mexico, were far superior to them in knowledge of the constructive arts, though the former used no metal implements. There was evidence that the Japanese had visited the northwest coast, and apparently introduced some arts, while it had been recently published as a fact that a Chinese junk had visited

Mexico before the time of Columbus. No evidence, however, had yet been found of ancient Asiatic communication with California.

Prof. Davidson said he had records of at least four shipwrecks of Japanese vessels on this coast within a period of one or two centuries past, and it is probable that many more had occurred previously. He had seen one ancient "dug-out" canoe at Point Concepcion.

Regular Meeting, November 1st, 1869.

President in the Chair.

Twenty members present.

Donation to the Cabinet: A broken tusk of the fossil Elephant from Alaska, by G. Yale. Specimens of *Quercus vaccinifolia* Kell., by Dr. Kellogg.

Donations to the Library: Observations on Geology of Alaska by W. H. Dall, pam., 4to, 1869, from the author. American Journ. of Conchology, vols. 1, 2, and 3, 8vo, from Dr. Cooper, vol. 4 by subscription. On the Origin of Genera, by E. D. Cope, Philad., 1869, pam., 8vo., from the author; also the following through the Smithsonian Inst.:

Four works in Russian from the Roy. Geog. Soc.; Bulletin and Memoires de l'Acad. Imp. des Sciences, Vols. XII and XIII, Nos. 1–3, St. Petsgb, 1861–8; Symbolæ Sirenologicæ, J. F. Brandt, pts. 2 and 3, 1861–8, 4to.; Reis. in Amurlande, Botan. Theil, F. Schmidt, 1 v., 4to, 1868; Die befruchtenbeiden Farrnkrautern, E. Strasberger, 1 v., 4to, 1868. Nova Acta Reg. Soc. Scient., Upsal, 3d ser., Vol. V, pts. 1-2, 4to, 1866–8; Abhandl. der Naturalvist. Gesell. Nurnberg, Vols. III and IV, 1866–8, 3 pts., 8vo; Sitzungsber. and Denkschriften der Kais. Akad. Wissensch., Wien, Vol 56, parts 1–3, 1868, 3 vol., 4to: Zeits. der Oesterr. Gesellsch. fur Meteorol., Wien, 1868, 1 v., 6vo; Jahrbuch & Verhandl. der K. K. Geolog. Reichsanstalt, Wien, 1868, 3 pts., 8vo; Verhandl. der K. K. Zoolog.-botan. Gesellsch., Wien, Vols. 17 and 18, pts. 1–4, 1868, 8vo; Monatsber. der K. Preuss, Akad. der Wissen. Berlin, 1869, 2 v. 8vo; Die vegetations verhaltniss von Croatien, Dr. A. Neilreich, Wien, 1868, 1 v. 8vo; Sitzsungs. der Naturwis. Gesell. Isis, Dresden, 1868–9, 2 v., 8vo; Der Zoologische Garten, Frankfurt, Nos. 6–12, 1868, 8vo; Zeitsch. der Deutsche Geolog. Gesell., Berlin, vol. 20, pt. 3, 1868, 8vo; Nachricht der K. Gesell. der Wissen. und George Augusts Univers. Gottingen, 1868, 1 v., 8vo; Correspond. der Zool. Mineral. Vereins Regensburg, 1868, 1 v., 8vo; Wurtemburg

Naturwiss. Jahreshefte, Stuttgart, 1868, 1 v., 8vo; Schrift. der Naturforsch. Gesell. Danzig, 1866–8, 2 v., 8vo; Jahresber. der Naturforsch. Gesell. Emden, 1867, 1 v., 8vo; Mittheil. aus der Osterlande, Altenburg, vol. 18, pts. 3, 4, 1868, 1 v., 8vo; Abhandl. der Naturforsch. Gesell. Halle, 1868, 1 v., 4to; Beobacht. des Meteorol. Observ. Hohenspeissenberg, 1851–64, and Ann. der Munch. Sternwarte, 2 v., 8vo, 1868; Uber die Theorien der thierisch. Organismen, C. Voit, Munchen, 1868, pam., 4to; Sitzungs. and Almanach der Kon. Akad. der Wissen. Munchen, 1867–8, 10 pts., 8vo; Denkrede auf H. A. von Vogel. 1868. Verhandl. 1868, Verslag. en Mededeel. 1868. Jaarboek, 1869. Catal. van de Boekerij, 1868, Process-verb., 1867–8, der Kon. Akad. van Wetenschap. Amsterdam, 1 vol., 4to, 5 vol., 8vo; Nederl. Meteorol. Jaarboek, 1867, and Temperature of Sea at south point of Africa, Utrecht, 1853, 3 vol. 4to. Oversig. Kong. Danske Videns. Selskabs, Kjob., 1867–8, 3 Nos., 8vo; Det Kon. Norske Univer. Aarsberet, 1867; Forhandl. i Vidensk. Selskabs, 1858–'67, 10 vol., 8vo; Beretning om Fiskerei udstill. i Aalsund, 1864, 1 v. 8vo; Norges Offic. Statistik, 1868, 3 vol. 4to; from Christiania, Norway. Beretning om den Internat. Fiskeri udstill., Bergen, 1867, 1 v., 8vo; Forteg. over de af Fiskinspekteur i Stockholm: Baaheslens Fiskerier, A. Andersen, 3 pam., 8vo. Les Peches de la Norvege, H. Baars, Paris, 1867, pam., 8vo; Bull. de la Soc. Imp. des Nat. de Moscou, 1868, 1 v., 8vo; Man. de la Soc. Physique de Geneve, Vol. XIX, pts. 1 and 2, 1866–8, 2 vol., 4to; Bullet. 1868, and Annuaire, 1869, de l'Acad. Roy. des Sciences, etc., Bruxelles, 3 vol., 8vo; Recherches sur la Syphilis, W. Boeck, Christiania, 1862, 4to; Memoires pour servir a la Connais. des Crinoids viv., M. Sars, Christiania, 1868, pam., 4to; Exeunte Octobri ad Filiolum, Ekker, Amsterd., 1868, pam., 8vo; Expos. Internat. d'Objets d'Horticult., St. Pets'bg, 1869, pam., 8vo. Geology of Trinidad, W. I., 1 vol., 8vo; Reports on parts of the Geology of Ireland, Dublin, 1843, 1 vol., 8vo, from the Geol. Survey of Great Britain. Mem. of U. S. Sanitary Comm., Statistical, 1869, 1 vol., 8vo; Proc. and Journ. of Roy. Hortic. Soc. Jan.–Mch, 1869, 2 pts., 8vo; Proc. Amer. Acad. Arts and Sciences, Vol. VII, 1868, p. 345 to end; Memoirs of Bost. Soc. Nat. Hist. I, 4, 1 vol, 4to; Entom. Corresp. of T. M. Harris, M. D., (from same) 1869, 1 v., 8vo.

Dr. Kellogg exhibited some plants collected by him during his recent tour to Humboldt Bay. He stated that his Vaccinium-leaved oak had been ascribed to Sir W. Hooker, and also considered a dwarf variety of *Q. chrysolepis*, but he would correct both these errors, as *he* had described it in these Proceedings, Vol. I, p. 96, and had found no intermediate specimens, though the two species grow near together. He exhibited his colored drawings of this, of *Brodiea coccinea* Gray, and *Chlorogalum angustifolium* Kell., for comparison with specimens. He found that land covered with a growth of a species of *Ceanothus* was considered most valuable by dairymen, because the milk of cows feeding on it gave more cream than when fed on other plants.

Mr. Bloomer reported that the "Wild Parsnip" presented October 4th was the *Cicuta maculata* Linn., usually called "Water Hemlock," and well known in the East as a deadly poison.

Regular Meeting, November 15th, 1869.

President in the Chair.

Donations to the Cabinet: Cinnabar, quartz and porphyry, from a point thirty miles north of Clear Lake, presented by Dr. Green through Mr. Yale.

Dr. Behr stated that a collection of butterflies, received by him from Colorado Territory, contained several species of a very Arctic type, and others of genera common to Germany, but rare in those parts of the United States heretofore explored.

Col. Ransom read the following paper:

Shell Mounds.

BY LEANDER RANSOM.

The subject of "Ancient Mounds" and their builders has attracted the attention of antiquarians, and men of science generally, for years. Much has been written on the subject, and much may be written, yet conjecture forms the basis of our knowledge regarding them.

California does not appear to have been visited by the "mound builders," whose works are numerous in the Mississippi Valley, as no trace of their work has yet been discovered on our coast. The only "ancient works," in the form of mounds yet discovered, are what we familiarly term "Shell Mounds," in consequence of their composition being largely of shells.

My attention was attracted at an early day to their existence on this coast, and from some memoranda made by me in 1854, I have drawn up this sketch, showing the position, appearances, and dimensions at that time, of a group of such mounds situated about one-fourth of a mile inland from the Bay of San Pablo, on the west side, a short distance below San Pedro Point, in Township 2 North, Range 6 West, Mount Diablo meridian. There are four of them. The largest is eighty feet in diameter on the top, forming a perfect circle, and twenty feet in height, with sides sloping about one and half degrees to one degree. Capt. Simpton, the proprietor of the land on which they were situated, has erected a comfortable dwelling on the top of it, two stories in height, where he resides.

Immediately in the rear, and extending northwardly, are three others, about the same distance from each other, respectively sixty, forty-five and forty feet in diameter at the top, and fifteen, twelve and ten feet in height, with a basin-shaped depression in the top of each. They are situated in a beautiful and picturesque valley, well wooded, and thoroughly shielded from the prevailing summer winds, by the surrounding hills and high lands, with a stream of water at their base, and in full view of the waters of the Bay.

Here must have resided a chief of a tribe, with his "men of science" about him, as the position and shape of these mounds indicate more than ordinary Indian skill and design.

Differences of opinion may and probably do exist as to the origin of these mounds, yet the more general opinion appears to be that there was no other definite object in their construction and subsequent growth than the one herein suggested. They are undoubtedly the work of the present race of Indians on this coast and their immediate ancestors.

Those that I have seen are uniformly situated in the neighborhood of beds of mussels or other shell fish, either on the banks of bays or streams of water, distant from a few chains to a quarter of a mile. A favorable place is selected for a residence or lodge, and a commencement is made by excavating a depression in the earth and throwing up a circular ridge; or where the ground is too low, commencing a foundation by a basin-shaped deposit of earth. Around and on the ridge, poles or stakes are planted, with the tops connected, to form a haystack-shaped structure, which is covered by bark, or more generally with the skins of animals. Around this lodge the refuse of their shell-fish, as well as the bones and other offal from other animals are thrown daily. After years of such deposits and accumulation, which at different times has been more or less covered over with earth when the stench became too offensive, and when fleas and other vermin became unbearable, a "purging by fire" is resorted to; then new structures are formed, and another series of years and deposits is added.

Let this extend to centuries, as has been the case on this coast, and you have the shell mounds which we see in favorable and desirable localities.

There is another species of mounds similarly formed, but not for the same purpose, which I may call attention to at a future day.

Mr. Yale read some notes on the "meteoric showers" of the night of the 13th and 14th instants, as observed by him.

The sky was clear before midnight, but fog partially obscured the sky from 12.30 until 3 A.M. He saw no meteors except at 4.45, when "the largest and most brilliant meteor I ever witnessed shot through directly from east to west. It illuminated the heavens and the earth on the line of its track, and appeared four to five inches in diameter, with an indefinite length, exploding with a fan-like shape of at least ten feet in breadth on an estimate, not unlike the appearance of a sky-rocket exploding. I heard no noise from the explosion."

Regular Meeting, December 7th, 1869.

President in the Chair.

J. Taylor and A. W. Bowman were elected resident members.

Donations to the Cabinet: A large collection of shells, radiata and fossil corals, with cones of *Pinus tæda*, from Florida, by R. E. C. Stearns.

Donation to the Library: Catalogue of recent Mollusca, part 4, by S. R. Roberts, Philad., 1869, pam. 8vo., from the author.

Prof. Whitney stated that in the Rocky Mountains of Colorado he had observed only six species of Coniferæ.

Dr. Behr mentioned *Eucalyptus marginata* as plentiful in Australia, which he thought might be imported with advantage for use in building wharves, as the logs are not attacked by the teredos. Another tree grows in salt marshes and might be cultivated in such situations here, (*Avicennia tomentosa?*).

Prof. Whitney read a very interesting letter from Baron von Richthofen on his recent explorations in China, where he has been a year and a half. He recognized there the "Taho sandstone;" next, a series of shales 1,200 to 3,000 feet thick, widely distributed; third, a superposition of limestone schists; fourth, a period of volcanic disturbances and outbursts of granite; fifth, an undisturbed stratum of sandstone; sixth, one of limestone, 600 feet thick, full of fossils, some of Devonian appearance; seventh, another limestone formation, followed by sandstone conglomerate, porphyritic tufa, and clays, as observed on the Yang-tze-kiang.

Professor Whitney read a letter from Mr. J. E. Clayton, dated Hamilton, Nevada, October 21st, 1869, and giving a sketch of the geological structure and mode of occurrence of the silver ores in the White Pine District.

Mr. Clayton gives the following section of the rocks in that region:

	Feet.
Very brittle, chiefly limestone, with *Productus, Spirifer*, corals and flint nodules	1,000
Greenish sandstone	60
Black bituminous shales	400
Encrinital limestone	60
Pink shales and sandstones	300
Silver-bearing limestone, with abundant corals and small bivalves	1,500

He considers the silver-bearing rocks as probably of Silurian age. In regard to the occurrence of the ore, he writes as follows:

"The ore is found, *first*, in certain lines of fractured country rock, which I call 'ore-channels,' or zones of metal-bearing country. The ore-channels have been in all cases brecciated or crushed by mechanical movements of the earth's crust, and sometimes extensive faults or vertical displacements are seen along the crushed lines, but not always. In some of the most extensive brecciated beds of limestone no material displacement has occurred; as, for instance, in the great Aurora ore-channel, which is one hundred to two hundred feet wide, and one mass of broken limestone, the angular fragments being of all sizes, from that of minute pieces to large blocks. In the interstices of this mass the quartz and ore have been deposited, the small fragments being completely changed to quartz, the large ones only partially so.

"*Second*—In layers between the bedding of the limestone in masses of all shapes and sizes, from a few pounds in weight to hundreds of tons, always connecting immediately or remotely with some vertical fissure or brecciated channel of country rock.

"*Third*—In vertical fissures, cutting the country to unknown depths; but there are no true veins of ore in these fissures; they are filled with silicified breccia of the same general character as that found in the ore-channels.

"Many of the true fissures are filled with banded spar veins; but they are barren and are of a later formation, in many cases cutting through the ore channels and country rock indiscriminately. There have evidently been two periods in the changes made here: *First*—A partial upheaval, fracturing the limestone beds, but not breaking the more flexible overlying shales, which thus confined the heated waters and gases to the limestone. This was the quartz- and ore-period. *Second*—An upheaval, breaking the whole series of overlying rocks, making new fissures, reopening old ones, and depositing spar."

Prof. Bolander spoke of the recently reported rise of six feet in the waters of Mono Lake, said to be accompanied by a freshening of the waters and the disappearance of the dense clouds of flies, of which the larvæ were formerly so abundant in the lake.

Prof. Whitney stated that the ancient water-marks showed that the lake was once 600 feet higher than now. He added that Pyramid and Great Salt Lakes had also risen very much in the past two years. He thought there were probably cycles of rise and fall in the waters of the Great Basin corresponding to periodical changes of the climate. There had been an unusually large rainfall east of the Sierra Nevada in the past year.

A discussion followed on the probability of these facts being connected with the uncommonly small rainfall in California this winter.

Regular Meeting, December 20th, 1869.

President in the Chair.

Fifteen members present.

Donation to the Cabinet: A fresh specimen of *Cosmos bipinnata* raised from seed sent from Guadalajara, Mex., by Baron Terloot, by Dr. Behr.

Prof. Whitney read the following paper:

Notice of Explorations in the Rocky Mountains.

BY J. D. WHITNEY.

Professor Whitney gave some of the results obtained in an exploration of a portion of the Rocky Mountains during the previous summer. The party, which was well provided with instruments for topographical, astronomical, and barometrical work, consisted chiefly of professors and students from the Mining School of Harvard University, and was also accompanied by Professor Brewer, of the Yale Scientific School, and Mr. C. F. Hoffmann, of San Francisco. A careful triangulation was made of the dominating range of the Rocky Mountains between Gray's Peak and the south edge of the South Park, and a map drawn by Mr. Hoffmann, on a scale of two miles to an inch, embracing an area of about 3,500 square miles. This map includes the whole of the South Park and its vicinity; but not the whole of the main divide of the Rocky Mountains, that portion which lies to the northwest of the head of the Arkansas River being necessarily left to be completed at a future time. It is hoped that it will be possible to extend the topographical work to the north and west, so that a detailed map may be prepared of the whole of the highest portion of the Rocky Mountains.

Among the results obtained by this exploration was the determination of the elevation of some high points not previously measured. The highest peak ascended lies to the west of the Arkansas, and it surpasses in elevation any yet observed in the Rocky Mountains. It was named Mount Harvard, and found to be 14,270 feet in height. The next highest points are: Gray's Peak, which was ascertained to be 14,145 feet in elevation; Mount Lincoln, 14,123 feet; and Mount Yale, 14,078 feet. Many other points were measured, but these were the only ones that were found to be over 14,000 feet high.

Dr. Parry is the only other explorer who has published any measurements of the peaks of this region. Having, however, no station barometer nearer than St. Louis, his results are liable to considerable uncertainty, as is shown by the fact that his elevation of Denver was found by the spirit-level surveys of the Central Pacific and Denver roads to be 282 feet too great, a result closely corroborated by the Kansas Pacific Railroad surveys. Dr. Parry also obtained for the height of Gray's Peak a result one hundred feet greater than ours. In every other instance where observations were taken by the Harvard Mining School party at stations previously occupied by Dr. Parry, the results of the latter are found somewhat too high, the discrepancy varying from 50 to 450 feet. This would indicate that the elevation of Pike's Peak, given by Dr. Parry at 14,216, may also be a little too high. But, to obtain the necessary data for working up to the last degree of accuracy the barometrical observations taken in this region, it will be necessary that stations be made on the plains at the base of the mountains—say at Denver—and at some point as high up as possible—as, for instance, Georgetown or Montgomery—and the observations continued for at least one year synchronously at the two stations.

In the meantime, it will be convenient to have the approximate heights of all the points in the Rocky Mountains yet measured, and which exceed 14,000 feet in elevation. They are as follows:

	FEET.
Mount Harvard	14,270
Gray's Peak (*a*)	14,245 (Parry)
Pike's Peak	14,216 (Parry)
Mount Lincoln	14,123
Mount Yale	14,078
Long's Peak (*b*)	14,050 (?)

(*a*.) This result is 100 feet greater than that obtained by the Harvard party.

(*b*.) This is an estimate based on a barometrical observation by Messrs. Powell and Byers, without any corresponding base observation. The barometer stood at 18.100 inches.

From the above it will be seen that no point has yet been found in the Rocky Mountains as high as several in the Sierra Nevada. It will also be noticed as a remarkable coincidence how little the highest points differ from each other in elevation.

It is thought by some that there are still higher peaks than any yet measured, to the southwest of Mount Harvard and Mount Yale, in the yet unexplored regions lying between the Arkansas and the Grand. This party was unable to carry its work so far in that direction as would have been necessary in order to decide that point.

The other results of this expedition will be worked out and published in due time.

Dr. Carl Von Scherzer, Chief Commissioner of the Commercial and Scientific Embassy from the Austrian Government to Eastern Asia and America, was invited to address the Society, and gave an interesting account of his observations in China.

Dr. Cooper presented the following:

The West-Coast Fresh-water Univalves, No. 1.

BY J. G. COOPER, M.D.

In the "Geographical Catalogue of West-Coast Mollusca," published 1867, I gave the names and range of the species known at that time; but having collected comparatively little in the interior, and being unable to obtain from Eastern conchologists a named series of even those I had collected, I compiled the list from the most recent publications of the work of others. Since that time, by the accumulation of new materials, that catalogue has already become antiquated, and I now propose to give some results of these later collections, made partly by me, but chiefly by my friends, Rev. J. Rowell, H. P. Carlton, G. W. Dunn, L. G. Yates, H. N. Bolander, Dr. C. A. Canfield, W. G. W. Harford, W. H. Holder, C. D. Voy, and the late J. Hepburn. To the two first named gentlemen I am especially indebted for typical specimens of the new forms discovered by them, and lately described by Tryon and Lea.

The Academy's Museum has also supplied types of several species discovered by Dr. J. B. Trask, Dr. J. A. Veatch, and the late Dr. A. Randall, some of them but lately described from the collections of Mr. W. M. Gabb and Dr. W. Newcomb, who obtained many from the same sources. (See also, Dall, in Vol. III, p. 264, on subfam. *Pompholinæ*, etc.)

Geographical Distribution.

The geographical distribution of fresh-water shells is very different usually from that of the terrestrial or marine species, and differs among themselves very much according to the family to which they belong. One generalization may be safely made, viz: that the Pulmonate species have often a vast range, while those able to live but a short time out of water are confined to comparatively narrow limits, each stream or lake often having its species nearly or quite peculiar. Local variations are also common among the Pulmonates, but not so strongly defined, nor usually admitting the rank of species.

Thus, among 20 Limneids given in the Geog. Cat., the first, *L. stagnalis*, is undoubtedly circumpolar in range, those of the two continents being undistinguishable. The third, *L. elodes* Say., (*palustris* Linn.?) is considered by many authors identical with the European form, but seems to me as well entitled to specific rank as many others. This we have in common with the Atlantic slope, but we also have several local varieties, at first called species, e. g., *proxima* Lea, *Traskii* Tryon, and perhaps others.

The other Pulmonates are, however, all peculiar to North America, and even to this west slope, in the opinion of several recent authors.

The *local* distribution of species is more interesting to naturalists on this coast. On account of the peculiarity of our wet and dry seasons, in which latter nine-tenths of the surface-water dries up in this State, it is not generally so well adapted for the concentration of many species in one locality as east of the Mississippi. Most of our waters, therefore, furnish but few species, and so isolated are they in the dry season that many local forms are generated by the influence of local causes.

The most notable exception so far discovered is near the junction of the Sacramento and San Joaquin rivers, where, by the discoveries of Messrs. Carlton, Rowell, and Dunn, we are informed of the occurrence of no less than twenty-one univalves and five bivalves in the fresh water. This point, as we well know, receives the flow of waters from a vast range of country extending from Lat. 35° to 42°, or about 500 miles, with a width of over 100. Doubtless there is no other point on the coast where so many can be found, and by extending the region as far as Sacramento and Stockton five or six more forms may be added, all of which will probably be yet detected near the former place.

At Mountain Lake, near San Francisco, a sheet of permanent and clear water, shallow but cool at all seasons, we find only seven forms of univalves and three bivalves, which is even more than I have heard of in any other so limited space. At Santa Cruz, a year's search in two perpetual streams furnished only five univalves and two bivalves, four of the seven distinct from those of Mountain Lake.

Walnut Creek, however, a little stream running N.W. from Mt. Diablo, half dry in summer, supplied Mr. Yates with eight univalves and one bivalve in a semi-fossil state; and, quite remarkably, I found three of the former distinct from those of the river junction, a few miles eastward, where, however, closely allied forms take their place.

Thus we find in every locality, however limited and closely joining others, a peculiar group of forms, among which are usually one or more of each prominent genus, representing those found elsewhere. This alone is strong evidence that the numerous local forms of these genera are only varieties, although perhaps reproduced at several distant points under similar circumstances.

Specific Characters of the Limneidæ.

The great difficulties and differences of opinion among naturalists, as to what constitutes a species, are nowhere more strikingly exhibited than in the fresh-water mollusca, on account of the variability just mentioned as connected with their local conditions. Sometimes it is easy to perceive the causes of variation, and to give these their due weight as mere accidental circumstances, but more frequently we can only assign them to some unknown local influences. Some authors, from studying only dead shells, are led to give such variations undue importance; or, from the ambition to make new species, wilfully pervert them to the rank of good specific characters.

I will briefly mention some of the characters that seem only of varietal value, and those apparently really specific. The thickening at or near the edge of the lip is attributed by Dr. J. E. Gray to the necessity for a stronger margin either during the winter hibernation or the low water of the dry season, and my observations confirm this, as all our forms without this character when mature inhabit waters never frozen nor dried up. Other waters, liable to dry up wholly or in part, furnish specimens differing only in having the lip thickened. I therefore consider this as the normal condition, and its absence as merely varietal, when uncombined with other characters. Only the subfamily *Ancylinæ* is destitute of it in all cases.

Dr. J. Lewis attributes the malleation of some species to rapid growth in warm water, causing the shell to solidify unevenly; and also mentions apparent metamorphoses of one species into another quite different, merely from change out of still canal water to that of a rapid brook.

As to the first observation, I think that the forms called *Limnophysa palustris*, and *elodes*, often considered identical, and as having a circumboreal range, at least as far north as Lat. 60°, sufficiently disprove it, for this malleation is one of the chief characters distinguishing them from their more southern allies *L. umbrosa*, *Nuttalliana*, etc.

The second statement is so opposed to the testimony of all other observers that it seems to me to require confirmation.

Size, in connection with thickened lip and other marks of maturity, has been made a specific character without good reason, for we find specimens, differing in small size from larger types, confined to small springs, cold water, or transient pools, where the want of nourishment is sufficient to stamp them as merely dwarfed races.

Color is another character often relied on as specific by those who study only the dead shells. A few bleached specimens, picked up by an inexperienced collector in a dried-up river bed, have been considered of natural color by even the cautious and exact Dr. A. A. Gould, as when he named *Physa virginea* from this very circumstance of "porcelain-like color," the living shell being really of the usual amber-yellow of the thin species.

Again: his *Physa virgata* was named from pale stripes alternating with the usual hue, and the *Ph. striata* of Lea, as well as the *Ph. sparsestriata* Tryon, were founded chiefly on the same character. In all cases, however, the specimens came from waters either brackish from salt mixture or from the alkalies so common in the drier portions of this State, and appear to me merely accidental varieties due to the introduction of the salts into the shell.

I may add, that from my observation *all* the species are normally, when living, of some shade of horn-color, varying from pale amber to dark brown, or when opaque becoming black. Also, that all those of any one locality are usually very similar in the color and thickness of their shells, the latter depending on the amount of lime in the water. This similarity extends to the colors of the animals, for of the ten univalve species found in Mountain Lake all have the same tint and thickness of the shell, and the same smoky-black hue of the animals, except an occasional spotted var. of *Physa*.

In many places the shells are all incrusted with the black protoxide of iron, and in others with the red sesquioxide. It is, therefore, useless to include color as a specific character, although its variations may not always be so easily explained.

Some species appear to absorb the thickening of the lip when making a new annual growth, while others retain it and thus show three or four dark bands, corresponding to as many years' growth, and these multiplied bands form usually a good specific character. Some probably exist for only one year, but this is unsettled.

Sculpture furnishes specific characters only in a few. Other *good* specific characters appear to be those founded on the general form, the modifications of parts, such as the columella, umbilicus, body-whorls, spire, number of whorls, and proportions of length to breadth, mouth to length, or body-whorl to spire. The authors who have adhered closely to these points have established the most reliable species.

Having studied specimens of all the following species and animals, except those marked with a Q, I have arrived at the conclusions given in the synopsis as to their true position. As to most of the others, the accuracy of the descriptions and figures given by their authors make their determination pretty certain; and if I have misunderstood them I do not feel accountable for the fact, as imperfect descriptions are worse than none.

Many of the higher divisions are founded in part on characters of the soft parts, but are intelligible without these, which may be found described in most recent works.

As I propose, at some future time, to give the special distribution of our species in a tabular form, with the numerous amendments required since the publication of the Geog. Catal., I now limit myself to making out a synopsis of the species and their leading characters, omitting much detailed criticism of each, more suited for a purely conchological journal. The present article includes only the family *Limneidæ*, which numbers nearly two-thirds of the nominal species said to be found west of the Rocky Mountains, between latitudes 32° and 49°. I have also collected materials for a similar synopsis of the others, but not yet so complete as for this family. The plan followed is similar to that used by me in Vol. III, p. 331, for the *Helicoids*.

The * indicates original measurements of authors, in hundredths of an inch.

Order PULMONIFERA.

Subord. LIMNOPHILA.

Fresh-water section, with shells.

Fam. *Limneidæ.* Shell thin, corneous, elongated spiral, planorboid, or patelliform.

Subfam. *Limneinæ.* Shell dextral, spiral, elongated, last whorl usually very large, mouth oblong.

Genus LIMNEA Lam. Spire attenuated, long, very slender, whorls flattened, outer lip spreading, umbilicus scarcely perceptible.

1 stagnalis *Linn.* Wh. 6, mouth about half total length; diam. 0.60 to 1, alt. 1.60–2 10.

2 lepida *Gld.* Wh. 5, mouth a little over half of length, spire thicker in proportion, otherwise like last; diam *0.25, alt. *0.60.

Subgenus *LIMNOPHYSA* Fitz. Spire gradually tapering, whorls rounded, the last less swollen, often umbilicate.

§ 1. Columellar lip strongly twisted, appressed, nearly hiding umbilicus.

† Diameter not over half of length. Outline sublanceolate.

‡ Malleated. (Varieties often smooth.)

3 elodes *Say*. Wh. 6–7, mouth about half of total length; diam. 0.50–0.60, alt. 1.00 to 1.35.

Var. *proxima* Lea. Wh. 6–7, mouth .40 of length; diam. *0.30–0.40, alt. *0.75–0.95.

Var. *Traskii* Tryon. Wh. 6, mouth and whorls more rounded, umbil. larger; diam. *0.32, alt. *0.64.

‡ ‡ Minute revolving grooves, chiefly on body-whorl, or smooth.

4 umbrosa *Say*. Wh. 6–7, mouth .45 of length, lip widely expanded; diam. *0.45–*0.60, alt. 1.30–1.55.

Var. *Rowellii* Tryon. Wh. 6, more slender and delicate, lip not expanded; diam. *0.40, alt. *1.00.

5 Nuttaliana *Lea*. Wh. 6, mouth .55 of length, whorls swollen; diam. *0.35–0.65, alt. *0.75–1.25.

Var. *Sumassi* Baird. Broader; diam. *0.40–*0.50, alt. *0.75–*1.12.

6 Tryoniana *Lea*. Wh. 5, mouth .45 of length, grooves obsolete; diam. *0.25–0.35, alt. *0.55–0.70.

7 desidiosa *Say*. Wh. 5, mouth .55 of length, grooves strong, spire slender; diam. 0.10–0.30, alt. 0.25–*0.70.

8 obrussa *Say*. Wh. 5, mouth .55 of length, grooves obsolete, spire short; diam. *0.20–0.35, alt. 0.45–0.60.

§ 2. Columellar lip little twisted, flattened, not appressed, usually leaving umbilicus open. Outline subovate.

† † Diameter usually more than half of length. Grooves variable.

9. Adelinæ *Tryon*. Wh. 5, mouth nearly .60 of length, umbil. open; diam *0.34, alt. *0.56.

Var. *Gabbii* Tryon. Wh. 5–6½, mouth similar, umbil. usually closed; diam. *0.28–0.45, alt. *0.62–0.95.

Q. 10 Binneyi *Tryon*. Wh. 5–6, mouth .68 of length, spire short; diam. *0.52, alt. *0.76.

11 bulimoides *Lea*. Wh. 5, mouth .55 of length, spire obtuse; diam. *0.22–0.30, alt. 0.38–0.45.

Q? Var. *solida* Lea. Wh. 5, thicker; diam. *0.25, alt. *0.40.

Q? Var. *apicina* Lea. Wh. 4, spire short; diam. 0.30, alt. 0.40.

12 humilis *Say*. Wh. 5–6, mouth half of length, spire acute; diam. *0.20, alt. *0.35.

Var. *exigua* Lea. Wh. 5, more slender; diam. *0.15, alt. *0.35.

Var. *ferruginea* Hald. Wh. 4–5, umbil. more or less covered; diam. *0.15, alt. *0.35.

Genus PHYSA Drap. Shell oblong, sinistral, thin, spiral, aperture sub-oval, columella twisted.

§ 1. Columellar lip strongly twisted, appressed, leaving little or no umbilical fissure behind it.

† Diameter not over half of length.

‡ Outline ovate-lanceolate, whorls very oblique. Rarely malleated.

13 gyrina *Say.* Wh. 5–6, mouth .55 of length, 1 to 3 lip-bands; diam. 0.20 to *0.40, alt. 0.50–*0.90.

14 virginea *Gld.* Wh. 5–6, mouth .60 of length, lip rarely thick; diam. *0.30–0.60, alt. *0.60–0.75.

15 venusta *Lea.* Wh. 4–5, mouth .70 of length, spire short, lip thick; diam. *0.26–0.30. alt. 0.55–0.70.

Var. *hordacea* Lea. Wh. 5, mouth .60 of length, lip thick, darker; diam. *0.13, alt. *0.27.

† † Diameter half to two-thirds of length.

‡ ‡ Outline acute oval, whorls not very oblique. Sometimes malleated.

16 Carltonii *Lea.* Wh. 5–6, thick, mouth .70 of length, 1–3 lip-bands; diam. 0.35–0.55, alt. 0.50–1.00.

17 Gabbii *Tryon.* Wh. 6, mouth .60 of length, inner lip expanded; diam. 0.25–*0.50, alt. 0.40–*0.90.

Var. *Traskii* Lea. Wh. 6, mouth .70 of length, thicker and darker; diam. 0.35–*0.45, alt. 0.60–*0.76.

Var. *occidentalis* Tryon. Wh. 5–6, mouth .70 of length, columella notched anteriorly; diam. *0.42, alt. 0.70.

Var. *D'Orbignyana* Lea. Wh. 5, mouth .75 of length, striped; diam. *0.32, alt. *0.55.(=*striata* Lea.)

Var. *sparsestriata* Tryon. Wh. 5, mouth .65 of length, lip thin, stripes few; diam. *0.28, alt. *0.48.

18 Blandii *Lea.* Wh. 4–5 (usually eroded), mouth .75 of length, diam. *0.30, alt. *0.48.

Var. *distinguenda* Tryon. Wh. 4–5, acute, mouth .65 of length, lip thin; diam. *0.28–0.35, alt. *0.52–0.60.

Q?=*Grosvenorii* Lea. Wh. 5, spire longer; diam. *0.18, alt. *0.30. (Prior name.)

Q?=*Nuttalii* Lea. Wh. 4, mouth .60 of length; diam. *0.27, alt. *0.40. (Prior name.)

19 triticea Lea. Wh. 4, mouth .75 of length, heavy, color dark, diam. *0.14–0.20, alt. *0.27–0.35. (Nearest to *heterostropha.*)

Q. Var. *Cooperii* Tryon. Wh. 3–4 (eroded), mouth .75 of length; diam, *0.18, alt. *0.32.

20 malleata *Tryon.* Wh. 5, mouth .65 of length, malleation strong; diam. *0.25–0.32, alt. *0.45–0.55.

Q? Var. *parva* Lea. Wh. 4, mouth .65 of length, smooth, lip thin; diam. *0.11, alt. *0.19.

‡ ‡ ‡ Often very fine revolving grooves.

21 diaphana *Tryon.* Wh. 5, mouth .65 of length, yellowish, thick; diam. *0.28-0.32, alt. *0.50–0.55.

Var. *politissima* Tryon. Wh. 5, mouth .60 of length, spire shorter, lip thin; diam. *0.26, alt. *0.45.

§ 2. Columellar lip little twisted, flattened anteriorly, not appressed, leaving an umbilical sinus behind it.

††† Diameter about two-thirds of length, or more. Smooth.

‡‡‡‡ Outline obovate, often shouldered, whorls scarcely oblique.

22 ampullacea *Gld.* Wh. 6, mouth .80 of length, horn-color; diam. 0.42–*0.55, alt. 0.72–*1.00.

Q. Var. *Lordi* Baird. More shouldered; diam. *0.50–*0.75, alt. *0.75–*1.00.

Var. *propinqua* Tryon. Wh. 5, mouth .75 of length, spire shorter; diam. *0.48–0.50, alt. 0.72–*0.78.

Q. Var. *coniformis* Tryon. Wh. 5, mouth .75 of length; diam. *0.36, alt. *0.60.

23 humerosa *Gld.* Wh. 5, thick, mouth .65 of length, strongly shouldered; diam. *0.38–0.45, alt. *0.50–0.70.

Var. *virgata* Gld. Wh. 4–5, mouth .75 of length, less shouldered, striped; diam. *0.25–0.40, alt. *0.40–0.65.

†††† With strong longitudinal ribs.

24 costata *Newc.* Wh. 4, mouth .75 of length, shouldered, ribs 10–14; diam. 0.20–0.30, alt. 0.35–0.50.

Subgenus *APLEXUS* Flem. Shell elliptic-oval, sinistral, lustrous, columella slightly indented.

25 hypnorum *Linn.* Wh. 6–7, mouth .55, diam. about .40 of length; diam. 0.20–0.30, alt. 0.50–0.85.

Subfam. *Pompholinæ* Dall. Shell depressed, few-whorled, the last nearly including the flattened spire; base convex, mouth effuse, imperforate.

Genus POMPHOLYX Lea. The only one known.

26 effusa *Lea.* Wh. 2½–3, surface smooth, or with strong growth lines; diam. *0.32–0.38, alt. *0.25–0.30.

Subfam. *Planorbinæ.* Shell dextral, spire depressed, usually sunken, whorls visible from below.

Genus CARINIFEX W. G. Binn. Shell angled, spire terraced, body-whorl narrowed below, mouth subtriangular, umbilicus funnel-shaped. (Animal still unknown.)

27 Newberryi *Lea.* Wh. 5, with 2 principal and 2 or 3 minor angles (the outer ones sometimes replaced by malleations), suture channeled; diam. *0.55 to 0.70, alt. *0.42 to 0.60.

Var.? *minor* Cp. Wh. 3, with but two angles, suture not channeled; diam. 0.30–0.40, alt. 0.15–0.20.

Genus PLANORBIS Guett. Spire sunken, outer 2–3 whorls nearly on a plane above, rounded, about as deep as umbilicus, mouth nearly semi-circular. *a.*

a. For convenience of comparison, I consider the *right* side the top, as did all the older authors, thus bringing the mouth in the dextral position.

§ 1. Only three whorls visible above.

28 subcrenatus *Cpr.* Wh. 6, rounded, growth lines strong, often giving the outline a crenated appearance, mouth slightly narrowed below; diam. *1.05, alt. *0.36.

Q? *glabratus* Say. Wh. 5, obsoletely rugose, rounded, mouth oblique, sub-oval, several obtuse angles in outline; diam. 0.80, alt. 0.20.

Specimens, common inland, closely resemble this, but may be *subcrenatus*.

29 tumens *Cpr.* Wh. 4–5, nearly smooth, swollen, beneath more or less angled, narrowing the mouth to an obtuse triangle; diam. *0.63, alt. *0.27.

30 Hornii Tryon. Wh. 5, uniformly rounded, smooth, ends of lip nearly meeting, mouth suborbicular; diam. *0.84, alt. *0.28.

Q? 31. Oregonensis Tryon. Wh. 3, but two visible above, rapidly expanding; diam. *0.36, alt. *0.16. (Probably young of *Helisoma Binneyi*.)

§ 2. Four to five whorls visible above.

Q. 32 gracilentus *Gld.* Wh. 4, the same on both sides, rounded, the last obtusely carinated at middle, mouth oblique oval, wider than high; diam. *0.50, alt. 0. 2.

Subgenus *HELISOMA* Swains. Shell with last whorl much higher than spire, mouth usually higher than wide, sub-angled below, ear-shaped.

33 ammon *Gld.* Wh. 4, but 2½ visible above, nearly smooth, last whorl and mouth much higher than wide, spire deeply sunken and small; diam. *0.25–1.05, alt. *0.60–0.86.

Var.? *Traskii* Lea. Wh. 5, the two last of nearly equal height, less narrowed below; diam. *1.05, alt. *0.86.

34 occidentalis *Cp.* n. s. Wh. 5–6, nearly all visible above, much narrowed and sub-angled below, nearly smooth, mouth little higher than wide, diam. 0.80–1.00, alt. 0.50–0.70.

N. B. This has been called *trivolvis* and *tenuis*, but differs from both in the much greater narrowing of the whorls below (approaching *ammon*), and from all, in the larger number visible above in large specimens. From *ammon*, also, in lower body-whorl. Binney's fig. 193 represents a form of it. Its range extends from Washington Terr. to Kern Lake, and along the coast to San José.

Q. 35 Binneyi *Tryon*, Amer. Jour. Conch. III, 1867; *corpulentus* Hald. 1844, Gould, 1852, W. G. Binney, Land & Freshwater Shells, II, 1865, 115, fig. 191, 192, not of Say (?) Mouth little higher than wide; diam. *0.90, alt. *0.65.

Tryon gives no diagnostic characters, but the figures look like a small northern variety of *ammon*, not mature, and nearest to var. *Traskii* which is found at Stockton, etc.

Subgenus *GYRAULUS* Agassiz. Shell small, whorls rounded, sometimes flattened below.

36 vermicularis *Gld.* Wh. 3–4, cylindrical, or oval, upper surface nearly plane, lower more concave; diam. *0.20, alt. *0.06–0.07.

Q. 37 parvus *Say.* Wh. 4, section sub-angled at periphery, both surfaces about equally concave; diam. *0.20, alt. 0.07.

Subgenus *MENETUS* H. & A. Ad. Shell small, flat above, periphery, and sometimes the base, angled.

38 opercularis *Gld.* Wh. 4, rhomboidal in section, upper angle obtuse, with 1 or 2 sub-marginal impressed lines, umbil. sub-angled; diam. *0.25–0.33, height *0.06.

Var.? *planulatus* Cp. Higher, rounded below, whorls semilunar in section, no impressed lines; diam. *0.25, alt. *0.10. *b.*

Subfam. *Latiinæ.* Shell cryptiform, with an upper chamber, and a septum dividing the two.

Genus GUNDLACHIA Pfeiff. Shell sinistral, sub-patelliform, apex posterior, slightly twisted to the left, projecting as an obtuse spur beyond the margin, and nearly separated from the main shell by an internal flat septum, with a semilunar opening in front (in adult).

39 californica *Rwl.* Outline sub-oval, widest anteriorly; diam. *0.08, long. *0.16, alt. *0.06.

Subfam. *Ancylinæ.* Shell pateliiform, simple, conical.

Genus ANCYLUS Geoff. Shell dextral, shallow, mouth very wide, apex a little to the right, not prolonged backward.

§ 1 Apex about one-third the distance from the posterior end.

Q 40 crassus *Hald.* Outline oval, surface obtusely rounded, breadth over .75, height .38 of length; long. *0.32, lat. *0.25, alt. 0.12.

Q Var.? *Kootaniensis* Baird. Posterior slope concave, height .19 of length; long. *0.25, lat. 0.18, alt. 0.05.

41 caurinus *Cp.* Outline elliptical, sides parallel, apex acute, posterior slope slightly concave, breadth half, height a third of length; long. 0.25, lat. 0.12, alt. 0.08.

Var.? *fragilis* Tryon. Apex a little more posterior, lower, narrower, anteriorly wider; long. *0.16, lat. *0.04, alt. *0·04. (Description prior.)

§ 2. Apex nearly central.

42 patelloides *Lea.* Outline elliptic-oval, surface obtusely rounded, ray-striped, breadth three-quarters, height half of length; long. *0.33, lat. *0.25, alt. *0.16.

Q. Var. *altus* Tryon. Outline broad-oval, obtuse conic, one end narrower; long. *0.32, lat. 0.24, alt. 0.16.

Q? Var. *Newberryi* Lea. Unicolor, height not half of length; long. *0.55–0.70, lat. *0.40–0.50, alt. *0.20–0.30.

Q? Var. *subrotundatus* Tryon. Outline nearly circular, breadth over .75, height not half of length; long. *0.32, lat. *0.26, alt. *0.12.

Subgenus *ACROLOXUS* Beck. Apex directed to the left.

Q. 43 Nuttalii *Hald.* Apex a fourth of length from end, breadth nearly equal to, height over a third of length; long. *0.32, lat. 0.30, alt. 0.12.

b. This and No. 41 were mentioned without sufficient description in my Nat. Hist. of Washington Terr. etc., 1859, and I am responsible for the omission, as my father had left them in his MSS. report without specific names, which I supplied in the proofs.

Mr. Bolander read the following paper:

The Genus Melica in California.

BY H. N. BOLANDER.

The distribution of the various representatives of the genus Melica affords an interesting indication of climatic differences. By far the largest number of the species, belonging to this characteristic and well-marked genus, are found growing in dry and arid habitats. Of the fifty-seven species known, twenty-seven belong to the countries near or adjoining the Mediterranean Sea, and fourteen to the dry western coast of South and North America.

The distribution of our species accords well with these general facts, for east of the Rocky Mountains but one species is known to exist, while California has already yielded eight, and with several very marked varieties.

1. Melica imperfecta *Trin.*

M. colpodioides Nees, Steud. Syn. Plant. Gram., p. 291. A perennial and exceedingly variable grass, growing in deep, loose soil, forming large leafy tufts in lightly shaded places, especially around shrubs and on wooded hillsides. In deep shady woods and thickets it becomes quite depauperated, and has the habit of an entirely different grass. Cattle touch it only early in spring, when its leaves are yet quite delicate and soft. It is very common on the eastern flanks of the Coast Ranges, north and south of San Francisco—March and May.

Melica imperfecta var. *flexuosa* Bol.

This differs from the ordinary forms, in having a very open and simple panicle, with the reflexed branchlets generally in pairs, and few flowered. The flowers are paler and rather more coriaceous, and somewhat larger and acuminate; on rocks on the road from Mariposa to Clark's, at about 3,500 feet alt., June, 1866.

2. Melica poæoides *Nutt.*

A coarse tufted perennial, drab-colored grass, exceedingly variable in its habit. It usually grows in a hard, dry, clayey soil, of the more dry and arid portions of the valleys of the Coast Ranges. It is, in fact, the counterpart of M. imperfecta in point of selection of habitats. Its culms are mostly tumid and tunicated at the base.

On the last day of August, 1866, I collected a large tuft of this grass at the base of a moraine, near Mount Dana, at an altitude of 10,000 feet; it differs in no point from the more reduced and depauperated forms often found in the hot and dry valleys. This species has apparently a very wide range. It is not touched by cattle.

Melica poæoides var. *inflata* Bol.

Spikelets oblong, cylindrical, 5 to 6 eighths of an inch long, 6 to 8 flowered, uppermost abortive, closely imbricated.

Plumes unequal, oblong, tapering abruptly into a blunt point, scabrous, distinctly nerved, broadly hyaline margined (lower 3 to 5, upper 7-nerved).

Palets unequal; lower oblong (0.43 inch long) distinctly 7-nerved, (the three central excurrent, the others evanescent) scabrous and tuberculate, broadly hyaline margined toward the apex; lower about one-third shorter, pyriform, obtuse, coriaceous, tuberculate, ciliate. Anthers three, ($\frac{1}{8}$ of an inch long).

Root tuberous; fibres tomentose. Culms rarely cæspitose, 3 to 6 feet high, erect, terete, canaliculate, smooth and leafy. Sheaths scabrous, the lower longer and the upper shorter than their internodes. Ligules exserted, lacerated. Leaves lanceolate, one-eighth of an inch wide, 7 to 10 inches long, scabrous.

Panicle oblong, simple, 6 to 10 inches long, interrupted; branchlets very unequal, generally in fours, of which one is much longer than the rest, usually spreading and many flowered, while the others are unequally short and one or few flowered; the rachis and branchlets angular and retrorsely scabrous.

Quite common in dry soil, in the upper part of Yosemite Valley, 4,000 feet alt. July, 1856. (My number 6,121 of Catalogue, 1867.)

3. Melica Harfordii *Bol.*

Root perennial, fibrous; fibres tomentose. Culms cæspitose, terete, lower internodes declining, then erect, 3 to 6 feet high, glaucous, generally smooth, but sometimes scabrous, leafy, (4 to 7). Sheaths smooth or scabrous, lower ones longer, and the upper ones shorter than their internodes. Ligules short and obtuse. Leaves lanceolate, 6 to 14 inches long and $\frac{1}{4}$ of an inch wide, on the inside, as well as on the margins, retrorsely scabrous.

Panicle 6 to 12 inches long, $\frac{3}{8}$–$\frac{1}{2}$ inch wide, claviform, interrupted especially below, but more dense and compact towards the apex, branchlets in series of twos and threes, short, unequal and closely appressed, single or few flowered. Rachis and branchlets scabrous. Spikelets oblong, cylindrical, $\frac{1}{2}$ to $\frac{5}{8}$ of an inch long, 5 to 8-flowered, uppermost abortive. Plumes unequal, obtuse, membranaceous, distinctly nerved, lower unequal, upper nearly equally, 5-nerved. Palets oblong; lower coriaceous, but slightly scarious margined, 5 to 7-nerved. The middle nerve is generally extended into a short scabrous awn, obtuse or retuse, scabrous, pubescent especially on the margins; lower palet $\frac{1}{4}$ shorter, obtuse or retuse, ciliate.

Wooded hill-sides, Santa Cruz road, near Lexington, June, 1865. (My number 53 of small sets of grasses.) Redwood, on the upper Mattole River, June, 1867. (No. 6,464.) Shady debris, Yosemite Valley, June, 1866. Bear Valley, Nevada County, (4,500 feet alt.) on rocks and debris, June, 1869.

It gives me great pleasure to name this beautiful species in honor of W. G. W. Harford, a very zealous co-laborer in natural history for several years. Although the gentleman devotes most of his time to conchology, yet he has constantly embraced every opportunity to collect largely botanical specimens. He explored some of our northwestern counties, visited the coast south of San Francisco, and the Sierras in Mariposa County. Last summer he also made a large collection of botanical specimens in Oregon, along the Columbia River.

4. Melica aristata *Thurb.*

Root perennial; fibres smooth or tomentose. Culms cæspitose, 2 to 3½ feet high, leafy, erect, terete, canaliculate. Sheaths strongly pubescent or smooth, the lower longer than their internodes. Ligules exserted. Leaves 3 to 4 inches long, 2 to 3 sixteenths of an inch wide, lanceolate, strongly pubescent, or smooth (the smooth ones retrorsely scabrous). Panicle very simple, 5 to 8 inches long, erect, contracted, interrupted; the lower rather distant series of branchlets in twos or threes, upper single. Branchlets unequal, short, (two single flowered, the other few flowered) appressed, (but spreading while flowering), angular, scabrous. Spikelets, 5 to 6 eighths of an inch long, oblong, 4 to 5 flowered, uppermost abortive. Plumes unequal, oblong, obtuse, scabrous, scarious margined; lower three, upper distinctly 5 nerved, (all save the central evanescent). Palets unequal; lower oblong, scabrous, emarginate, scarious margined, 7-nerved, the central one of which is prolonged into a scabrous, erect awn, about the length of the palet; upper oblong, retuse, ciliate at the apex. Stamens three.

(Number 4,861, Catalogue, 1867.) Loose soil in open woods near Clark's, 4,000 feet altitude, 1866. In a similar habitat, Yosemite Valley, June, 1866. In loose soil along the Central Pacific Railroad, from Shady Cañon to the Summit, July, 1869. Shady Hillsides, on the road from Bear Valley to Eureka South, (5,000 feet alt.) July, 1869.

In the two last-named localities, the spikelets were frequently tinged with a dark purple. Dr. Hillebrand, of Honolulu, also collected this grass in 1864, on the higher Sierras.

5. Melica Geyeri *Munro.*

This species is No. 40 of my small collection, and No. 6,119 of the Catalogue, 1867, there enumerated as M. poæoides var bromoides *Bol.*

Col. Munro, to whom specimens were sent, makes the following remarks on this species: "Mr. Bolander may be right in considering this to be a variety of M. poæoides, but I think they are all distinct. In this the glumes are shorter than the flower and the terminal flower is acute. In M. poæoides the glumes are nearly as long as the whole flower and the terminal flower is very obtuse. I should call this M. Geyeri Munro = Melica bulbosa Geyer, Ms."

Root perennial, tuberous, tunicated; fibres villous. Culms 2 to 5 feet high, tufted or single, terete, striate and smooth. Sheaths scabrous. Ligules short, entire or lacerated. Panicle from 4 to 8 inches long, rather simple and loosely spreading; branchlets 1 to 5, very unequal, in the lowest series generally fewer and shorter. Leaves ⅛ of an inch wide, long, slender, scabrous. Spikelets loosely 5 to 7 flowered (4 to 7 eighths of an inch long), uppermost abortive, tinged with purple. Anthers three, ⅛ of an inch long.

This tall tufted grass has very much the habit of a Bromus. It develops most beautifully in loose soil, in the open woods and park-lands of the Russian River Valley, where it forms large tufts and attains a height of 5–6 feet. April, 1864. Common on the Coast Ranges.

It has been asserted that clavate or bulbous roots of grasses were owing to a hard compact soil. This assertion does not hold good in California, for our species having tuberous roots (M. poæoides var. inflata Bol.; M. fugax; M. Geyeri), occur in rather loose soils.

6. Melica acuminata *Bol.*

Number 4,698 of Catalogue, 1867, enumerated as M. poæoides var. acuminata *Bol.*

Root perennial, tuberous; fibres tomentose. Culms generally single, 2 to 3½ feet high, terete, smooth. Sheaths scabrous. Ligules very small, lacerated. Panicle rather compact and close, claviform, erect 5 to 8 inches long. Branchlets 2 to 5, short, unequal, appressed, few-flowered, the shortest single-flowered. Rachis and branchlets angular and scabrous.

Spikelets lanceolate, very loosely imbricated, 4 to 6-flowered, uppermost abortive, ¾ of an inch long. Plumes unequal, acuminate, hyaline, tinged with purple; lower 1-, upper 3-nerved (¼ of inch long), slightly scabrous on the nerves.

Palets very unequal; lower lanceolate, acuminate (½ inch long) distinctly 7 nerved, pubescent, hyaline margins exceedingly narrow; upper obtuse or retuse, much shorter than the lower, ciliate.

Anthers three 0.06 of inch long.

Redwoods near the seacoast in Mendocino County, May, 1866.

7. Melica stricta *Bol.*

Proceedings of the California Academy of Sciences, Vol. III, p. 4. This species forms large tufts on the shaded debris in Yosemite Valley (1 to 2 feet high). It differs from the eastern species M. mutica in being much smaller, in having a simple erect panicle and larger acuminate flowers.

8. Melica fugax *Bol.*

Root tuberous; fibres smooth. Culms cæspitose or single, 18 inches to 2 feet high, slender, pubescent, about three-leaved. Sheaths pubescent, the lower one longer than its internode. Ligules short and lacerated. Leaves 3 to 5 inches long, and about ⅛ of an inch wide, lanceolate, pubescent and scabrous on the margins.

Panicle 3 to 6 inches long, erect, very simple and open, lower series of branchlets in threes, upper in twos, very unequal, divergent or reflexed, single or few-flowered, the central one reduced to a mere pedicel, bearing a single spikelet. Rachis and branchlets angular and scabrous.

Spikelets ¼ to ½ of an inch long, 3 to 5-flowered, uppermost abortive, flowers loosely imbricated and articulated, breaking away very easily, even while flowering. Glumes unequal (the lower about ¼ shorter), obtuse; the lower distinctly 3-, the upper 5-nerved. Palets nearly equal; lower 7-nerved, scabrous; upper (sub lente) ciliate margined.

Apparently common on dry, sandy soil among "sage brush" (Artemisia), near Donner Lake; also, on dry hillsides on the road to Lake Tahoe. June, 1869.

This species has very much the aspect of a Poa.

Annual Meeting, January 3d, 1870.

President in the Chair.

Thirty members present.

The following gentlemen were elected Honorary Members:

Prof. Henry Milne Edwards, Paris, France.
Prof. Robert Bunsen, Heidelberg, Germany.
Prof. H. L. F. Helmholtz, Berlin, Germany.
Prof. Jas. D. Dana, New Haven, Conn.
Dr. Jeffries Wyman, Boston, Mass.
Dr. George Engelmann, St. Louis, Mo.
Prof. Benjamin Pierce, Cambridge, Mass.
Prof. T. H. Huxley, London, England.
Dr. J. D. Hooker, London, England.

The President read his usual annual address, which was very satisfactory as to the condition of the Academy, etc.

The Treasurer read his report, stating that the Academy was free from debt for the first time in many years.

The report of the Director of the Museum showed an improvement in that department of the Academy.

The Librarian's Report showed that the whole library had been re-arranged by Dr. Cooper, and the foreign works all catalogued, in addition to those in the English language before catalogued by Mr. E. Brooks. Also, that the number of books received from all sources, was annually increasing, being 189 the past year, and only 59 in 1868, though it was considered expedient by the Council to stop the subscription to most of the periodicals taken for two years past and to offer in exchange the publications of the Academy to those of them not before on the exchange list.

The following gentlemen were elected officers for the ensuing year:

PRESIDENT.

DR. J. BLAKE.

VICE PRESIDENT.

DR. A. KELLOGG.

CORRESPONDING SECRETARY.

LEO ELOESSER.

RECORDING SECRETARY.

H. P. CARLTON.

TREASURER.

ELISHA BROOKS.

LIBRARIAN.

DR. J. G. COOPER.

DIRECTOR OF MUSEUM.

H. G. BLOOMER.

A discussion on the subject of earthquakes occupied the rest of the evening.

REGULAR MEETING, JANUARY 17TH, 1870.

President in the Chair.

Twenty-five members present.

Mr. J. C. Brevoort of Long Island, N. Y., was elected a corresponding member. Mr. Donald Bruce was elected a resident member.

Donations to the Museum: Fishes and Crustaceans by Mr. Harford from Ounalaska Island. A specimen of *Buccinum cerulеum* from Plover Bay, Kamtschatka, by Dr. Cooper. A model of a mining shaft in Ballarat, Australia, representing the formations found to a depth of 200 feet, by Mr. Bloomer.

The fruit of a cucurbitaceous plant from Mexico was exhibited by Dr. E. Palmer, of the U. S. Agricultural Bureau, who stated that it germinates on the surface of the ground, and was eatable.

Donations to the Library: Books from Australia, through Dr. E. Müller, being duplicates of the proceedings of Societies, etc., received from there last year. Fragmenta Phytographiæ Australiæ Nos. 44 and 45, pam. 8vo. by Dr. E. Müller from the author.

Prof. Whitney concluded his account of the exploration of South Park, Colorado, and read a letter from Baron Richthofen, giving further notes of his geological surveys in China.

Prof. Bolander, made some remarks on the grasses of the genus *Melica* in addition to his published paper.

Dr. E. Palmer gave an interesting account of his journeys in Arizona and Sonora, the habits of the Indian tribes, and of the ruins of their ancient towns, with the relics which he had found in them.

Dr. Stout exhibited some globular concretions from Calaveras County, near Mokelumne Hill, and others from Fossil Hill, Nevada. He contended that some of them were composed of volcanic materials and had been formed by being thrown out from craters in a melted stated to a great height, then falling in water, by which their shape was produced, as in the manufacture of leaden shot.

Regular Meeting, February 7th, 1870.

President in the Chair.

Twenty-two members present.

Prof. Williams, Col. C. D. Gibbes, Abner Doble, Thomas Nelson, and Charles C. Rueger, were elected resident members.

Donations to the Cabinet: 25 species of land shells of Panama, etc., by Dr. Palmer through Mr. Harford. A large collection of Oregon and Californian plants by Dr. Kellogg, collected by himself, Prof. Bolander and Mr. Harford.

Donations to the Library.—The following foreign exchanges and donations were received through the Smithsonian Institute, viz:

Zoolog. Miscel. Nos. 14 and 15, 1867–8, two pam. 8vo.; Beiträge zur Fauna von Nikobar, II., 1868, pam. 8vo.; Uber Schmetterlings Selbstsfänger, 1868, pam. 8vo.; Uber Baumwollschädlings Egyptiens, 1868, pam. 8vo.; Uber Drehkraukheit bei Gemsem, 1868, pam. 8vo.—all by G. von Frauenfeld, Vienna. Untersuch über die Constitution der Atmosphäre, Dr. H. Gylden, 1868; Beobacht des gross Kunsten von 1861, O. Struve, 1868; Beitr. zur Entwickelungs der Libelluliden u. Hemipteren, A. Brandt, 1869; Uber die Halsrippen der Menschen, Dr. W. Gruber, 1869; Al Farabis' Leben, etc., M. Steinschneider, 1869; Die Lehre von der Gymnospermie in Pflanzenreiche, G. Sperk, 1869; Beiträge zur Anat. der Schädelgrundes, Dr. W. Gruber, 1869; Histoire Chronol. d'Armenie, M. Brosset, 1869; Uber Linaritkrystalle, N. von

Kokscharow, 1869; 8 vols. 4to. from Acad. Imper. des Sciences de St. Petersburg. Bulletin de l'Acad. Imper. des Sc. Nat. de St. Petersburg, XIII., p. 321 to 588, 4to.; five 8vo. works in Russian from the Roy. Geog. Soc. of St. Petersburg; Arbeit. des Naturforsch. Vereins zu Riga, Heft 2, 1868, 1 v. 8vo.; Correspondenz of same, 1869, 1 v. 8vo.; Uber Asplenium adulterinum, G. von Mesel, Brunn., 1868, pam. 8vo.; Zur Geschichte der Pflege der Naturwissen. in Mahren & Schlesien C. R. d'Elnert, Brunn, 1868, 1 v. 8vo.; Verhandl. der Naturwiss. Vereins in Preuss. Rheinland und Westphalien, Bonn, 1868, 2 v. 8vo.; Abhandl. der Kon. Böhmisch. Gesellsch. der Wissensch. 1 v. 4to.; Sitzungsberichte, 2 v. 8vo., Prague, 1868–9; Verhandl. der Schweiz Naturforsch. Gesell. in Einsedln. 52d Versamm. 1868, 1 v. 8vo.; Verhandl. der Phys. Med. Gesell. in Wurzburg, Band 1, heft 3, 1868, 1 v. 8vo.; Abhandl. der Naturwiss. Vereins zu Bremen, Band 2, heft 1, 1869, 1 v. 8vo.; Berichte der Naturforsch. Gesell. zu Bamberg, Nos. 2 to 8, 3 v. 4to. and 4 8vo., 1854–'68; Sitzungsber. der Kais. Akad. Wissensch., Vienna, 5 hefte 8vo., 1868–9. Nederlands Meteorol. Jaarboek, 1 v. 8vo.; 1868; Der Zoolog. Garten, Frankfurt a'M., 6 pts., 1869; Schrift. der Naturforsch. Gesell. in Danzig, 1867, 1 v. 8vo. Oversigt. Kongl. Dansk. Vidensk. Selsk. Copenhagen, 1867–9, 3 v. 8vo.; Kongl. Svenska Vetensk. Akad. Handl., b. 5 to 7, Stockholm, 1864–7, 4 v. 4to.; Lefnadsteckningar afver K. S. Veten. Akad., B. 1, 1868, 1 v. 8vo.; Eugenies Resa, Heft 12, Zool. Inseckter, E. Holmgren, Stockholm, 1863, 1 v. 4to.; Meteorologiske Iagtaggelser, 1864–6, Christiania, 3 v. 4to.; Oversigt. Kongl. Vetensk. Akad. Abhandl., vols. 22 to 25, 1865–'68, 4 v. 8vo.; Sketch of Geology of Spitzbergen, A. E. Nordenskiold, Stockholm, 1867, 1 v. 8vo.; Hemiptera Africana, C. Stäl, Stockholm, 1864–'66, 4 v. 8vo.; Conspectus Avium Picinarum, C. J. Sundevall, Stockholm, 1866, 1 v. 8vo.; Die Thierarten des Aristoteles, by same, do. 1860, 1 v. 8vo.; On the existence of rocks containing organic substances in gneiss of Sweden, Stockholm, 1867, pam. 8vo.; Astronomische Mittheilungen, Gottingen, 1869, 1 v. 4to.; Essai Monographique sur les Oxybel du Bassin du Leman, F. Chevrier, Schaffhausen, 1868, pam. 8vo.; Description de deux Chrysides, by same, do. 1868, pam. 8vo.; Bulletin de la Soc. Imp. des Naturalistes de Moscow, 1868, Nos. 2–3, 8vo.; Archives de la Societe Hollandaise des Sciences, vols. 1 to 3, La Haye, 1866, et Catal. de la Bibliotheque, 1 v.; Bulletin de la Societe des Sciences Naturelles de Neuchatel, VIII., 1, 1868, 1 v. 8vo. Melanges Orthopterologiques, 2d fasc. 1869, Hymenopteres divers du Musee Goddefroy, pam. 8vo., Essai d'un Systeme des Mantides, pam. 8vo., all by H. de Saussure, Geneva.

Also the following through the Swedish Consul:

Kong. Norske Frederiks Universitets Aarsberetning, 1867, 1 v. 8vo.; Tre Akademiske Taler, M. J. Monrad, Christiania, 1863, 1 v. 8vo.; Udstillings Sager fra Norge i Stockholm, 1868, pam. 4to.

Dr. Stout read a letter from the Royal Academy of Christiania, Norway, to Consul-General G. C. Johnson, accompanying a donation of a beautiful bronze medal to this Academy, with the inscription, "Ex haustu Olympico valentior."

A vote of thanks to the Consul-General was unanimously passed for his agency in establishing a friendly interest towards this Academy in his fellow-countrymen, and a committee appointed to draw up a suitable letter in reply to that of the Royal Academy.

Dr. Behr read a paper on the extinction of plants in the neighborhood of San Francisco by the progress of settlement and the encroachment of foreign weeds.

President Blake read a paper on pre-historic man, being an abstract of a paper by Carl Vogt, read before the Ethnological Society of Copenhagen last year.

In discussing the subject of Dr. Blake's paper, Mr. Bloomer read an abstract from the address of President Stokes before the British Association, to prove that man was not the product of gradual progressive development, but of special creation.

Dr. Gibbons exhibited twenty-seven species of plants, collected recently in flower on the Oakland hills, as an example of the Flora of February in this part of California: also, a piece of concretionary sandstone from the same hills, much resembling a redwood stump petrified, showing numerous layers like those in wood.

Prof. Whitney made some remarks upon an interesting memoir by Prof. Sars, on the living crinoids dredged by Prof. W. B. Carpenter and others, at a depth of 4,300 feet, in the North Atlantic, exhibiting a copy of the work.

Regular Meeting, February 21st, 1870.

Vice-President in the Chair.

Thos. W. Newcomb and A. A. Hazeltine were elected resident members.

Donations to the Library: The following very valuable works were presented by B. M. Hartshorne: Flora Javæ et Rumphia, C. L. Blume, 1828–1836, 7 vols., folio; the same, new series, Orchideæ, 1858, 1 vol., folio; The Fishes of Malabar, Dr. F. Day, London, 1851, 1 vol., 4to.; The British Sea-Anemones and Corals, P. H.

Gosse, London, 1860, 1 vol., 8vo. Also, from the authors, Report of Chief of Engineers, U. S. A., Wash., 1868, 1 vol., 8vo.; Trans-Atlantic Longitude, B. A. Gould, Wash., National Observat., 1869, 1 vol., 4to.; Supplementary Index to vols. I. to XII. of Obs. on Unio, etc., I. Lea, L. L. D., Philad, 1869., pam. 4to.

Mr. Easton gave a verbal account of his theory as to the structure of the coast mountains, supposing that beds of coal exist in them at nearly regular intervals between the spurs running into the ocean, and that this formation extends to the Isthmus, where the lateral valleys form natural passages for ship canals across from ocean to ocean.

Prof. Whitney read a paper on the Northern drift formation, intended for publication in an Eastern journal.

Regular Meeting, March 7th, 1870.

President in the Chair.

Donations to the Cabinet: Mr. A. H. Titcomb presented two specimens, supposed to be the globes of human eyes dried into hard balls, taken from the graves of Chilian aborigines that were opened by the great earthquake two years ago. These on examination proved to be vegetable productions.

Dr. Blake read the following remarks on the climate of California.

Remarks on the Climate of California.

BY JAMES BLAKE, M. D.

In offering a few observations on the general features of the climate of California, I am aware that up to the present time materials have not been collected to enable us to take in the atmospheric changes that take place on this coast, in one comprehensive survey. The absence of any extended system of meteorological observations in this State will prevent my doing more than tracing what I consider to be the broader outlines of the peculiarities of our climate, and I trust I shall be able to point out, on the one hand, the laws on which they depend, and also the support they afford to certain theoretical considerations which still require further evidence for their acceptance. There can be no doubt but that our geographical position and the configuration of our country render this part of the globe one of the most important fields for meteorological observations, and I trust before long that we shall be able to organize a comprehensive plan for carrying them out throughout the State and in the adjoining States and territories. Before proceeding to the immediate object of my communication, it may be well to recall to mind the more general laws which govern the atmospheric movements—laws which are as invariable and determinate in their action as the ordinary changes of the weather are apparently capricious. It is well known that a current, or currents, of cold air are always flowing from the colder regions of the earth towards the Equator, and currents of heated air are as constantly flowing from the region of the Equator towards the Poles. At from 25° to 30° of the Equator the Polar currents are found spread out over the whole surface of the ocean, constituting the northeast Trades to the north of the Equator and the southeast Trades in the Southern Hemisphere. These two vast bodies of air that are constantly flowing towards the Equator from the Poles, are separated from each other near the Equator by a belt known as the region of calms. There, there is hardly any horizontal movement in the atmosphere. The air, now heated and loaded with moisture, which has been flowing from each side towards this point, ascends into the upper region of the atmosphere, and, as the southwest anti-trade, commences its journey again towards the Poles. Thus a constant movement of currents in opposite directions is for ever going on in the atmosphere. In the region of the Trade Winds these two currents pursue their course in a quiet sort of way—the Polar current below ,the Equatorial current above—rarely interfering with each other. When, however, we pass beyond the region of the Trades, these currents no longer occupy the same relative positions. The warm moist current as it flows into higher latitudes finds itself compressed laterally on account of the smaller circles of longitude, and the Polar current has to spread itself out horizontally in order to cover a larger surface as it approaches the Equator. From this cause, and possibly for other reasons which are not discovered, the upper current now comes down to the surface in certain points, forming as it were a channel for itself through different parts of the Polar current. The two currents do not mingle indiscriminately. There seem to be large continuous portions of the earth's surface which are occupied by one current, whilst running parallel, although in an opposite direction, is a broad current which occupies another large portion of the surface. The breadth of these currents and the points they usually occupy on the surface of the earth are data which are still undetermined, but it has been found as a general rule that the cold, or Polar currents prevail more in the interior of the larger continents, while the Equatorial currents mostly reach the Poles over the surface of the larger oceans and the lands near the coasts. There can be no doubt that the climate of any country is most essentially influenced by the position it occupies as regards these vast streams of atmosphere—places situated within the Polar stream enjoying a dry climate and those in the Equatorial stream a moist climate—and did these streams always occupy the same positions on the earth's surface, the dryness, or humidity of a place would depend on its geographical position. But these two currents, although well marked in their general boundaries, by no means pursue their course without influencing each other, on the one hand and on the other, without being strongly affected by the orological features of the regions they traverse. It is not here the place to enter into the minutiæ of these phenomena, even as far as they are now known, and up to the present time they have been but very imperfectly studied. All I wish now to point out is that the edges of these currents, or where they meet, is frequently the seat of violent atmospheric disturbances, either in the form of cyclones or from large masses of the warmer and colder currents breaking into each other sideways and thus interpenetrating for considerable distances, causing storms of wind and rain. The direction of the mountain ranges in a country in relation to these currents also exerts a marked influence on the general character of the climate. On this continent, where the direction of our mountain ranges being more nearly parallel to these currents, they are subject to less disturbance than in the old continent, where the direction of the mountain chains is more directly opposed to the course of the air current. I will now endeavor to point out how the character of our seasons, as regards the rainfall, is dependent on these air currents. In ordinary seasons there can be no doubt but that the rainfall is determined to a great extent by the vertical mixing, so to speak, of these currents—the upper Equatorial current reaching the surface and breaking into the northerly current at different places and at short intervals. But seasons occasionally occur in which these currents, instead of frequently intermingling, pursue their course in broad continuous belts, extending sometimes for thousands of miles, and flow in these broad belts for months together without much lateral or vertical displacement. It is such a condition of the atmosphere that gives rise to extreme seasons, particularly in those countries which usually have winter rains and which happen to be within a Polar current at this season of the year.

We will now consider the connection of these currents with the climate of our State. During the summer months the whole of the State is generally within the region of the Northeast Trade, which, however, does not prevail as such on account of the barrier offered by the Sierra to the East and to the other ranges of mountains running southeast and northwest, so that when we have a north wind it is usually deflected in a westerly direction. These winds prevail to a much greater extent in the interior valleys than in the western border of the State, although at a short distance from the shore northerly currents prevail during the whole summer. [Our local westerly and southwesterly winds in summer are undoubtedly a sort of monsoon, caused by the rarefaction of the air in the interior. Their low temperature is owing, in part, to their being northerly winds that have not been heated by their passage over any great extent of heated land, and also to the cold sea current that flows along our coast.] During the winter the Equatorial current reaches the surface about in the latitude of our State and mixing with the colder Polar current, causes our winter rains. We then have frequent storms with strong southeast winds, for although the Equatorial current is a southwest current, and shows itself as such in Europe—and even in Nevada, directly over the Sierra—yet, here it is deflected to a southeast current by the mountain barrier of the Sierra.* Such are the gen-

* It is undoubtedly owing to this cause that thunder storms are so rare in our State, the Sierras opposing a barrier to the sudden lateral intrusion of masses of cold, dry air into the Equatorial current. The same cause also probably accounts for the slight fluctuations of the barometer which are observed in our southerly storms, the air being heaped up against the mountain barrier, and thus causing an increased pressure, or at least counterbalancing, to some extent, the fall that would otherwise take place.

eral features of our climate in ordinary years, but in those seasons in which the Equatorial and Polar currents run in broad belts, we either have a very dry season when wholly within the northern current, or a warm, moist season when in the southern current, or, such is the extent of our State in latitude, that one portion of it can be within the Polar current and another portion within the Equatorial current during the greater part of the winter, and then we have rains in one part of the State and drought in another part.

A rough sketch of the weather during the present winter, not only in this State but across the continent, will afford an illustration of the prevalence of these opposite currents over a large extent of country, and the character of the seasons depending on them. The accompanying diagram will illustrate the tracts of country over which these different air-currents prevailed. About the middle of October we had a portion of the Equatorial current in the northern part of the State, but previously to this the current had been blowing over Oregon and Washington Territory, causing very heavy rains there in September and the earlier part of October. After this we had nothing like a southerly gale until February; but during most of this time, and particularly during the earlier part of the winter, the Equatorial current was blowing at a distance of three or four hundred miles from the coast, and was impinging on the coast of Oregon. Almost every ship that arrived in the harbor during November and the earlier part of December, reported having experienced very heavy weather at some distance from the coast, to the westward and about the mouth of the Columbia, north of us. One ship towards the middle of December reported being caught in a cyclone, in which the barometer fell to 28.54 in., said to be the lowest point ever reached by the barometer on these shores. During the whole of this period, or from October until February, almost the entire State was under the Trade or Polar current; the southern part of the State completely so, whilst in the northern and middle portions of the State occasional eruptions of moist air broke in from the northward and westward, giving us light fog-rains and a great deal of foggy weather. These rains were partial and very different in their character and distribution from the true rains of the fully established Equatorial current. They were heavier along the coast, particularly towards their southern border, where the western current seems to have been entirely kept back from the interior by the coast range of mountains, no rain falling in the Salinas Valley, although on the mountains on the western side of the valley there were copious showers. As these partial currents passed to the eastward less rain fell (at Sacramento 6.8 inches to 11 inches in San Francisco, and still less in the mountains), the very reverse of what takes place in a rain from a full Equatorial current, when the rainfall is always greater in the mountains. While this has been the state of the weather during the greater part of the winter in this State, we find that to the eastward as far as Omaha this same northerly current has generally prevailed—at least concluding such to be the fact from the absence of snow in the interior of the continent—whilst again to the east of this, and extending to the Atlantic coast, a warm Equatorial current has prevailed since October, when its irruption was marked by excessive rains, causing great damage. This current seems to have maintained its position during the whole winter, causing the mild season that has prevailed in the Eastern States.

At its western border, when this warm current comes into contact with the Polar current, great atmospheric disturbances have been produced—some of the most destructive tornadoes ever known in this country having ravaged portions of the Mississippi States during the present winter. Thus, at the two edges of the northern current, both to the westward of our shores and in the Western States, where it comes into contact with the warmer southerly stream, great atmospheric disturbances have taken place; whilst in that part of the surface of the continent where the central parts of the currents prevailed, the weather has been much more settled. In the Eastern States, where the southern current prevailed, they have had south winds, warm atmosphere, and plenty of rain; whilst in the interior of the continent, and on this portion of the coast, north winds have prevailed, with a general absence of rain and snow. This state of things continued, with but little disturbance, until about the 7th of February. The occasional rain we had, had been comparatively light, with north and northwestern winds—more copious to the north and along the coast, but not reaching the southern portion of the State, where the edge of the southwestern current was much farther from the coast than it was more to the north, as is shown on the diagram.

On the 7th of February I noticed cirrus moving rapidly from the southwest, although the sky was otherwise clear and the barometer high. On the 8th the barometer commenced falling, and cumulo-stratus formed to a considerable extent—the wind from the west. By this time the southern current had struck the northern part of the State, as it commenced raining heavily at Yreka on the 8th—in the evening. At Salem, in Oregon, a heavy rain-storm had begun on the 7th.

The southwestern current reached the surface here at about 11 A.M. by a sudden gust of wind from the west, almost a tornado lasting for a short time and accompanied by slight rain in large drops. At Virginia City the current seems to have reached the surface earlier, owing probably to its elevation. At 4 A.M. there was quite a hurricane there from the southwest, lasting for some hours. Here we did not get the full force of the current until 4 P.M., when it commenced blowing hard from the southeast, and blew until 9 P.M., with rain showers. The full force of the wind did not reach Stockton and Sacramento until six hours after it was felt here, and Los Angeles until the next day, and about the same time at which it reached Elko, some six hundred miles beyond Virginia. The Equatorial current did not reach so far south as San Diego. For some days after this we had variable weather and a moderate fall of rain, the polar current again prevailing, although at the same time in Oregon there were strong southwest winds and a great deal of rain. On the 16th a strong northeast wind prevailed, causing the coldest day of the winter. The barometer rose to 30. 31, and the whole of the State seemed again under the influence of the dry and cold Polar current. On the 17th cirri again began to form, with a strong southwest upper current. This, however, did not reach the surface until the 19th, at which time a heavy rain-storm was prevailing in Oregon.

Here the air was comparatively calm during the 18th, 19th, and until about noon of the 20th, when we fell under the full influence of the Equatorial current, with a strong south wind and heavy rain. On this occasion the Equatorial current reached beyond the southern border of the State, heavy rains falling at San Diego, and more rain falling in the mountains than on the coast. Whilst this western edge of the Polar current was yielding to the Equatorial, we find that its eastern border was moving to the eastward, displacing the Equatorial current that had been prevailing in the Eastern States. As the data I have collected on this point have been obtained only from the few facts telegraphed to the newspapers, they are necessarily imperfect. On the 18th a cold northern gale was prevailing at Memphis; on the 20th a very heavy freshet in Maine; and on the 21st the weather on the Atlantic border was the coldest of the season, evidently caused by the lateral displacement, eastward, of the Polar current. How far these movements are connected with atmospheric changes taking place on other parts of the surface of the earth, it is difficult at present to say. I would merely remark that at the time of the descent of the Equatorial current on this coast, or about the 8th and 9th of February, very bad weather was experienced on the Atlantic, and on the 12th a northeast wind prevailed over most of the west part of Europe, causing great cold. As regards the existence of these currents in other years, the only data I have been able to compare are some obtained from the Army Medical Reports. I have taken the quantity of rain that fell at Fort Snelling, latitude 44°, longitude 93°, and at West Point, latitude 41°, longitude 74°, in two seasons, corresponding to two of our rather extreme seasons, viz: 49.50 for a dry season, and 52.53 for a wet one. When we are fully under the influence of the Polar current, and but very little rain falls, it would be highly probable that Fort Snelling would be pretty well in the Equatorial current, and would have at least the average amount of rain; and on the other hand, when we are well under the Equatorial current, and have a wet season, Fort Snelling would probably be well in the Polar current, and would have a dry season. The quantity of rain at the Fort during our rainy months, October to April, inclusive, was in 1849–50, our dry season, 5.28 inches, whilst during the same months 1852–53, our wet season, but 1.95 inches fell, thus supporting the theory of the prevalence of air currents for considerable periods over the same surface. There can be no doubt but that there are two ways in which these different currents of air become mixed, so that moisture is deposited. In the first place, by the upper current breaking through the under current, and thus reaching the earth's surface having its temperature lowered and its vapor condensed. It is this that affords the usual explanation of our rain storms; but I believe a more careful investigation of the facts will show that the greater part of our storms are due to the mixing of the currents by lateral displacement, at least in the Temperate Zone. These currents, as before stated, often occupy large areas of the earth's surface over which they flow, apparently but slightly disturbed for considerable periods, interfering with each other only at their borders or where they come into contact laterally—here great atmospheric disturbances take place; whilst in the center of the current the weather maintains the character peculiar to the current, whether Polar or Equatorial. In the former there will be but little rain, and a cool, dry atmosphere; in the latter a warm and moist atmosphere, and generally a free rainfall, although it is where the edges or sides of the currents touch that the greatest fall of rain will be found to take place. There can be no doubt but that these currents are subject to periodical and, apparently, also accidental displacements. Of the former we at present know nothing, or at least but very little, and of the latter but few observations have been made. Muhry and Dove, the German Meteorologists, have recorded some instances of this displacement which accompanied European storms; but from the disturbing influences that on the old continent interfere with the regular movements of the air currents, it is probable that this continent will afford the best field for these investigations when the attention of observers shall be more fully directed to these general movements instead of being too exclusively devoted to the registering of the less important local changes in temperature and pressure. If ever meteorology is to become a really useful science to the agriculturist, it is in this direction, I think, its advantage will be secured. There can be no doubt but that questions of the greatest importance connected with agriculture, particularly in this State, are dependent on the existence and position of these air currents; and if ever any scientific foundation for predicting the weather is obtained, I am convinced it will be by ascertaining the laws that govern the movements of these vast air belts that carry with them seasons of plenty or of famine. From even a very imperfect series of observations made in connection with this subject since I have been in California, I am convinced that its more thorough investigation will lead to a scientific basis of weather predictions, as regards the general character of the seasons; and now that a telegraph extends over so large a part of the northern hemisphere, we are in a much better position than ever before to complete our knowledge of the laws that govern the movements of these vast air currents. Observation has already shown that the lateral displacements of these broad air currents are intimately connected with each other, but we are still completely ignorant of the laws that regulate their distribution in longitude, and why in some seasons they occupy continuously broad portions of the earth's surface whilst in other seasons they seem to be constantly mixing, both vertically and laterally, on the same portions of the globe. As to the breadth of these currents, they undoubtedly vary in different seasons. This year the breadth of the Polar current, on this continent, would be about 1,200 miles, whilst the Equatorial current to the east extended from the western border of the Mississippi Valley to the Atlantic.

I regret not having the data to compare the rainfall at different points of the continent for the years 1861–2 and 1863–4, two of the most marked seasons we have had. I have brought the subject before the Academy in this imperfect state in the hope of attracting more attention to this particular branch of meteorology.

Dr. Behr presented a piece of wood of an unknown kind from Mexico, having the odor of the "Lemon Verbena" (*Aloysia*) and the East Indian *Aquilaria*, a valuable wood.

Regular Meeting, March 21st, 1870.

President in the Chair.

Dr. Wm. P. Gibbons, of Alameda, and S. H. Herring were elected resident members.

Donation to the Museum:

Dr. H. Gibbons, Jr., presented a piece of Oregon fir and a larva of a beetle, probably *Ergates spiculatus*, that had bored several inches in the wood.

Donations to the Library:

On Lepetidæ, W. H. Dall, Philad, 1870, pam. 8vo.; Ann. de la Soc. Entemologique Belge, vols. 1 to 12, 1857–1868, 12 vols., 8vo.; Ann. de la Soc. Malacologique de Belgique, vols. 1 to 3, 1863–68, 3 vols., 8vo.; 43 Pamphlets, by the Baron de Selys Longchamps, on Phenom. Period. de la Regne animal, 4to.; Mammiferes du Brabant, 4to.; Micromamalogie, Paris, 1839, 8vo.; Calendrier de Faune en Belgique, 1852, 1854; Animaux utiles a l'agriculture, 1866; Faune Belge, 1st part, 1842; Hybrides anatinees, 1856; Oiseaux Americaines admis dans la faune de l' Europe; Catalogue des Oiseaux de l' Europe; 16 others on mammals, birds and fishes, with 14 on insects and note on Populus monilifera, by the same author; De la class des Fougeres, J. E. Bommer, Paris, 1869, 1 vol., 8vo.; Les Platanes et leur culture, by same, Brussels, 1869, 1 vol., 8vo.; Instructions pour recueillir Mollusques par Dr. J. Lewis, Mohawk, N. Y., traduit par J. L. Weyers, Brussels, pam. 8vo.

Dr. Cooper made extracts from a paper of Baron de Selys Longchamps on hybrids occurring naturally among various wild birds of the family *Anatidæ*. He also stated that instances were lately published in the "Ann. de la Soc. Mal. de Belgique" of snails reviving after a torpidity of ten years in a cabinet; and also that Mr. Gabb had found the eggs of *Limax Columbianus* to hatch after being kept in a box three years.

Dr. Blake read the following abstract of a paper from the French of M. Gintrac, of the Academy of Sciences of Paris:

On account of the disease prevalent amongst the silkworms in France, many experiments have been made in order to discover the best means of rearing them. The results obtained by M. Gintrac, and which were communicated to the Academy of Sciences in Paris in September, seem to contain facts which may be useful for the sericulturists of this State. This observer found that silkworms succeeded much better when raised in the open air than when kept in close rooms. The idea up to the present time has been that the worms require to be kept at a high temperature and carefully preserved from sudden changes. M. Gintrac finds, on the contrary, that they bear very well a temperature as low as 47° and as high as 104°; that they are not injured by the direct rays of the sun nor by sudden changes in temperature. They were not hurt by rain, nor even by thunder-storms. The disease that has been so prevalent amongst silkworms in Europe, and which has called for so large an importation of foreign eggs, is considered by the author to be caused by the worms being confined in too close rooms. The only shelter he gives them is an open shed, with roof sufficient to keep off the rain. The yield of silk seems very satisfactory, as 38 ounces of eggs furnished 372 pounds of cocoons, besides a large yield of eggs.

Dr. Gibbons read a printed article, written by Mr. Canby, of Wilmington, Del., on the *Dionæa Muscipula*, or "Venus Fly Trap."

Dr. A. Saxe, a member from Santa Clara, made remarks on the sea-currents of our coast, which elicited considerable discussion.

Regular Meeting, April 4th, 1870.

President in the Chair.

Charles Geddes and Wm. J. Fisher were elected resident members.

Donations to the Cabinet: Argentiferous Galena, from fifty miles west of Salt Lake, by G. Bale; also fossils from the carboniferous formation at White Pine, by the same. Two war clubs and some shells, from the Feejee Islands, by Dr. G. B. Woods, through Dr. Gibbons. Three species of shells, from Oregon and California, by Dr. J. G. Cooper. Two fur robes from Alaska, one of panther skin, with fur seal collar, the other of squirrel skin, by Mrs. O. C. Pratt.

Dr. Blake read a translation of a memoir presented to the Academy of Sciences of Paris, on the relation of heat and light.

Remarks were made on the auroral light observed about midnight of March 28th, and on the earthquake shock of April 2d, at 11.49 A. M.

Regular Meeting, April 18th, 1870.

President in the Chair.

Donations to the Cabinet: Mr. Carlton presented the skull and jawbone of an Indian dug up near Colusa. Gregory Yale presented, from C. Scott, a fossil oyster from the coal formation on Soledad Creek, near San Diego. Prof. Bolander presented a valuable collection of American ferns, forwarded by Prof. Eaton, of Yale College.

Donations to the Library:

Twenty-one pamphlets on Birds, by G. N. Lawrence, N. Y., (extracts from various journals). Geology of the New Haven Region, J. D. Dana. pam. 8vo. 15th, 16th and 17th An. Reports of Trustees of the Pub. Library of Boston, 1867–9, 8vo. Reale Comitato Geologico d' Italia, Boletino primo, Jan., 1870, 8vo. Mammalia of Massachusetts, by J. A. Allen, Cambridge, Mass., pam. 8vo. Contrib. to Fauna of Gulf Stream at Great Depths, 3d series, Echinoderms, pam. 8vo. (The two last are bulletins of the Mus. Comp. Zool. Cambridge, Mass.)

Dr. Blake read a communication from Captain Hall, the Arctic explorer, asking the Academy to petition Congress in favor of an appropriation of $100,000 in aid of his proposed expedition to the open Polar Sea. After some discussion, a motion that the Academy memorialize in favor of the appropriation was adopted.

Prof. Whitney said Mr. Robert Brown, of Edinburgh, had made a statement that the coal of this State is inferior to that of British Columbia, and that we might expect to depend on that province for our future coal supplies. Mr. Brown had also declared that the coal beds of British Columbia belonged to the true carboniferous formation. Prof. Whitney noticed these statements because they had gone the rounds of the press and might have some influence. They were not correct. It would be curious to find that a political line coincided with a geological division. The coal formation described by Mr. Brown was not later than the cretaceous; and the coals of British Columbia were not superior to those found southward.

Prof. Whitney also made some remarks on the boundary line between California and Oregon. It has been correctly surveyed and established by order of the Secretary of the Interior, by a party under Maj. Daniel G. Major, who had correctly determined the intersection of the 42d parallel of latitude with the 120th degree of longitude. Major's party were unable to find the monument erected by the party which had previously, by order of Nevada and California, established the boundary between those States. The line run by this party was about two miles to the eastward. It was probably accurate enough for the purpose of the State survey, which was mainly prosecuted to determine on which side of the boundary Honey Lake Valley was located; but it would not serve for an exact boundary. In connection with this subject, Professor Whitney said that Goose Lake, adjoining the northeastern boundary, had materially increased its volume of late. It had formerly no outlet, but is now pouring a large volume of water into Pit River, and some apprehensions are felt lest its flooding may do damage. All the lakes in that region have increased their volume within a few years, and are still rising. The subject was one worthy of special inquiry, and when the Geological Survey reached the region he said he would endeavor to collect accurate information concerning it.

The subject of earthquake shocks was briefly discussed, and Prof. Whitney moved the appointment of a committee to inquire as to the best instrument for recording such phenomena, and the proper place to fix it. He thought the Academy might make some very useful observations, with a good instrument.

Dr. Gibbons and Mr. Williams described several simple and inexpensive methods of recording earthquake shocks, but Prof. Whitney contended they were not exact enough for scientific purposes.

The motion was finally adopted, and the Chair appointed Prof. Whitney, Dr. Gibbons, Prof. Davidson and Col. Williamson a committee to carry out its object.

Dr. Cooper made some interesting remarks in regard to the connection of earthquake phenomena with the dry climatic zones, and the destruction of ancient cities in Asia.

Mr. Hanks stated that he was engaged in the analysis of some water obtained from a spring near this city, which contained so much iodine that, without condensing, it gave a strong reaction when the proper test was applied. A full statement of the analysis will be made to the Academy.

Prof. Whitney referred to the elaborate and delicate processes of analysis now used in Europe, which sometimes consume months, and stated that analysis of California waters is very desirable.

Regular Meeting, May 2d, 1870.

President in the Chair.

Twenty members present.

Donations to the Cabinet: Specimens of gold-bearing quartz from the San Diego mines, from Hayden Brothers, through G. Yale. Section of the trunk of the Lemon Verbena tree, (*Aloysia citrodora*) showing its luxuriance in this climate, the diameter being seven inches, half a foot from the ground. Human bones, and an Indian implement, shaped like a plummet, from an Indian mound at the end of the Bay View Railroad, presented by Dr. Gibbons; the former showed indications of disease, apparently from a compound fracture. A living scorpion from Gilroy, by Dr. S. R. Harris, through Dr Gibbons.

Donations to the Library. The following were received through the Smithsonian Institution:

Das Kais. Kon. Montanistische Museum. W. von Haidinger. Vienna, 1869. 1 v. 8vo.; 35th Jahresbericht Mannheimer Vereins fur Naturkunde, 1869, pam. 8vo.; Zeits. der Deutsch. Geol. Gesellsch. Band XX., Berlin, 1869, 1 v. 8vo.; Abhandl. der Naturforsch. Gesell. zu Halle, 11th vol. 1869. 1 v. 4to.; Sitzungsber. der Kais. Akad. der Wissen. zu Wien, 1868–9. 12 pts. 8vo.; Gedachtsrede auf Alex. von Nordmann, Dr. Hjelt, Helsingfors, 1868, pam. 8vo.; Verhandl. der K. K. Geol. Reichsanstalt, No. 10, 1869. Vienna, 1 pam. 8vo.; Jahrbuch. 1869, 1 pam. 8vo.; Zeeusch Genoots. der Wetenschappen, Apr. 1869, 1 v. 8vo.; Het Papier, etc., door J. H. de Stoppelaar, Middelburg, 1869. 1 v. 8vo.; De Ongezongheid von Zeeland. Dr. A. Kokker, Midd., 1869, pam. 8vo.; Twee Rekningser der Stadt Hulst, F. Caland, Midd., 1869, pam. 8vo.; Nog eene Verordening of het Delven, etc., in Zeeland, pam. 8vo.; Philippus en Petrus, Dr. Fokker, Landsbergen, pam. 8vo. Jaarboek, 1868, Process-Verbal, 1868–9, and Verslagen en Mededeelingen der Kon. Akad. der Wetenschap., 2d Ser. vol. III., 1869, 8vo., Amsterdam; Bijdragen tot de dierkunde, Artis Magistra Naturae te Amsterdam, 1869, 1 v. 4to. Norges Officielle Statistik, 5 vols. 4to., 1866–9; Anatomisk Beskrivelse Bursæ mucosæ, etc., A. L. D.

Synnestvedt, 1869, 1 v. 4to.; Oscarshalle, pam. 4to.; Forstelling om Thomas ā Becket af Canterbury, C. R. Unger, 1869, 1 v. 8vo.; Forhandl. i Selskabs. Videnskabs., 1868, 1 v. 8vo.; Norsk. Meteorol. Aarbog. 1868, 1 v. 4to., all from Christiania, Norway. Ofversigt af Finske Vetensk. Societat, 9, 10, 11, 1868–9, 3 vols. 8vo.; Arta Societ. Scient. Fennicaè, vol. VIII., pts. 1 and 2, 1869, 2 v. 4to., all from Helsingfors. Exposé general de la Societe d' Ethnographie, 1869, pam. 8vo.; Notice sur le debris des Cheloniens. Description de Dermatemys Mawii, et d'un nouvelle espece Americaine de Caiman, M. de Borre, Brussels, 1869, 3 pam. 8vo. Bull. de la Soc. des Sciences de Neuchatel, vol. VIII., 1868, 1 v. 8vo.; Mem. de la Soc. de Physique et d'histoire Nat. de Geneva, vol. XX., pt. 1, 1869, 4to.; L'Epoque quaternaire dans la vallee du Po, 1864, pam. 8vo., Origine de la Navigation et de la Peche, M. G. de Mortillet, Paris, 1867, 8vo.; Le Glacier de Boium en Juillet, S. A. Sexe, Christiania, 1869, 1 v. 4to.; Rapport au Congres internat. de Statistique de Norvege, a la Haye, pam. 4to.; Traité Elementaire des Fonctions Elliptiques, Dr. O. J. Broch, Christiania, 1869, 1 v. 8vo.

Prof. Davidson mentioned the remarkable effect of the sun's heat on the sandstone bluff seventy feet high, on which his instruments were placed for observations, near San Buenaventura. The expansion caused by the greatest heat of the day produced a serious change in their level, and obliged him to move the instruments one hundred yards back, when the disturbance ceased.

He also remarked that the inhabitants of the southern plains of this State were likely to lose their entire crops from trusting too much to rain, when they could obtain abundant water for irrigation at seventy feet depth.

He also exhibited about one hundred photographs of the late total eclipse of the sun, taken at Springfield and Shelbyville Illinois, showing the improvement in accuracy of observations by photographing them.

The Professor then stated that in observing the occultation of the star Alpha Scorpii by the moon, the *red* star seemed visible for some seconds *on* the grey limb of the moon, although *pale* stars disappear at the moment of contact. No satisfactory explanation of the phenomenon has yet been given.

Dr. Cooper suggested that the image of a red star was likely to remain on the retina, and therefore seem visible longer than that of a pale one. He also gave an account of some observations made by him in a late trip in the Sierra Nevada, on the absence of frost in the ground under the deep snow, and on the wonderful rapidity of vegetable growth which springs up while the drifts are but half melted—flowers blooming at their very edge. He also noticed ant-hills half buried in snow, the tops of which were covered with the active insects, and small quadrupeds coming out of their winter burrows as soon as the sun's rays strike the bare soil. Many small birds were also winter residents of the summit of the mountains.

Prof. Whitney exhibited an impression of a fan-palm leaf in volcanic "cement" or sedimentary mud, found near Placerville—the first of the kind yet found in California, and showing a sub-tropical climate in the tertiary era. Many animal remains of the tertiary age have been found in other parts of the Sierra Nevada, and those of different subdivisions of that age do not show yet any identical species between the supposed miocene and pliocene.

Regular Meeting, May 16th, 1870.

President in the Chair.

Twenty-five members present.

Donations to the Cabinet: Dr. Blake read a letter from A. Garrett, of Papeete, Tahiti, accompanying and describing two boxes of valuable and curious objects of natural history, collected for and presented to the Academy. The writer said that after being for four years cut off from the civilized world, engaged the whole time in collecting specimens of Natural History, he had had the misfortune to lose, by shipwreck, his manuscripts, drawings, collection of dried plants and insects, portraits of native tribes, native curiosities, and fifty volumes of scientific works. The boxes that he had sent contained 327 specimens of shells; also, lizards, snakes, crustacea, bats, frogs, etc. The skull of a Vitian native, who had been eaten by cannibals, was also in the collection.

A peculiarly marked section of meteoric stone, sliced from one of several found near together at Milwaukie, Wisconsin, was received from Dr. I. A. Lapham of that place.

Donations to the Library:

Notices and descriptions of fossils, by A. Winchell, Philadelphia, 1869, pam. 8vo.; Notes on Diatomaceæ, A. M. Edwards, Boston, 1870, pam. 8vo.; Address to State Historical Society of Wisconsin, M. M. Strong, Madison, 1870, pam. 8vo.; Proceedings and Communications to the Essex Institute, VI., 1, Salem, Massachusetts, 1868, 1 v. 8vo.; List of Birds of Alaska, W. H. Dall, etc., Chicago, 1869, 1 pam. 4to.; 12th Annual Report of Board of Trade, Chicago, C. Randolph, 1869, 1 v. 8vo.; 1st, 2d and 3d Annual Report of Commissioners of Fisheries for Maine, 1867–9, 2 pam. 8vo.; 8th Annual Report of Board of Public Works, Chicago, 1869, 1 v. 8 vo.; Discourse on life of George Peabody, by S. W. Wallis, Salem, Massachusetts, 1870, 1 v. 8vo.

Attention was called to the death of Dr. Veatch, a member of the Academy, and notice given of a memorial to be introduced hereafter.

Gregory Yale commented upon the subject of Indian mounds in California, and proposed a field meeting for the investigation of one at the Potrero next Saturday.

Dr. Cooper gave an interesting account of several small caves in El Dorado county, including the well-known Alabaster Cave. No human or other animal remains have been found in any of these, but may be hereafter, when they are examined carefully. One cave described, which was used as a dance-house by the miners twenty years ago, contains three chambers of about forty, twenty and twelve feet square, or round, respectively. In one of these caves Dr. Cooper saw a bunch of bats clinging in one mass, at which he fired his gun, killing twenty at one shot. They proved to be of a species not heretofore found in California, the *Synotus Townsendii*, mentioned on page 6 of this volume.

Regular Meeting, June 6th, 1870.

President in the Chair.

S. R. Throckmorton and J. T. Brown were elected resident members.

Donations to the Cabinet: A skin of *Putorius xanthogenys*, the yellow-cheeked weasel, from Dr. Strentzel, of Martinez, through Dr. Behr. Pliocene fossils, from Santa Rosa, by Dr. Cairns.

Dr. Cooper exhibited a specimen of a rare reptile, received by Col. Warren, editor of the California Farmer, from Santa Barbara, the *Anniella pulchra* Gray, a lizard without feet, like the "glass snake" and "slow worm."

Donations to the Library: 1st An. Rept. Amer. Museum of Nat. Hist'y, N. Y., 1870, pam. 8vo. 52d An. Rept. Trustees N. Y. State Library, Albany, 1869, pam. 8vo.

Dr. Gibbons remarked on the unusual and abnormal disturbances lately observed in the climate entirely across the continent.

Prof. Davidson exhibited a skull of a sea-lion killed near Punta Arenas, Cal., with its flippers, and a stone as large as a child's head, which he said was one of several found in the animal's stomach. The hunters of these animals state that in the breeding season the male of this species eats no food, but swallows these stones instead, and is consequently very thin afterwards, furnishing very little oil. The Aleutians confirm this statement respecting the fur-seal, which is allied to the species here shown.

Dr. Stout asked whether basalt had been found within the city limits, as he had a specimen supposed to be that of rock found in a well, 128 feet deep.

Regular Meeting, June 20th, 1870.

President in the Chair.

T. C. Banks, J. B. McChesney and Chas. B. Turrell were elected resident members.

Donations to the Library: A lamp for burning petroleum, invented and presented by Mr. J. Hucks. A new map of California, and also a pocket map, made in 1852 by C. D. Gibbes, presented by the author. Third An. Rept. Peabody Institute of Baltimore, Md., 1870, pam. 8vo.

Dr. Stout remarked on the process of preserving specimens with carbolic acid—such as birds, which may be preserved entire by injection of that fluid.

Dr. Cooper stated that the specimens were liable to be spoiled by shrinking out of shape.

Prof. Davidson presented two photographs of the sun, and described Clark's new process for obtaining sun-images by a reflector as very superior to the old method.

Dr. Blake mentioned that on the 12th of June a hailstorm occurred twelve miles south of Pleasanton, across the Bay, in which stones fell so large as to kill birds. It was followed by a rain-shower with thunder and lightning.

Dr. Stout exhibited a piece of rock, supposed to be basalt, found in a well seventy feet deep in this city. Water was struck at 125 feet in the well mentioned after passing through the hard rock into slate.

Prof. Whitney considered it to be the very hard, metamorphic sandstone, not uncommon on this peninsula.

Adjourned Meeting, July 11th, 1870.

President in the Chair.

Dr. C. D. Ellinwood and J. F. Gray were elected resident members.

Donations to the Cabinet: The President presented a stuffed specimen of the "Shovel-nosed Shark," *Rhinobatus productus* Ayres, found in this bay. Specimens of *Unio spatulus*, from Wisconsin River, by I. A. Lapham, through Dr. Cooper.

Mr. Bloomer exhibited specimens of *Lilium* closely resembling *L. superbum*, found in Butte County by Mr. Brooks.

Donations to the Library: A beautiful colored drawing of *Rhododendron Californicum*, a very rare shrub, found at Waddell's Mills, near Santa Cruz, and drawn by the donor, Dr. Saxe, of Santa Clara. Annual Rept. of Mus. of Comp. Zoology, Cambridge, Mass., 1870, 1 vol., 8vo.

Col. Williamson, U. S. Engineers, asked for information as to how to prevent the movement of the sand-dunes around the Light House at Toke Pt., Cape Shoalwater, Wash. Ter. He stated that the building was liable to be undermined by the blowing away of the sand.

Prof. Davidson mentioned that similar difficulties in France had been overcome by heavy walls built so as to have a foundation below the drifting sand.

Prof. Bolander thought that protection might be given by planting such trees and shrubs as can grow in the sand and bind it by their roots, mentioning several such, native or easily naturalized.

Prof. Davidson said that the sand sometimes changed level fifteen feet in a single night, so that such roots would be no protection.

Dr. Blake suggested the growing of annuals of dense growth to give firmness to the surface until larger plants could become rooted.

Prof. Davidson made some remarks on the habits of whales not mentioned in Capt. Scammon's book. He said that the Thrasher Shark would manage to ride on the whale's head and keep it under water, or stop its breathing holes until it was suffocated. He also said that on "sounding" in shallow water, the whale came up stunned, giving the whalers a chance to strike it again, which made the hunt in such seas the best.

Prof. Bolander mentioned some new fresh-water plants found by him in the Sierra Nevada, which he proposes to describe for publication. He also mentioned that land slides were now common in the coast ranges on account of difference in the soil from that of the Sierra Nevada, and not on account of the action of frost alone.

Prof. Davidson stated that the angle of the piece of rock supposed to be basalt by Dr. Stout was 140°, which would make a nine-sided prism.

Prof. Whitney stated that no basalt had been found within San Francisco County by the Geological Survey.

Regular Meeting, July 18th, 1870.

President in the Chair.

Henry Hemphill was elected a resident member.

The resignation of Mr. Eloesser, as Cor. Secretary, was received, and an election to fill the vacancy was held, resulting in the choice of Henry G. Hanks.

Donations to the Cabinet: Dr. Cooper presented a specimen of metamorphic sandstone, containing alumina and other mineral substances, found near the city.

Mr. Hanks exhibited specimens of the fossil trees recently discovered near Calistoga. The specimens were pronounced to be silicified wood, beyond doubt.

Donations to the Library: Address delivered at the Centennial Anniversary of the birth of Humboldt, by Prof. Agassiz, Boston, 1869, 8vo. Mem. de l' Acad. Imper. des Sciences Naturelles de Cherbourg, XIII. and XIV., 1868, 2 vols., 8vo.

Dr. Blake read the following paper upon a series of observations made by Capt. Doane, of the U. S. Mail Steamship *China*, during six consecutive voyages to Japan, upon the meteorology of the Pacific Ocean, from November, 1869, to July, 1870. These observations were of a very interesting character, and tended to confirm the views previously expressed by Dr. Blake, that there exist broad belts of climatic extremes, extending over the Pacific Ocean, and that these extraordinary variations occurred at the same time that the entire continent of Europe and western part of Asia were subject to unusual extremes of temperature. The Doctor called the attention of the Academy to the peculiar curves of temperature between this city and Yokohama, which he illustrated by diagrams as they were discovered to exist by Captain Doane:

Climate of the North Pacific Ocean.

BY JAMES BLAKE, M. D.

In a paper I read March 7th on the subject of the meteorology of the past winter, I advanced the opinion that the extreme climates to which we are occasionally subject on this coast, and in fact over the whole globe, were owing to the Equatorial and Polar currents of air prevailing in broad belts over contiguous parts of the earth's surface for a considerable period. These views have received most striking confirmation from the meteorology of the past few months, during which extreme climates have still been prevailing over the whole of that portion of the northern hemisphere about which we have any correct data. It is not, however, my intention this evening to analyse the whole of these facts, but merely to bring before the Academy some interesting data that have been furnished me by Captain Doane, of the Pacific Mail Steamship Company's steamship China, containing an abstract of the meteorological observations made on board in crossing the Pacific from here to Yokohama and back during six consecutive voyages. The data contained in these observations afford most important evidence of the correctness of the former views I advanced, showing the existence of a broad belt of extreme climate over another large portion of the earth's surface; and this, too at the time the whole of this continent and Europe and the western part of Asia were subject to unusual extremes of temperature. I would first call attention to the diagram on the board showing the curves of temperature between here and Yokohama in May last. In my former communication on the subject I stated that from the memoranda of ships arriving in this port during the months of November and December, there was evidently an Equatorial current of air prevailing off the coast to the West, and meeting the polar current at no great distance from the coast. The observations furnished by Capt. Doane show that the Equatorial current extended across the Pacific, giving rise to an extraordinary high temperature, the mean temperature for the voyage in November, which lasted twenty-five days, was 70.2°; the extremes, with the exception of the coast climates, being 65° and 77°, temperatures which, at this season of the year, show the complete absence of any Polar current. Although we do not possess any data as to what is the monthly mean temperature of this portion of the earth's surface, yet there can be no doubt but that this November temperature is far above the average mean temperature of the month; it is in fact nearly 5° above the mean temperature of the middle of summer, as furnished by the last voyage from the 22d of June to the 13th of July. There can be no doubt, however, but that during the latter period the temperature was probably as much below the mean as the temperature of November was above it, the unusual distribution of the atmospheric currents still continuing, giving us the excessively hot summer we have been experiencing on land, whilst an almost winter climate prevailed on the Pacific Ocean.

On the same paper on which I have made a diagram of the temperature for November, I have also made another showing the temperature across the Pacific from the 1st to the 22d of May, a period during which we had an exceedingly high temperature over the greater part of the continent. In fact, the temperature in the early part of May was higher than I had ever seen in this country so early in the summer, and whilst we were so warm here, over the surface of the Pacific a cold Polar current was prevailing, reducing the mean temperature of the voyage 8.3° below that of the month of November. The same anomalous temperature prevailed during the months of June and July, keeping the temperature of what should be the hottest season of the year below that of January. In making this calculation, the observations affected by the coast climate have been left out. The observations furnished by Capt. Doane present many other points of interest, which I hope to discuss at some other time. I have brought forward these few remarks trusting that the strong evidence they offer in support of the views I have before advanced, will direct the attention of meteorologists more particularly to the investigation of this branch of the science, as it is, I believe, in this direction that we must look for its most useful discoveries.

By these observations, furnished by Capt. Doane, and other data, we can now make a chart of the climate prevailing in the latter part of November and December over the largest part of the Northern temperate zone, embracing about 200° of longitude; and although the data from Central Asia are somewhat uncertain, yet they are sufficient to show the prevalence of an unusual climate even there. Beginning with Central and Western Asia, we have notice of military expeditions on the Persian Gulf being stopped for want of water in March, owing to the excessive drought of the early winter and spring months. Subscriptions had also been started in England to provide food for the Jews, owing to an anticipated famine on account of the failure of the rains in Syria. From Europe our data are more certain. There the early part of the winter was marked by an unusual degree of warmth, the thermometer for many days in the early part of January being 10° and 12° above the mean temperature. On the Atlantic I have no definite data, but from information furnished me by gentlemen who crossed early in January, I believe a Polar current was prevailing there. In the Eastern States the winter was unusually mild, whilst from the Pacific Coast to the other side of the Rocky Mountains, a cold northerly current prevailed; from here across the whole of the Pacific a warm south current existed. Nor has this abnormal distribution of the atmospheric currents yet ceased, as the low temperature and prevalence of northeast winds on the Pacific Ocean in June and July, and the unusually high summer temperatures, both in this country and Europe, evidently prove. These high summer temperatures on the continent are probably not so much dependent on the direction of the winds as on that condition of the atmosphere by which the mixing of the upper and lower currents is prevented; and this is much more likely to be the case when the Polar and Equatorial currents run in broad belts. In fact, to this absence of perpendicular movement in the atmospheric currents, the extremes, both of heat and cold, may in a great measure be attributed.

Gregory Yale read an extended paper on the subject of the Indian mounds of the Potrero, one of which was examined a few months since by several members of the Academy.

Mr. Yale exhibited a diagram of the mound. He stated that the paper was not complete, and asked permission to complete it, and to arrange in order the specimens collected, so that they could be more satisfactorily examined by the members. Mr. Yale also announced his intention to prepare at some future time a complete history of his observations on mounds in this country. He thought a systematic series of observations on the subject of mounds might be made with great advantage, which would result in correct conclusions as to their origin and purposes.

Dr. Saxe, of Santa Clara, made some interesting remarks regarding the subsidence of the Santa Clara Valley and the artesian wells of San José. He incidentally stated that fish occasionally came from the wells, and sometimes sawdust flowed out with the water. He was satisfied that the fish did not come originally from subterranean sources, but that they found their way there from open streams or beds of water through underground channels.

Prof. Davidson stated that the workmen of the Central Pacific Railroad Company had bored a well at Oakland Point, and at the depth of 206 feet they passed through a redwood 7 feet in diameter. Both the wood and the bark were fresh and sound. At the depth named, the flow of water was materially influenced by the tide in the bay. At high tide the increased pressure produced an increased flow of water from the well.

Mr. Hanks stated that borate of lime had been found in considerable quantities at a point beyond Virginia City—a fact rendered interesting on account of the probability that nitrate of soda will be associated with it.

Regular Meeting, August 3d, 1870.

President in Chair.

Professors Joseph and John LeConte, of the University of California, Messrs. E. Durand, Charles H. Dennison, and James R. Smedberg, were elected resident members.

Donations to the Cabinet: Some fossil mollusca of the Cretaceous period, from Arevichi, Mexico, presented by Mr. Hanks.

Dr. Ellinwood made a motion to invite the American Association to hold their next annual meeting in this city.

The President said that it would be necessary that the subject come before the Council at their meeting, to be held next day.

Dr. Stout made some instructive remarks upon the preparation of specimens of natural history by the use of carbolic acid. He exhibited several specimens of fish and birds, some of which had been in his cabinet a year, and gave no evidence of decay. These specimens were not skins, but the entire body of the animal was preserved, only the contents of the abdomen being removed, and the cavity filled with cotton soaked in fluid carbolic acid, reduced with alcohol at 95. He said the largest animals could be so preserved—even elephants and whales—and he had himself preserved an alligator. He said, also, that upon the death of Captain Pearson, of our city, some years since, it became his duty to embalm the body, and he did so by using carbolic acid, and said that he had not the slightest doubt that one hundred years hence the body would be found in a good state of preservation, if examined.

Prof. Davidson said if the Doctor's theory was correct, the preparation was a valuable one for collectors, who had not time or skill to skin specimens, or in case of vultures, buzzards, etc., not a pleasant work.

Dr. Cooper thought it might answer for temporary purposes, but doubted its value for lasting any long time on account of evaporation of the acid.

Dr. Stout said it was true it would evaporate, but in doing so seemed to permeate every particle of the tissues, and even preserve the brain. The body dessicates and becomes very light, and decomposition seems arrested. The Doctor said that the principal preserving substance in the preparation used in embalming the mummies of Egypt, was, undoubtedly, carbolic acid in a crude state.

Dr. Cooper said it dried the body and contracted it so, that he thought specimens so prepared could never be set up by a taxidermist.

Prof. Davidson made some interesting remarks upon certain species of seal upon this coast, called by hunters the Sea Lion. He said the female remains on the coast all the year; the males come only for a short time, about two months, and during their entire stay they never feed, whereas the females go in schools regularly to feed. At Point Arena, a male, one of a school of nearly one hundred, was shot, and a spear head, such as is used by the Alaska Indians, was found imbedded in the body, with a part of the sinew line attached. This sea lion had evidently come about 1200 geographical miles.

Dr. Cooper made some observations upon a trip recently made to "Castle Peak" on the Sierras. He said the mountain is readily accessible, although the angle of ascent is greater than 45°, and herds of cattle nearly reach the summit. It consists, finally, of a mass of vertical cliffs, capped by a chimney, though there is now no crater. The structure is basaltic and volcanic conglomerate. The climate is not alpine, neither are the flora or the fauna strictly such. The flowers and vegetation generally are like those below, except a species of ranunculus and one of anemone. The butterflies and other insects differ more widely, but not being an expert in that department, he would leave them for Dr. Behr to decide upon.

Regular Meeting, August 15th, 1870.

President in the Chair.

Donations to the Cabinet: Mr. Turrell presented some specimens of fossilized wood from Dutch Flat. Dr. Aug. Le Plongeon presented some skulls from Peru.

Donations to the Library:

Anuario del Observatorio Fisico-Meteorico de la Habana in 1862. Tomo 1, 1869, 4to; Relacion del Gran Terramoto, Habana, 1868, pam. 8vo; Sur la Nature des Nuages, Recherches our Polarization atmospherique, Versailles, 1865, 2 pam. 8vo; Sur la Rotation des Nuages, 1864, Bibliographie Cyclonique, 1866, all 8vo; Sur l' Eclipse solaire de 1856, 1863, Sur la pluie d' Etoiles en Mexique, 1867, Sur las Colorations ozonoscopiques, 1867, all pam. 4to; a new classification of Clouds, 6 articles in the Rural New Yorker, 1869-70, folio, all by Prof. A. Poey, from the Author. On fossil fishes of Green river, Wyoming Ter., on Classification of Batrachia salientia, 2 pam. 8vo., E. D. Cope, Philad, 1869.

Prof. Poey, director of the Observatory at Havana, up to the time of the recent troubles there, and also an attaché of the French scientific expedition to Mexico, was presented as a visitor and was invited to address the Academy.

He made some remarks upon the books presented by him ex-explaining the nature of their contents. He said in his remarks on meteoric showers, that it had been established by Professors Newcomb and Comstock, of the United States, that the usual periods of these showers occurred in August and November, but the longer periods, when they fall in great abundance, occurred once in about ten years. He had observed that this cycle law for short periods did not hold good south of the latitude of Cuba.

He stated in his remarks on the spots on the sun, that all physical phenomena on the earth, such as storms, seasons of cold and heat, etc., occur in cycles of nine or ten years or more, and that they correspond to the astronomical cycles of the shooting stars, and also that the spots upon the sun's surface have some close relation to these.

Prof. Whitney remarked that during the past fortnight the Geological Survey had ascended three of the mountains known as "Castle Peak." Of these, one is about four miles north of the Summit, on the Central Pacific, in Nevada County, and is the one referred to by Dr. Cooper at the last meeting; another is twelve miles south-west of Bridgeport, Mono County, while the third is about ten miles west of this, and in Tuolumne, at the head of the West Walker River. The last mentioned mountain is the one originally named "Castle Peak" by George H. Goddard in 1854, and until now it has never been ascended or measured, although it has been attempted to be reached several times by the Geological Survey. It is a mass of granite pinnacles, and presents a grand appearance, especially from Pilot Peak and other points on and near the road to the Yosemite from Coulterville. The elevation is a little over 11,000 feet. Standing back in the interior of the chain, it is hardly visible from Mono Lake or Bridgeport.

The second Castle Peak to which reference was made is about 12,000 feet high, and a very conspicuous object from various points on the road from Carson to Aurora. It is, however, very far from having a castellated appearance, as it is round-backed and made up of metamorphic slates. Still the name has become firmly fixed on it by the people living near, and it cannot now be changed, although evidently given originally through the mistaken idea that it was the point so named by Mr. Goddard. The views from both these points are exceedingly grand, commanding a large part of the central masses of the Sierra, and some of the most picturesque scenery.

The mountain known as Castle Peak, or as Fremont's Peak, north of the Pacific Railroad, is also a grand point of view, and is the most elevated summit between the Pyramid Peak group and Lassen Peak, being about 9,500 feet high. It is very conspicuous from all along between Donner Lake and the Summit, and has a fine group of volcanic crags on its western edge. It is a portion of the broken rim of a stupendous volcano, and from it to the north one can look down into the former crater, at a depth of 600 to 800 feet below.

To avoid confusion, the surveyors will designate this mountain on their maps as Mount Stanford, in honor of the President of the Central Pacific Railroad; the one originally named Castle Peak by Mr. Goddard will be called "Tower Peak;" and the third, or the least castellated of the three, will necessarily have to retain its present name of "Castle Peak," as it is already widely and exclusively known by that designation.

The exact altitudes of the various points mentioned have not yet been calculated, as the observations have not all come to hand, and the figures given at present are only approximate.

Prof. Whitney read some extracts from letters just received by him from Baron Richthofen, giving an account of a recent discovery made in the progress of the geological reconnoisance of China, which the Baron is carrying on under the auspices of the Shanghai Chamber of Commerce. The extract read related to the immense development of the loess in the northern part of the Chinese Empire, and to the mode of the occurrence of the bituminous and anthracite coals in Southern Shansi.

The loess is one of the most important formations of Northern China. When not removed by denudation, it spreads in a continuous sheet of great thickness over the whole surface of the country, rising on the high plateaux, or spreading over the entire area of the Northern Provinces of China, and probably extending far into Central Asia. It is very porous, and frequently intersected by small ramified tubes, which are evidently the spaces previously occupied by rootlets, their walls being usually covered with a thin layer of calcareous matter. Everywhere and throughout the whole mass of the formation is an abundance of perfectly preserved shells of the genus *Helix*, and in many cases the bones of land animals are found. This loess is nowhere stratified, and in places it attains the enormous thickness of 1,500 feet.

The problem of its origin is an extremely difficult one, and it is evidently a subærial deposit, and one without a parallel in any other part of the world, as far as yet observed. Prof. Whitney remarked, in commenting on these facts, that a most careful and detailed series of observations on this formation would be required, in order to be able to arrive at anything like a satisfactory conclusion in regard to the geological condition under which it has been deposited.

Dr. H. Gibbons spoke of the smoky state of the atmosphere, which he had noticed for the last twenty-four hours, and referred it to the annual fires in the forests of Oregon. This produced some discussion, Dr. Cooper and others opposing it.

Dr. Gibbons called the attention of the President to a paper read by him some time since on the belts of temperature, and asked how he would explain the present heated term at the East, and where the counterbalancing cold zone was?

Prof. Poey said that undoubtedly such opposing zones did exist, and that he had observed that, when all North America was in a heated condition, South America was in an opposite state of cold.

Regular Meeting, September 5th, 1870.

Prof. Whitney in the Chair.

Twenty-five members present.

Prof. A. Poey was elected a corresponding member, and Dr. C. M. Hitchcock and H. E. Highton resident members.

Donations to the Cabinet: Rock crystal from Clear Lake, pumice stone and galena from Battle Mountain, Nev., selenite from San Joaquin county, by G. Yale. A piece of silicified tree from Calistoga, by Mr. Badlam through Dr. Stout.

Donations to the Library:

The North American Lakes, Dr. E. Andrews, Chicago, 1870, pam. 4to.; The Total Eclipse of July, 1860, Wash. Nat. Observ. pam. 4to.

Also the following through Smithsonian Institution:

Trans. Edinburg Geol. Soc., I., 3; On sandstone in Fifeshire, and on columns in Mica schist, J. Haswell; Smithsonian Contributions, XVI., 1 v. 4to., and Miscel. Collections, VIII. and IX., 2 v. 8vo., Washington, 1869, Myriapoda Nova Americana, Vespidæ Amer. novae, Description de divers Myriapods, Humbert & de Saussure. Paris, 1869, 3 pam. 8vo. Annals de l'Observatoire Physique central de Russie, St. Petersburg, 1865, 1 v. 4to.; Melanges Physiques et Chimiques, Dr. Wild, St. Petersburg, 1 v. 8vo.; Commelinaceæ Indicæ, Carl Hasskarl, Vienna, 1870, 1 v. 8vo.; Sertum Tianschanicum, Osten Sacken & Ruprecht, 1869, 1 v. 4to.; Dinotheriorum genere, etc., J. F. Brandt, St.

Petersburg, 1869, 1 v. 4to.; Abhandl. vom Naturwiss. Vereins zu Bremen, 1870, 1 v. 8vo.; Zeits. der Deutsch. Geolog. Gesellschaft, XXI., 4, 1869, 1 v. 8vo.; Beitrage zur Telegraphie, Dr. E. Zetsche, Chemnitz, pam. 8vo.; 54th Jahresber. der Naturforsch. Gesell. zu Emden, 1868, pam. 8vo. Das Gesetz der Winde uber Nordwest Europa, Dr. Prestel, Emden, 1869, pam. 4to.; Verhandl. der Phys. Med. Gesell. in Wurzburg, Band 1, heft 4, 1 v. 8vo., und Verzeich. der Bibliothek, pam. 8vo.; Bulletin de l'Acad. Imper.des Nat. de Moscow, 1864, No. 4, 8vo.; Bulletin de l'Acad. Imper. de St. Petersburg, XIV., pts. 1 and 2, 4to.; Memoirs de l'Acad., XIII., 8, XIV., 1-7; Studien uber die Wanderblocke, und die Diluvialgebilde Russlands, G. V. Helmersen, 1 v., Synopsis der Viperiden, Dr. A. Strauch, 1869 1 v., Uber die Embryonalhulle der Hymenoptera, M. Garnier, 1869, 1 v.. Untersuch. uber die Gattung der Klippschliefer, 1869, 1 v., Verlauf der Chylusbahnen in Dunndarme, T. Zarwarykin, Uber die periodischen lebens der Pflanzen, C. Linnser, 1869, 1 v., all 4to., from Acad. Imper. de St. Petersburg. Nachrichten der Konigl. Gesell. der Wissen. und Univers. zu Gottingen, 1869, 1 v. 8vo.; Abhandl. Senckenberg Naturforsch. Gesell Frankfort am Main, Band VII., heft 1 and 2, 1 v. 4to.; Repertorium fur Meteorologie, Dr. Wild, St. Petersburg, 1869, 1 v. 4to.; Beobacht. uber Lerneocera, etc., Die Cypris larva der Cirripedien, und uber Leptodera appendiculata, Dr. C. Claus, Marburg, 1868–9, 2 v. 4to.; Die Entewickelungs der Muskelfaser, G. B. Wagener. Sitzungsberichte der Gesell. zur Beforderung Naturwiss. in Marburg, 1868 to 1869, 3 v. 8vo.; Ann. der Kon. Sternwarte in Munchen, XVII., 1869, Suppl. VIII. and IX., 1869, 3 v. 8vo.; Verhandl. der Kais. Kon. Zool. Botan. Gesell. in Wien, XIX., 1869, 1 v. 8vo., Beitr. zur Fauna der Nikobaren, etc., G. von Frauenfeld, 4 pam. 8vo.; Mittheil. aus dem Osterlande, XIX., 1 and 2, Altenburg, 1869, 1 v. 8vo.; Sitzungsber. der, 1869, 3 hefte, 8vo., und Abhandl. der Math–Phys. Klasse der K. Bayerisch. Akad. der Wissen. Munchen, 1869, 1 v. 4to.; Entwickelung der Agrikultur-chemie, A. Vogel, Denkschrift auf C. F. P. von Martius; Oversigt over det Kong. Dansk. Vidensk. Selskab., 1868–9. 2 pam. 8vo.

Presented by the author, Dr. Le Plongeon, La Religion de Jesus, Boston, 1867. 1 v. 8vo., and Monita Secreta Societatis Jesu, Paris, 1869, 1 v. 12mo. By G. Yale, Dictionary of Terms of Art, J. Weale, London, 1860, 1 v. 8vo.: Geology of Lake Superior, Foster & Whitney, Washington, 1851, vol. 3; Coal and Coal-Oil, E. Bowen, Philadelphia, 1865, 1 v. 8vo.; Seven years' residence in Great Deserts of North America, Abbe E. Domenech, London, 1860, 2 v. 8vo.; Lifted and Subsided Rocks of America, G. Catlin, London, 1 v. 8vo.; Mexico, by H. G. Ward, London, 1829, 2 v. 8vo.: Correlation and Conservation of Forces, E. Yeumans, New York, 1869, 1 v. 8vo.; Manual of Mineralogy, J. D. Dana, New Haven, 1865, 1 v. 8vo.; The New World compared with the Old, G. A. Townsend, Hartford, 1869, 1 v. 8vo. Also, by mail, Synopsis of Unionidæ, Dr. I. Lea, Philadelphia, 1870, 1 v. 4to., from author.

Dr. Le Plongeon read part of a long article on the aboriginal ruins of Peru, referred to the time of the Incas. He also exhibited a collection of remarkable skulls and specimens of art from the ruins, with photographs of the architecture, showing that they were acquainted with the structure of the arch.

Dr. Stout called attention to the prospects of the "Bolivia Colonization Company," which was intended to establish a settlement about four hundred miles up the Amazon, and to keep open a constant communication with the Pacific shores by highways across the Andes. He hoped that some means would be found to make the project an aid to the scientific exploration of those regions, and that the Academy might obtain some of the valuable collections which might be made there.

Regular Meeting, September 19th, 1870.

Judge Gregory Yale in the Chair.

Rev. Wm. Alexander, of San José, was elected a resident member, and Drs. Miguel de los Rios and A. J. de los Rios, of Lima, Peru, were elected corresponding members.

Prof. Esmark, Director of the Zoological Museum, Christiania, Norway, was introduced by Dr. Stout, and made some interesting remarks on the fishes of Norway, where he had discovered ten species before known only from Greenland.

Donations to the Library: An engraved portrait of Berzelius, by J. A. Raymond, through E. Brooks. Gramatica y Arte nueva de la lengua Q' Quichua o lengua del Inca, 8vo., 1842, by Dr. Le Plongeon. Memoirs de la Societe Royale des antiquaires du Nord, Copenhagen, 1867, 8vo.; Tillaeg til Aarbogen for Nordisk Oldkyndighed, og Historie, Copenhagen, 1867–8, 2 vols., 8vo.; Bened Grondal (egilsson), Clavis poetica antiqua linguæ septentrionalis, Hafnia, 1864, 1 vol., 8vo.; Dannevirke og Omegn, Chr. C. Lorenzen, Haderslev, 1863, 1 vol., 8vo.; Fragmenta Phytographiæ Australiæ, Nos. L. to LIV., all through Dr. F. Müller.

Mr. Yale stated that some of the Regents of the University had made verbal offers to him, proposing the incorporation of this Academy with the University.

Dr. Stout and others objected to any such arrangement, and it was finally decided to await more definite propositions.

Mr. Hanks, Corresponding Secretary, stated that the American Association for Advancement of Science had accepted the Academy's invitation to hold a meeting here in 1872.

Regular Meeting, October 3d, 1870.

President in the Chair.

S. Clinton Hastings, Jacob R. Snyder and Dr. N. R. Davis were elected resident members; Prof. Esmark, of Christiania, Norway, and Thomas London, of Dalles, Or., corresponding members.

Donations to the Museum: Coal, from the new Mines on Queen Charlotte's I., by Prof. Davidson. Hamburg coin of 1728, by Dr. J. B. Trask. A skull of an Apache Indian, by Dr. Sawyer. A skull of a badger, (*Taxidea*) from forty feet beneath the surface at Los Angeles, Cal., in asphaltum beds. Australian plants, by Dr. F. Müller, through Prof. Bolander.

De Kellogg exhibited a skin of a Bushy-tailed Rat, (*Neotoma*) from the summit of the Sierra Nevada, at the Railroad Pass, latitude 39°.

Donations to the Library:

Coast Pilot of Alaska, Washington Ter., Oregon and California. G. Davidson, U. S. C. S., Washington, 1869, 2 vol., 8vo. Astron. and Meteorol. Observ. at U. S. Naval Observatory for 1869, Wash., 1870, 1 vol., 4to. Nobert's test plate and striæ of Diatoms, Sullivant & Wormley, New Haven, 1861, pam., 8vo. Nunquam Otiosus, Zool. Mittheil., Dr. L. W. Schaufuss, Dresden, 1870, pam., 8vo. An. Rept. Directors of Cincinnati Observatory, 1870, pam., 8vo. The Eared Seals, (*Otariadæ*) J. A. Allen, Cambridge, Mass., 1870, pam., 8vo. Molluscan Fauna of Peru, Tertiary, New Haven, 1870, pam., 8vo. An. Catal. Mass. Inst. of Technology, Boston, 1870, 1 vol., 8vo. Act to Establish Quarantine and Sanitary Laws, S. F., 1870, pam., 8vo.

The President made some remarks on the fossil trees of Calistoga, which he found to be imbedded in an tufaceous sandstone, of volcanic materials, their petrification being caused by infiltration of silicate of potash, contained in such large quantities in these volcanic rocks. As the softer rock wears away, the trees are exposed. It has not yet been determined whether they are conifers or dicotyledonons.

Mr. Carlton exhibited a specimen of *Serpularia* grown around a branch of wood which was dredged on the Codfish grounds of the Aleutian Islands, at fifty fathoms depth.

A discussion ensued on the subject of entertaining properly the Association which is to meet here in 1872.

Regular Meeting, October 17th, 1870.

President in the Chair.

Donations to the Museum:

Dr. Hewston presented some very large barnacles taken from the body of the whale recently washed ashore near the Cliff House. There were two species, *Coronula diadema*, and attached to the *Coronula* were *Otion Cuvieri*.

Dr. Hewston also exhibited a species of Syngnathus, known as the Pipe fish, found in the Bay of San Francisco, and sometimes caught with shrimp.

Prof. Davidson made some remarks on the storms in the Gulf of California, particularly the *Cordonoza*, which blows every year in September or October, and in which the "Continental" was lost. It seems that the natives have a dread of it, and fly for shelter with their vessels at the first indication of its approach. He said a curious feature of the late storm was that one of the "Continental's" boats was carried against the wind, evidently by a strong ocean current, forty miles up the coast. Mr. Yale also made some remarks on Pacific Coast storms, and stated that he was preparing a paper on the subject.

Dr. Blake commented upon the remarkable meteorological disturbances that have occurred in various portions of this continent lately, and gave the result of his observations on the late northeasterly wind on the California coast, which was characterized by unusual dryness. On Saturday, the 15th inst., the thermometer was at 78° in the morning, and 68° in the evening. At 6 A.M. the wet bulb showed 20 per cent. of moisture; at 3 P.M., 19 per cent.; at 4 P.M., under the influence of a southwest wind, blowing with a force of 2, (the maximum standard being 6) it had risen to 45 per cent., and at 11 P.M. fell again to 20, when the northeaster returned with a force of 5. The barometer continued sinking some hours after the norther began—an unusual occurrence except on this coast. The extreme dryness of the air will be seen more plainly from the explanation that the wind that blows off the great Desert of Zahara seldom contains less than 20 per cent. of moisture, and our late northeaster was at one time one per cent. below that.

Regular Meeting, Novemrer 7th, 1870.

President in the Chair.

Generals D. D. Colton and John Hewston were elected resident members.

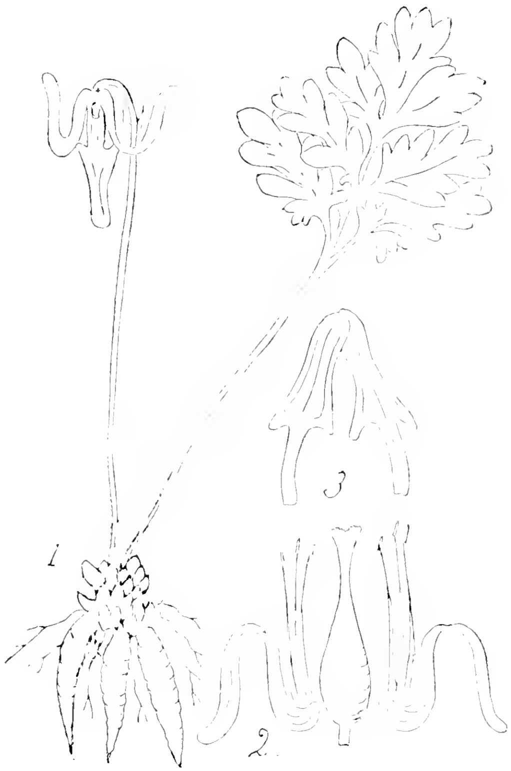
Donations to the Library: Etudes sur l'Australie in 1862, 1869, S. Morhange, Brussels, 1 vol. 8vo., from the author; Introduction to Practical Astronomy, Prof. E. Loomis, New York, 1861, 1 vol. 8vo., from G. Yale.

Dr. A. Kellogg presented specimens of a new plant, accompanied with a sketch and electrotype, and read the following description:

A New Californian Dicentra.

BY A. KELLOGG, M. D.

Dicentra uniflora—Kellogg. Root fasciculate, granular at the crown; scape annual, as long as the leaf—*i. e.*, two to three inches long—bibracteate, one-flowered; flower nodding, whitish or flesh-colored; a gland at the inner base of the filaments; leaf ternately compound and multifid, slightly pubescent near the base; capsule oblong, ovate, lanceolate; seeds crested at the hilum. Found at Cisco and at the summit of the Sierra Nevada mountains, on the line of the Central Pacific Railroad, in June, 1870. This species of *Dicentra* cannot be mistaken for any other in any stage of its growth, either in respect to form or size. In the figure, No. 1, is the natural size of the plant—1 to 1½ inches of the lower portion is embedded in the soil—Nos. 2 and 3, the parts of the flower, etc., somewhat enlarged. It is probable the fasiculate portion of the root is thrown off, in anticipation of the fruiting scape, or scapes, after which it decays and others succeed. Found chiefly adjacent to rocks.



A specimen of fossil wood, petrified by carbonate of iron, found in the Mount Diablo coal mines, was exhibited by Mr. Durand from the cabinet of Mr. Pioche.

Judge Hastings read a brief paper on earthquakes, propounding the theory that they are caused by the falling in of the walls of caverns beneath the crust of the earth. He thought subterranean water action might be an agent of these collapses. He believed that the cessation of earthquakes in countries once disturbed by them, like England, was due to the final settling in of the earth's crust and filling up of cavernous vortices. He asserted that earthquakes are confined to countries where long dry seasons prevail, and that the phenomena recur at the period between the dry and rainy seasons, as in California, where they are most marked in the Fall and Spring. In allusion to the subterranean water sources, he explained the increase in the volume of springs and streams at the end of summer, by assuming that rains had swollen their sources, and these, by hydrostatic pressure through underground conduits, had raised their distant outlets.

Prof. Davidson said the theory of Judge Hastings was unsupported by facts. Earthquakes are not confined to dry, warm countries. They are common in Alaska, in a climate of perpetual moisture.

Dr. H. Gibbons pronounced the explanation of the rise of springs and streams as equally untenable, and ascribed it to the diminution of evaporation with the shortening of the days and the lengthening of the nights; a view in which he was supported by Dr. Cooper and Dr. Kellogg. He had treated that subject in an elaborate paper, which was published in Silliman's Journal some twelve years ago, and his explanation had been accepted by scientific men as correct.

Dr. Kellogg related the results of experiments to test the amount of evaporation from the earth, which was ascertained to be very great in the dryest season. Of course, when this evaporation was lessened by shorter days, there would be a gradual increase in springs and streams.

Dr. Blake thought that the contraction of rocks, with lessened heat, might, by reopening fissures, permit a greater flow of water; and commented upon the increase of streams after an earthquake shock as the result of the opening of cracks.

Dr. Gibbons said that the increase of water occurred with the shortening days when there was no abatement of heat, and he rather referred the flow coincident with earthquakes to the settling of the soil and rocks, which would squeeze out the moisture or close its ordinary channels of escape under the surface.

Judge Hastings observed that he advanced his theory only to elicit discussion, but he thought he could vindicate it. In reply to a question from Dr. Gibbons, he said that he was first led to attribute earthquakes to the falling in of cavern walls by a fact told him six months ago by one of the Sisters at San Juan Capistrano, who showed him where the hill had sunk in at the time of the earthquake which destroyed the Mission Church in 1813.

Dr. Le Plongeon made some remarks on earthquakes in Peru, and endorsed an opinion advanced by Dr. Gibbons, that such phenomena were caused by the explosion of gases along spaces between the molten core of the earth and its crust.

Dr. Blake closed the discussion by remarking that what was wanted about earthquakes was facts, not theories. Unfortunately, the circumstances attending these phenomena are not favorable to a careful collection of data, and our knowledge is not sufficient to afford a complete explanation.

Dr. Gibbons gave the result of some recent observations on cloud currents in the upper and lower atmosphere, preceding the late rain. The two currents moved in opposite directions, but apparently in obedience to some common impulse, and finally coalesced. The barometer rose, instead of falling, as the rain approached, and until it fairly set in, and was rapidly falling as the sun broke out and the rain ceased.

Prof. Davidson gave the result of his observations on the glacial grooves in the southeastern part of Vancouver and adjacent islands. They bear north 9° east, true. The rock in which they are found is a highly crystalline feldspar and hornblende.

He gave the result of his measurement by triangulation of the height of Mt. Baker as follows: north peak, 10,719 feet; south peak, 10,079; upper part of the crater, 10,123; bottom part of crater, 9,925; slope of crater, 30 degrees; length of crater, 407 feet.

These measurements were never before given. The height of the snow line on the west side of the mountain was found to be 5,301 feet, which is 2,150 feet greater than the elevation reported by Alexander Agassiz, which has generally been distrusted.

Mr. Hanks referred to the reported finding of a ship on the Colorado desert, alleged to have been stranded there centuries ago by the recession of the sea, and proposed that a committee be appointed to investigate the facts.

Mr. Hanks said that Col. Evans had described the ship in an article published in the Galaxy.

A motion was carried that Col. Evans be invited to address the Academy on the subject, and that Mr. Hanks be appointed a committee to gather evidence on the subject.

REGULAR MEETING, NOVEMBER 21ST, 1870.

President in the Chair.

Thirty members present.

Dr. J. Morrill, of Colima, Mex., was elected a corresponding member.

Donations to the Cabinet: A dried specimen and drawing of the "Skooma," or "Elephant Fish," (*Chimæra Colliei*) from Puget's Sound, by A. W. Chase, through Prof. Davidson. Another specimen of the same species taken near this city was exhibited.

Mr. Turrill presented some shells and pieces of rock from old Indian "Kökkenmöddings," near Black Point, remarking that their occurrence on top of hills of pure sand showed that they had not been carried up by water.

Donations to the Library: Proceedings of the Lyceum of Nat. History of New York, vol. I., sigs. 1–3. The California Horticulturist and Floral Magazine, No. I, 1870, 8vo.

Prof. Davidson, of the U. S. Coast Survey, gave an account of his observation of meteors on the nights of the 13th and 14th instants. The moon was shining brightly during the six hours the count was kept—recorded by the telegraph method on the chronograph. During the first two hours and a half, from twelve o'clock midnight, only six meteors were seen. Prof. Davidson thought at the time the observation was made, the earth had passed out of the meteoric belt, or was possibly just in its edge. He said that in the observation made last year at Santa Barbara, five hundred and sixty-six meteors were counted in six hours. He mentioned a brilliant one with a train that lasted eight and a half minutes, in which time it changed to two-thirds of an ellipse.

Mr. Hanks read a carefully prepared report upon the subject of the remains of a ship alleged to have been seen in the Colorado Desert, forty miles north of Fort Yuma, near the San Bernardino Road. He gave the newspaper history of the subject, and the result of his correspondence with various parties at San Bernardino, Los Angeles and San Diego. His enquiries had elicited nothing but hearsay evidence. There is positive testimony that numerous persons have seen at the distance of a few miles, an object that they believed to be the wreck of a large ship imbedded in the sand, at a spot which is watery and inaccessible during portions of the year. A company left San Bernardino some time ago to solve the mystery, but they could get no nearer to the object than four miles on account of mud. Another party has lately started, with an outfit by which they expect to be able to reach the place. Florencio Islas reports that the Indians assert the existence of a ship in the locality mentioned. There are distinct water marks on the adjoining hills, and enormous quantities of shells are swept into drifts and piles by the winds. Mr. Hanks offered as a theoretical explanation, in the absence of direct proof, that the alleged ship may be only a mass of the curious travertine which forms in alkaline lakes on the plains and southern deserts, and which grows into fantastic shapes like coral. He had seen forms which could easily be mistaken for anything. He exhibited some specimens from Owen's Lake.

Prof. Davidson, in allusion to the assumption that the alkaline valley surrounding the "ship" is seventy feet lower than the sea level, stated that the field notes of a party surveying for the 32d parallel railroad showed the level of the western edge of the desert was 750 feet above the ocean.

Col. A. S. Evans, on invitation, gave an account of his observation of the supposed ship. He had crossed the desert several times, had seen the object once from a distance of ten miles, afterwards from a point within three miles, and had from this distance examined it with a glass. It appeared to be the hulk of a vessel, partly on its side and partly buried in the alkaline mud that surrounded it. The locality was a salt plain, which at certain seasons was covered with water, and at others quite dry. He had observed the old water lines on the surrounding hills, and was surprised at the drifts of fine shells, spirals, such as are found in ocean beds. His impression was that the locality was above the present sea-level. The so-called "New River," which runs from the desert into the Colorado south of the ship, might have been formed by an immense cloud-burst, or water-spout, emptying on the desert, and cutting a channel to the river, which the drifting sands are now closing up. He mentioned several instances of water-spouts that had precipitated rivers of water, cutting large channels in the earth and destroying everything before them. He had heard the Indian story of the ship, and the Indian tradition that the ocean once flowed in here from the Gulf, but did not attach much importance to them. He did not know that the object seen by himself and others was a ship, but he thought it was; and because he had seen it on several occasions, he knew it could not be the effect of mirage. Neither could it be the schooner said to have been hauled to the desert on an ox-cart by Martin Vise, for that went by a road far south of the place described, and he had reason to believe it had reached its destination, and was now afloat. Furthermore, the supposed ship was described before Vise ever started with his schooner. He mentioned one person who claimed to have gone to it and examined it, and who said it was made of teak wood.

Some conversation followed in regard to cloud-bursts and their effects.

Prof. Davidson commented on the unreliability of the barometer for observations of heights in the heart of a continent.

Col. Williamson gave his views on the same subject, and thought one portion of the Colorado desert might be as low as has been reported.

The thanks of the Academy were returned to Col. Evans for his interesting communication.

Regular Meeting, December 5th, 1870.

President in the Chair.

Donations to the Cabinet: A spider, allied to the genus *Gastrocanthus*, from San Rafael, by Henry Highton, through the President. A white magnesian mineral from Market Street Cut, by Dr. Cooper.

Prof. Davidson presented some specimens of oysters raised in San Francisco Bay, from seedlings brought from New York, and planted in March last, showing a very rapid growth. They were several times larger than the seedlings.

Mr. Throckmorton, Dr. Cooper and others, said that shells of this size were three years old in New York Harbor, and doubted their growing here in the time stated; but Prof. Davidson said the fact was from undoubted authority.

Dr. Cooper wished to know why an imported species of oyster should grow so large when those native to this coast, planted under the same conditions, were no larger than in an uncultivated state.

Prof. Davidson said that true diamonds had been recently found in Arizona. The specimens had been brought by prospecting miners, among a great variety of minerals, including rubies, garnets, etc. The miners, not knowing the diamond in the rough, had thrown away some large and valuable specimens. The largest brought to this city will cut three carats, and according to the experience of Frontier, Pohlman and Bellemere, lapidaries, will be worth about $500 when cut. This discovery developes another industry in our country.

Prof. Davidson said, in making some computations of recent astronomical and geodetic observations, large deflection of the plumb line had been detected. Numerous instances were cited, from the Straits of Fuca to Los Angeles, where the deflection ranged from 6 to 12 seconds of arc. But no prediction of the direction of the deflection could be made from the position of adjacent mountains, for although the Santa Barbara mountains evidently deflect the plumb line 7½ seconds, the deflection at Santa Cruz is 10 seconds towards the deep submarine valley of Monterey Bay, although the hills rise high to the northward of the station. At the Straits of Fuca station, the error of deflection of the plumb line was 6 seconds; at San Francisco, 6 seconds; at Santa Cruz, 10 seconds, not towards the north line of mountains, but south, towards a submarine valley in Monterey Bay, showing a powerful submarine attracting power.

Dr. Blake said that observations showed a connection between our meteorology and that of the Sandwich Islands. A gale occurred at the Islands on the 20th of October. The barometer in San Francisco commenced falling on the 21st, and reached the minimum on the 24th, in the morning. On the 27th a gale at the Islands began, which lasted three days. The barometer in San Francisco fell 0.25 from the 29th to the 30th, the minimum being reached November 2d. A gale blew at the Islands from October 30th to the 6th of November. The barometer in San Francisco began to fall on the 4th, and reached its minimum on the 6th.

Dr. Le Plongeon read a lengthy paper on the origin of earthquakes.

Dr. Hewston made a motion, which was carried, that Prof. Esmark be allowed the use of the rooms of the Academy, and that the specimens of crustaceans and fishes be put in his charge for the purpose of classification.

Regular Meeting, December 19th, 1870.

President in the Chair.

Twenty members present.

Donations to the Museum: Bones of a mastodon, from Inyo County, by Dr. Blake, who remarked that he hoped to obtain the head also. Larvæ of a Cicada, from Mazatlan, Mex., with fungoid growths from their heads, of the genus *Spheria*, (like S. Robertsii, often exhibited on a Chinese caterpillar) from Mrs. A. J. Grayson, through Mr. Carlton. A West Indian sponge, from Dr. Bourne. Fresh water mollusca, also a Spirifer from the Wasatch Mountains from Dr. R. F. Reid, found in Utah, etc., through Dr. Trask.

Donations to the Library:

Reports on Provinces of China, Baron F. Von Richthofen, Shanghai, 1870, 1 vol., 4to. Coal Fields of the North Pacific Coast, R. Brown, Edinburg, (Geol. Soc.) 1869, pam., 8vo. Genus Pompholyx and its allies with revision of the Limnæidæ, W. H. Dall, (An. N. Y. Lyceum) 1870, pam., 8vo. Military maps of Virginia, Engineer Dept., Washington, 1870, folio. Journal of Gas Lighting, etc., London, Nov. 22d, 1870, folio; E. Döll, Vienna, 1870, pam., 8vo.; Overland Monthly for January, 1871, 1 vol., 8vo.; American Journal of Microscopy, No. 1, Chicago, Nov., 1870, 4to, from the Publishers.

Dr. Le Plongeon continued the reading of his essay on Earthquakes.

Prof. Davidson stated that in studying the bars and entrances to all the rivers and bays opening directly into the Pacific along our coast, he had discovered the general law that the channels all tended to the northward, directly in the face of the northwest wind and northwest swell rolling steadily all summer. He attributed this to the eddies running *within* the great northwest current, and, of course, contrary to it, usually with a velocity of two miles per hour and width of about three miles. The sand was rolled *northward* by these eddies, making the long spit which usually forms the beach south of the entrance of the bays, as at San Diego, San Pedro, Humboldt and Shoalwater Bays. Usually, too, the area of the bays is largest south of their mouths.

Dr. Kellogg exhibited specimens of a plant (*Ceanothus infestans*) brought by Prof. Davidson from the Chilchat river, latitude 59° 25′, but previously considered Mexican.

Dr. Cooper remarked that the shells sent by Dr. Reid would fill several gaps in the Academy's collection of shells of the West Slope of North America, and in the following article:

On Shells of the West Slope of North America.

BY J. G. COOPER, M.D.*

The shells presented this evening were collected by Dr. Robert K. Reid, formerly of Stockton, and since a surgeon in the California Volunteers, who collected them while stationed near Salt Lake in 1864. By unknown causes their arrival has been delayed until now. As the molluscan fauna of the great interior Basin is still imperfectly known, I have included in a catalogue of his species those collected more recently, in that and adjoining regions, by Mr. H. Hemphill, C. D. Voy, W. G. W. Harford, G. W. Dunn, L. G. Yates, J. Rowell, myself and others, with short descriptions of the species not given in the synopsis referred to.

There are among these several additions to the lists of Helicoids given by me in our Proceedings, Vol. III., p 330, and the synopsis of *Limneidæ* in Vol. IV., p. 92, as well as the Geographical Catalogue compiled for the Geological Survey in 1867.

I add a few of the most important notes on species obtained outside of the Basin since previous publications.

Additions to the fauna have their names in small capitals.

1 Sphærium patella *Gld.* Lakeport, Upper Clear Lake—*C. D. Voy.*

2 S. lenticula *Gld.* Found by me near San Joaquin River and Visalia.

3 S. striatinum *Lamk.* Humboldt River—*J. Hepburn.* I found thirteen specimens at the north end of Clear Lake, apparently a variety of this species or S. dentatum *Hald.*

4 Pisidium abditum *Hald.* Raft River, near Fort Hall, Idaho —*Dr. Reid.*

5 P. ultramontanum *Prime?* "Narrows" of Clear Lake. Rare; approach form of *P. compressum.*

6 Margaritana falcata *Gld.* Near Salt Lake or Fort Hall—*Dr. Reid.* Stanislaus River is the most southern point I have found it inland.

* For full notes on the species, I may refer to the American Journal of Conchology Vols. IV., V., VI., and to the State Reports now being prepared.

7 Anodonta angulata *Lea.* "Narrows" of Clear Lake, and San Joaquin River to bend.

8 A. Wahlamatensis *Lea.* Clear Lake, and south to Kern Lake.

9 Ariolimax niger Cp. Near San Francisco and Saucelito. Mt. Diablo Range—*Yates.* Pescadero—*Wackenreuder.*

10 Arion (?) Andersonii Cp. East side of S. F. Bay, and south to Santa Cruz. These, with another new species of *Limacidæ,* will shortly be published with illustrations.

11 Limax campestris Binney. Clear Lake to Santa Cruz. Alta 3.625 feet elevation Nevada county, and Truckee, 5,866 feet on east slope. Probably also in valleys and throughout California, as it is found everywhere eastward.

12 Succinea rusticana *Gld.* Clear Lake, and probably Mojave River. Also White Pine region—*Hemphill.*

13 S. Nuttalliana *Lea.* Clear Lake, and probably Mojave River. Rare in California. Near Fort Hall—*Dr. Reid.*

14 Vitrina Pfeifferi *Newc.* White Pine Mts.—*Hemphill.* Indian Valley, Plumas county—*Voy.*

15 Hyalina Breweri *Newc.* Hunter's Point, S. F. county, very rare. Will probably prove a variety of the next.

16 H. arborea Say. Whorls 4 or 5, higher, and larger than last, color darker brown; diam. 0.22, alt. 0.12. West side of Johnson's Pass, 1864, from 3,650 to 5,000 feet elevation. Portland, Oregon, and Clark's Ranch, Mariposa county, 4,000 feet elevation—*Dunn.* Indian Valley and San Gorgonio Pass —*Voy.* Also New Mexico and whole of Eastern United States.

17 Conulus chersina *Say.* White Pine Mts.—*Hemphill.*

18 Pseudohyalina Mazatlanica Pf. Whorls 4, larger, smoother, and lower than *Ps conspecta;* diam. 0.10, alt. 0.03. Lone Mountain, S. F. county —*Dall, Rowell.* "Mazatlan"—*Pfeiffer* (doubtful).

19 Patula Cronkhitei *Newc.* White Pine Mts. and Northern Utah—*Hemphill.* Common. Truckee, and at Mariposa Big Tree Meadows—*Dunn.* Is often confounded with *P. Whitneyi,* which is either a smoother variety of this or a flat smoky variety of *H. arborea,* but is quite variable in degree of smoothness. The southern specimens are usually smoky, but some are found pale like the types from Klamath Lake. Scarcely distinct from *striatella* Anth.

20 "Helix" (Anguispira?) Haydenii Gabb. Whorls 5½, depressed turbinate, with 9 or 10 revolving ribs; diam. *0.80, alt. *0.55. Mountains east of Salt Lake, *Dr. F. V. Hayden.* (Amer. Jour. of Conch., V., p. 24, pl. 8., f. 1, 1869.)

21 "Helix" (Anguispira?) Hemphillii, Newc. Whorls 5, subturbinate, strongly angled, with wide flattened spaces above and below the angle. Pale brown, a darker band above the angle, narrower ones below and at the suture. Lines of growth strong, and crossed by about six rows of faint tubercular ribs below, fainter ones above; diam. *6.25 to 0.70, alt. *0.40 to 0.45.

White Pine Mts., *H. Hemphill.* Bears a similar relation to the last as *A? strigosa* to *Cooperi.* (Amer. Jour. of Conch., V., p. 165, pl. 17, f. 4, 1870.)

Ammonitella Cp., (Amer. Jour. of Conch., IV., 209, 1869.) Ammonite-shaped, the last whorl nearly inclosing the rest; spire sunken, mouth vertically crescent-shaped, lip a little thickened within; umbilicus like depressed spire.

22 A. YATESII Cp. Wh. 6½, yellowish, corneous translucent, bowl-shaped spire one-third the width of shell; last whorl much deflexed and expanding near mouth, umbilicus showing 5½ whorls; diam. 0.31, alt. 0.14.

Cave at Cave City, Calaveras Co., *Dr. Stivers* and *Mr. Holder*, *Dr. L. G. Yates* and others. The first-named gentlemen lost the credit of this interesting discovery, by keeping their unique, but perfect specimen hid from conchologists for several years.

VALLONIA Risso. Form like *Patula*, but with a white, thickened, reflected peristome, nearly circular and spreading.

23 V. MINUTA Say. Wh. 4, whitish, smooth, or ribbed, nearly flat, umbilicus wide; diam. 0.12, alt. 0.05.

This American form of the Old World pulchella *Mül.* has only lately been found west of the Rocky Mountains. I obtained an immature specimen near Truckee in May, which I referred doubtfully to *P. Whitneyi* as a pale variety. Mr. Harford afterwards found it common near Donner Lake, a few miles above Truckee, and Mr. Hemphill has also found them common near White Pine Mountains. Not having been found north of Canada, its circumpolar distribution, though asserted by Middendorf, is doubtful, he, like most authors, considering it identical with *pulchella*.

24 Lysinoe Carpenteri *Newc.* (Cp.) This species, described in the Proceedings, Vol. II., p. 103, from specimens collected by Col. C. D. Gibbes, in Tulare Valley, has been since overlooked or confounded with others, until Dr. Newcomb identified it with specimens collected by Mr. Gabb in Lower California, and referred by him to *Remondii* Tryon, a distinct Guaymas species. Mr. Gabb's specimens compared with the type in our cabinet agree very closely, and also with a specimen found by me at San Diego, but referred by Dr. Newcomb as variety to *rufocincta* Newc. Mr. Hemphill has found others at the Coronados Is., near San Diego, and some bleached ones from near Fort Tejon seem the same. It differs from *Traskii* Newc., previously described, in a a very slight degree, and may prove identical.

It was first described from faded specimens, which fact, together with a wrongly-named fossil specimen (undescribed) in the State Museum, led me to place it in the wrong section in my synopsis.

L. Rowellii *Newc.* is the flattened companion of this, like those similarly connected with Group XIII., but separated in my synopsis as Group XIV.

25 Arionta Kelletii *Fbs.* Specimens from the Coronados Is., (*Hemphill*) pass into the variety Stearnsiana *Gabb*, from Lower California. Others from east of San Diego are very similar to the form called redimita, by W. G. Binney, from Clemente Is., which is a smooth form of crebristriata Newc.*

* The specimen found by Mr. Holder at Alameda, "on the shore," before referred to *redimita* as an extreme variety, with only 4½ whorls and a form like *pomatia*, proves to be a faded specimen of *Buffoniana* Pf. (*Humboldtiana* var ?), doubtless imported from Mexico. Ends of four bands are still faintly visible.

DÆDALOCHEILA Beck.—Shell flattened, many whorled, peristome simple or curiously twisted and contracted, two or three-toothed, and a tooth on the columella.

26 D. HARFORDIANA *Cp.* (Amer. Jour. of Conch., V., p. 196, 1870.) Wh. 6, flat, the last a little deflexed, umbil. wide, showing 5 whorls; peristome thickened, with 2 inflected teeth, its margins joined by a thick callus, and a strong, triangular, parietal tooth placed nearly horizontal; diam. 0.40; alt. 0.16.

Found by Harford & Dunn at the Big Trees of Fresno Co., 6,500 feet alt.

This is one of the most interesting discoveries yet made among our land-shells, being the first of the group found on our Pacific Slope, and also the simplest in its dentation, which, with the open umbilicus ally it it to *Triodopsis*. This combination is not found in any eastern species of the group, though the characters occur separately.

27 Odotropis devia *Gld.*(Cp.) Varieties of this species from Oregon (*Dunn*), are sometimes toothless, some with umbilicus hidden by lip, and one with several narrow, pale bands, probably the result of disease. Some are nearly as small as large examples of *Columbiana*, and very like them.

28 Triouopsis loricata Gld. Found in the Sierra Nevada, between the same latitudes as in the coast range. At Shasta City (Voy), Placerville, 2,500 feet alt. (Rowell), Alta, Nevada Co., 3,600 feet, by me, and Clark's, Mariposa Co. 4,000 feet, (Dunn.) Not high on coast mountains?

29 Pupa Arizonensis Gabb. Found common at White Pine by Hemphill. Of nine specimens, one only differs in having a parietal tooth, like *hordacea* of Binney & Bland, (which does not agree with *hordacea* Gabb.) Another is larger with one more whorl, (6) but no longer than the type.

ZUA Leach. Shell pupaeform, tapering toward both ends, lustrous, pellucid mouth nearly half of total length, peristome simple, thickened, the ends connected by a callus, imperforate.

30 Z. LUBRICOIDES Stimpson. Wh. 5–6, the last 0.40 of total length, apex obtuse, lip often brownish; diam. 0.10; alt. 0.24.

This curious little shell was found by Harford in Alaska, but, though common eastward, was only discovered in California this year by C. D. Voy, who found two at Indian Valley, Plumas Co., with Nos. 14, 17, and *Pupilla corpulenta* Morse.

Binney & Bland follow most authors in uniting this with the European *subcylindrica* Linn., (*lubrica* Müll.) but Stimpson and Pfeiffer saw differences in the shells, while Morse has shown others in the animal. Whether the Alaska shell differs from that of Siberia, or whether several species are not confounded in the Old World, the study of the animals must show.

31 Limnophysa desidiosa *Say*. Birch Creek, Idaho, *Hemphill*. Not uncommon west of the Sierra Nevada.

32 L. Nuttalliana *Lea*, Warm Springs, near Salt Lake, Utah. *Dr. Reid*, 10 specimens, presenting several varieties.

33 L. humilis *Say*. With the preceding, *Dr. Reid*, two only. Monterey, *Dr. Canfield*.

34 L. Tryoniana *Lea*. Seven, either from near Salt Lake or from Fort Hall, Idaho, *Dr. Reid*. The first of this well-marked species, from east of the Sierra agree closely with coast types.

35 PHYSA SAFFORDII *Lea*. Common with preceding; also from Snake River Valley, *Dr. Reid*: Nevada and eastern Idaho, *Hemphill*, with three varieties of color and size. New to west slope.

36 PHYSA HAWNII Lea? Specimens from near White Pine (*Hemphill*) seem nearer to this Kansas species than any other. They resemble *P. Carltonii* Lea., in form, and like that have three lip-bands.

37 Physa costata *Newc.* Clear Lake. The animal like that of *P. diaphana* and variety *politissima*, also common there.

38 Carinifex Newberryi *Lea.* Owen's Valley. (*Hemphill*) the most southern locality. Clear Lake, variety *minor* common, and the animal undistinguishable, externally, from that of *Planorbis ammon*, also found there.

39 Gyraulus vermicularis *Gld.* Truckee, rare, 5,866 feet elevation. Portland, Oregon—*Dunn.* Merced Falls and Santa Cruz, its southern limits, about latitude 37°.

40 Pompholyx effusa *Lea.* var. solida *Dall.* Near White Pine, (*Hemphill*, who sent them through Harford to Dall, not "Clear Lake," where no species is found). It seems scarcely worth a name as a variety of *P. effusa*. I found the latter rare at Tehama, Sacramento Valley.

41 Ancylus fragilis *Tryon.* Merced Falls and Santa Cruz, common, and exactly alike, except smaller at former place.

42 Gundlachia Californica *Rwl.* Merced Falls, rare with last, under flat stones in brooks running from springs.

43 Amnicola turbiniformis *Tryon.* Near Fort Hall, Idaho—*Dr. Reid.* Animal of Truckee specimens is exactly like *Amnicola* externally.

44 Pomatiopsis intermedia *Tryon.* Near Pioneer Cave, Nevada county. San Francisco, near Industrial School—*Dunn, Carlton.* Santa Cruz —*Dr. Anderson.* White Pine—*Hemphill.* The last are from near the original locality, and only differ from types in being *brown*, when the "dark green" *Conferva* is removed. Those from nearer the coast are distinguishable only by smaller size. I have determined the animals of those from near this city to agree in generic characters with *P. lapidaria.* It may be identical with *P? Binneyi.*

45 Fluminicola Nuttaliana *Lea.* Tehama, Sacramento Valley. Also Warm Springs, near Salt Lake (and probably Snake River)—*Dr. Reid.* None of these approach *F. ?* ("*Leptoxis*") *fusca* Hald. ("from Salt Lake"—W. G. Binney, in Land & F. W. Shells, pt. III., p. 92) which is probably wrongly located and of another genus. The specimens include varieties *seminalis* Hds., and *Hindsii* Baird.

N. B.—Among the sixteen forms of mollusca found by me in and around Clear Lake, after most thorough search (some being limited to special parts), I failed to find Nos. 40 and 45 or the following, and do not believe they exist there, though reported either in print or on manuscript labels:

Physa gyrina Say. Dr. Veatch in Museum California Academy.

Cochliopa Rowellii Tryon. Mr. Rowell thinks he may have got it at Panama, or elsewhere.

Besides the twelve above mentioned, the following *are* found in or around the lake:

Ariolimax Columbianus *Gld.* Rare in September.

Limnophysa *var.* Gabbii *Tryon.* Not rare.

L. obrussa *Say.* Cache creek, rare, with *P. diaphana* and No. 8.

Valvata virens *Tryon.* Very common throughout lake.

The Borax, Soda, Alum, Iron, Sulphur, etc., found around the lake do not effect the taste of the water, and do not seem to influence animal life, except in limited spots where no *mollusca* are found, perhaps on account of subaqueous mineral springs.

Annual Meeting, January 3rd, 1871.

President Blake in the Chair.

Twenty-five members present.

Mr. William Blunt was elected a resident member.

Donations to the Cabinet: The skull of a sea lion from St. Paul's Island was presented by Captain Scammon. A jar with different specimens of lizards, tarantulas and other large insects from Arizona, by Dr. Sawyer.

LIBRARIAN'S REPORT.

The Librarian, Dr. Cooper, took great pleasure in stating that the Library of the Academy had increased, during the past year, beyond all precedent, and that the books added were many of them of greater value than any ever before presented, showing that the public appreciation of the importance of our Society as the custodian of scientific treasures is increasing, notwithstanding the establishment of various other richer and more popular libraries in our midst.

TREASURER'S REPORT.

The Treasurer, Elisha Brooks, reported that the receipts of the present year lacked about $260 of equaling those of last year. This is, perhaps, owing to the financial depression. The total receipts were $1,355. The members residing in the country, with very few exceptions, have paid nothing this year. Still we are out of debt, and have left on hand a balance of $8.35.

REPORT OF THE DIRECTOR OF THE MUSEUM.

The Director of the Museum, Mr. Bloomer, reported that the collections had much increased, and were of great value, although they cannot be displayed for lack of room, and are not yet all classified and arranged.

The Curators labor gratuitously, reaping no rewards but from the love of knowledge; and when it is considered that these rewards can be obtained in their own cabinets at home, and when it is also seen that it is done for an unappreciative public—a rich and wealthy public — that has witnessed the meetings of this society in their dingy rooms for eighteen years, without coming forward to aid in building up an institution that would be an honor to our city, there need be no wonder that the Museum of the California Academy of Sciences does not present a more satisfactory appearance, however enthusiastic members may be in the general work of the Society. Mr. Bloomer reported that the additions for the year were mostly to the departments of Botany, Mineralogy, and Conchology. Professor Esmark, of the Royal Academy of Christiana, Norway, is arranging the alcoholic specimens, making about 300 jars; and Henry Edwards is arranging the Entomological collection.

ELECTION OF OFFICERS.

The following gentlemen were chosen officers for the year:

PRESIDENT.

DR. JAMES BLAKE.

VICE PRESIDENT:
PROF. GEO. DAVIDSON.

CORRESPONDING SECRETARY:
REV. F. HANSON.

RECORDING SECRETARY:
H. P. CARLTON.

TREASURER:
ELISHA BROOKS.

LIBRARIAN:
J. G. COOPER.

DIRECTOR OF THE MUSEUM:
H. G. BLOOMER.

Dr. Blake stated that he had been to Lafayette, Contra Costa County, to see a mound of shells. It was at a distance of about eighteen miles from the salt water. Upon examination he found them to be salt water shells, mussels, oysters, etc. He further stated that he did not think it was the Indians who had carried them for food to that distance, as it was far, and it was not a desirable spot for such a use, and his opinion was, that the valley in the immediate vicinity has been a salt water bay. That he intended, however, to make a further examination at some future time. The altitude of the mound is about ten feet, and its extent one hundred by fifty yards. There were also skeletons of Indians and bones of deer, etc., in the mound, besides many flint chips.

Prof. Bolander said that in Mendocino County the Indians *now* carry mussels, etc., to still greater distances from the sea.

Prof. Davidson called attention to the subject of the ship in the desert, and stated that Col. Sedgwick says the elevation of New River, where it enters the Colorado, is 150 feet, up which the ship must have ascended. If, as stated, the ship is 250 feet long, it must have a capacity of 2,000 tons.

Regular Meeting, January 16th, 1871.

President in the Chair.

Charles A. Spencer was elected a resident member; and James S. Lawson, of the United States Coast Survey, corresponding member.

Gregory Yale read an opinion on the status of the Academy, to the effect that before it could have a legal character, and be able to proceed with the business of building, as contemplated, it must reincorporate and elect Trustees according to law. He submitted forms for this purpose, which were adopted. The members present attached their signatures to an agreement for reincorporation, and the Secretary was directed to advertise a notice for an election of Trustees, to be held February 6th.

Donation to the cabinet: Specimens of the flesh of the Teal duck, thickly studded with Entozoa—microscopic parasites—were presented through the President from Dr. Thorn, of San José.

Dr. Gibbons made some interesting remarks on his observations with an extemporized seismometer, or earthquake guage, consisting of a pound weight hung to the end of wire, and stated that 24 hours seldom passed without an indication of movement in the surface of the earth. He said nearly four months had passed without an earthquake movement—an unusually long period in this locality.

Dr. Blake and Prof. Davidson suggested that some of the oscillations observed in the quiet of the night, as Dr. Gibbons said, might be caused by atmospheric or hygrometic changes, which affect all buildings, even some of stone and brick; in support of which idea Prof. Davidson advanced a number of facts, including the well known contraction and expansion of Bunker Hill monument.

Prof. Davidson made some remarks upon the observations recently concluded by the Coast Survey to determine the geographical position and elevation of Mount Rainier. By permission of the Superintendent of the survey, he stated that Mount Rainier is found to be in latitude 46 deg. 51 min. 09 sec., and in longitude 121 deg. 45 min. 28 sec. Previous locations of it were twenty miles from being true. The elevation is definitely ascertained to be 14,444 feet, making it 4 feet higher than Shasta, and confirming the speaker's previous impression that it was the highest peak on the coast. In reply to a question, Prof. Davidson said that there are large glaciers on the side of Rainier. The mountain was ascended to the summit last summer by Stevens and Von Trump. The observations relating to Rainier, which have just been concluded, were made by Prof. Davidson and Mr. Lawson. Mount Baker, about one hundred miles further north, and in the same longitude, he had found to be 10,760 feet high.

Regular Meeting, February 6th, 1871.

President in the Chair.

Twenty members present.

Henry Chapman was elected a resident member.

Donations to the Cabinet: A specimen of Cinnabar ore, from the Redington mine, presented by Mr. Durand, composed of extremely rich crystals, which were a modification of the rhombohedral system, in the form of an hexagonal prism. A live specimen of Filaria, two feet long, which was taken from a water pipe from a well 200 feet in solid rock, on the San Bruno Road. Fossils from the Aleutian Islands, by Captain C. M. Scammon.

Donations to the Library: A box of books from the foreign correspondents of the Academy, through the Smithsonian Institution.

The Society then proceeded to the election of Trustees, and after considerable discussion the number was fixed at seven—the President, Secretary, and Treasurer to act as ex-officio Trustees; the remaining four to be elected from the body of the members.

The following were elected:

DR. JAMES BLAKE,
ELISHA BROOKS,
H. P. CARLTON,
DR. C. M. HITCHCOCK,
GENERAL JOHN HEWSTON,
F. L. A. PIOCHE,
SAMUEL HUBBARD.

A motion was carried that the Trustees prepare a certificate containing the name and objects of the Society, which is to be certified by the officers, and filed in the records of the County Court.

Regular Meeting, February 20th, 1871.

President in the Chair.

Dr. J. P. Whitney and G. A. Carnes were elected resident members.

Donations to the Cabinet: Professor Bolander presented the Academy with a large collection of dried European plants, sent by Dr. Hooker, of the Kew Gardens, from the herbarium of Professor Gay, of London.

Donations to the Library: Valuable documents sent to the Academy by the Geological Society of New Zealand.

The Secretary presented a specimen of the fiber of the Mexican Maguey plant, received from Colonel Evans. The fiber of this plant is used in the manufacture of twine, rope, and textile fabrics.

Mr. Bloomer presented specimens of the wood of the lignum vitæ, (*Guiacum officinale*) from Bermuda; the lemon verbena, (*Aloysia citrodora*) from the garden of Hon. George Hobler, of Alameda; the juniperus, from New Idria, California; and the tamana wood, from the Society Islands. He urged the members of the Academy to make a collection of woods, and he would prepare their specimens for exhibition.

Dr. Kellogg presented specimens of a lily, with the following description:

On Lilium Bloomerianum.

BY A. KELLOGG, M.D.

Root a slightly-oblong, broadly-conic, scaly bulb, somewhat laterally compressed; scales lanceolate, fleshy, elliptically incurved; two to three inches long; somewhat loosely set; often oblique or progressively developed, but not creeping. *Stem* terete; very short-pubescent above and somewhat scabrous; purplish, smooth and glaucous below; six to eight feet high. *Leaves* broadly oblanceolate, acute or sub-acuminate: five to seven—rarely nine nerved; nerves pubescent underneath; margins of leaves and foliaceous bracts slightly scabrous: waved, varnished above; glabrous and shining beneath; veins anastomosing or reticulate; whorled in verticels of six to twenty mostly; somewhat scattered above and below. *Peduncles* alternate; long and widely divaricate—often at an obtuse or depressed angle. *Flowers* nodding, large, loosely-recurved, bell-shaped; claws of the three inner petals short—about one-fourth of an inch—and somewhat crested: claws of the three outer narrower petals longer—one-half of an inch: light orange-color, with madder brown velvet-like spots. Pistil three-parted or lobed—sometimes cleft half inch or so.

This is the most magnificent lily of the Pacific coast. Piduncles are often ten inches to a foot in length, and so widely spread as to be slightly reflexed. Flowers larger, tighter, looser and rarely revolute; much more open and flexuous top than the *L. superbum*; eight to twelve in number, or, in the most robust specimens, twenty to thirty.

This lily is easily discriminated from all others in any stage of its growth. The bulb is purplish. Its first bud above ground is always purple, which hue it bears in stem, leaves and bracts, in every stage of its growth. The cotyledonoid scattered leaves at the base of the stem perish early, as the proper whorls appear, leaving, however, scars to record their presence. The bulbs are larger than those of any other California lily. It offsets sparingly, and is not "*somewhat creeping*," as in *L. pardalinum*, which offsets abundantly. In its habit of growth no one would mistake it for *L. superbum*.

Dr. Kellogg exhibited a painting of this large Mountain Lily, to which the attention of the Academy had been directed about twelve years since. As stated and shown at that time, he still held it sufficiently distinct from all others to entitle it to a specific description. Out of respect to its time-honored cultivator, Mr. H. G. Bloomer, he offered the provisional name of *Lilium Bloomerianum*—Kellogg.

Professor Bolander said that he had received from Europe a catalogue in which a lily had been named *L. Humboldtii*, and he believed it to be the same as the plant described by Dr. Kellogg.

Mr. Bloomer thought there were reasons for believing *L. Humboldtii* and the so-called *L. Canadensis*, of California, to be synonymous with *L. Pardalinum*, which was described by Dr. Kellogg several years ago.

Professor Bolander said that he had seen in a newspaper a statement that parties were making arrangements to cut peat in the San Joaquin valley, and inquired if any real peat was known to exist in California. He expressed the opinion that the geological and climatic conditions of the State were not favorable to the formation of peat. This substance is formed by the decay of vegetable matter constantly under water. Where the vegetable matter was subject to overflows, as was the case along the San Joaquin river, earthy matter must be deposited which would prevent the formation of real peat.

Dr. Blake stated, in regard to the shell mounds near Lafayette, that he had learned from an old Californian that the Indians were formerly in the habit of gathering shell fish on the coast, and carrying them ten or fifteen miles inland for food.

Dr. Gibbons stated some observations he had made regarding the rain in this State. He said that in the Eastern States the rain begins in the quarter from which the cloud comes, while upon this coast the rain begins to fall first in the quarter toward which the cloud is being blown.

Regular Meeting, March 6th, 1871.

President in the Chair.

An old coin was presented, with a communication from W. C. Brown, of Marysville. The coin was found in a Chinaman's camp on Wolf Creek, below Grass Valley. It is dated 1717, during the reign of King Charles the Twelfth, while he was King of Norway, Sweden and Denmark. It is a copper coin, in size smaller than a ten cent silver piece.

Professor Davidson called attention to an article in the *Atlantic Monthly* for March, in which Clarence King claims for himself and party the first discovery of glaciers in the United States. Mr. King had made valuable observations, but he had been preceded by other parties in the discovery of active glaciers. Lieutenant (now General) August V. Kautz, U. S. A., attempted to ascend Mount Rainier in 1856 or 1857, but found his way barred by great glaciers. Mr. King, in his paper, says it was possible that glaciers may be discovered upon Mount Baker; but this question was settled by Mr. Coleman, of the Alpine Club, who ascended the mountain in 1869. He published, in *Harper's Magazine* of that year, a description of glaciers on Mount Baker, and gave illustrations of them.

He also stated that he had received a letter from Professor W. P. Blake, in which he corrects the statement which had been made in the papers recently, that the Western Union Telegraph Company had made the first discovery of glaciers on the Stickeen river, in 1865. Professor Blake published a description of the same glaciers in 1863.

Professor Davidson then read extracts from the letters of some members of the expedition to the Mediterranean to observe the solar eclipse in December last, and made a statement of the results of the expedition.

Professor Bolander stated that one hundred and forty species of grasses were now known on this coast since 1861. Only fourteen species had been observed before the Geological Survey. This was probably owing to the rapidity with which the observers went over the ground. Among the total number he included several species that were cultivated, such as timothy and grasses used for lawns. He had recently found a species which he believed to be identical with that found by Dr. Hooker, at Magellan Bay, when he was on his expedition to the Antarctic continent with Captain Ross. It is distinguished by a remarkably vivid green color, and the Professor recommended it to the attention of persons who intended making lawns. This species grows abundantly from Cisco to the summit, and stock raisers spoke of it as being of especial value for grazing. The grasses around Mono Lake he regarded as identical with those which were natives of Chile.

Regular Meeting, March 20th, 1871.

President in the Chair.

Donations to the Cabinet: A fine specimen of jasper, found ten miles south of Merced Falls, was donated to the Society; also specimens of the shrub *Garrya Fremontii*, gathered near the summit of a mountain 4,000 feet above the level of the sea: both by Mr. J. A. Johnson.

Mr. Brooks said he had an assay made of some of the sand from Black Point, but the "gold" proved to be brass. The assayer, Henry G. Hanks, said he had made a careful examination of the ground. On the top of the bluff, for several hundred feet, it showed a dark color, and upon examination it proved to be black magnetic sand. He washed sand from several parts of the ground, and obtained particles of the supposed gold, pretty evenly distributed. When examined under the microscope the substance appeared like trimmings and filings. When examined chemically, it proved to be brass, as did the sample furnished by Mr. Brooks. His theory is, that there has been a machine shop on the ground, or that the brass filings have been placed there, with an intention to deceive the public; but it is difficult to account for the black sand and the even distribution of the brass filings.

Mr. Durand presented a list of various minerals and mineral localities of the coast, which have not before been made public.

Professor Davidson reported that the apparatus he had devised for recording sub-surface temperature for great depths, by means of an electro-thermal pile, had made good progress, even against the previous opinions of the instrument maker himself. It is proposed to register the depth by the well-known means of breaking the circuit of an electrical current passing through two insulated wires in the sounding line—say every 100 fathoms—by means of the wheel-work of Wassey, or similar apparatus. In the changes of temperature, an electro-thermal pile eighteen inches long, insulated, surrounded by a non-conductor except one end, is used in combination with a Thompson's Reflecting Galvanometer, not liable to derangement on shipboard. At every 100 fathoms, when the chronograph registers the depth, the observer notes the reading of the galvanometer, which readings are reduced to Fahrenheit degrees.

Dr. Blake suggested that the unexposed end of the pile should be surrounded by ice, and that by a non-conductor.

Professor Davidson said the suggestion was a good one, and that he was anxious to receive suggestions on that and any other point, in order that he may arrive at some knowledge of the conditions of sub-surface temperature, and their influence upon the ocean currents, etc.

Regular Meeting, April 3rd, 1871.

President in the Chair.

Donations to the Cabinet: Compounds of cinnabar, chrome and asphaltum from New Almaden mines, by Mr. Durand. A species of *Libinia*, also apples with a parasitic growth on the skin resembling fungus spores, by Dr. H. Gibbons.

Dr. Blake spoke of the earthquake shock last evening, which seemed to vibrate from north to south. It was more severe at San José, and across the Bay, than in this city.

Dr. Ayres said that the severest shocks here were scarcely felt in the direction of Clear Lake, beyond Mount St. Helena.

Mr. Bloomer quoted from Brigham's history of earthquakes in New England, from 1568 to 1870, that 148 occurred in winter, and but 74 in summer.

Mr. Heynemann thought that the changes in the weather and wind yesterday were connected with the earthquake. He offered the theory, that if a moist current of air is above, and a dry one below it, a thunderstorm may be produced; while the opposite condition of currents, after a continued drought, may cause an earthquake.

Rev. F. Hanson having gone east, Dr. J. G. Cooper was elected Corresponding Secretary, subject to the approval of the Board of Trustees.

Regular Meeting, April 17th, 1871.

President in the Chair.

Henry Keller was elected a resident member.

Donations to the Cabinet: Dr. Ayres presented to the Academy a fine specimen of the *Syngnathus griseolineatus*, procured at Monterey Bay. It is twenty-three inches long, and about one inch in diameter at the widest part of the body, of brown color, with dark spots. The head is very thin and long, the tip of the bill or mouth being nearly three inches from the eyes. A mineral called "Kaolin," from Lower California, was presented by Mr. C. B. Smith. Lime Garnets from Inyo County, and Partzite from Benton, Mono County, by Mr. Hanks. He also exhibited very fine photographs of Fungi, taken by Dr. Curtis, U. S. A., in Washington. Dr. Ayers presented a photograph of a trout (*Salmo stellatus*, Girard) captured in a stream running into Clear Lake, which was 31½ inches in length, weighing twelve pounds. He says that trout had not been found in Clear Lake until within a few years.

Dr. Blake called attention to the condition of the atmosphere during the past few days. The barometer had been lower than at any previous period during the winter. A southerly wind had prevailed for an unusual length of time, with a low temperature; the upper currents differing from the lower, being from the west over this city, and north at Haywards.

Mr. Hanks gave an interesting description of the Owens River country.

An Equador Mummy of a female child was presented for inspection.

Regular Meeting, May 1st, 1871.

President in the Chair.

Dr. Blake stated that the Board of Trustees had decided to re-incorporate the Academy under the old constitution, with such amendments as might be deemed necessary, and they would be acted on at the next meeting.

Donations to the Cabinet: Dr. Cooper presented forty species of shells, mostly collected by himself on this coast, and not before in the Museum. H. G. Hanks presented a bottle of pigment used by the Indians in Mono county; he also gave an extended analysis of its properties, finding it to be hydrated sesquioxide of iron and silica, reduced to a very fine powder. He had seen "pictured rocks" in Kern County; and Dr. Blake mentioned others, near Salt Lake, so old that the present Indians knew nothing of their history, but preserving the colors very well. A specimen of *Polyporus variegatus* was presented by Mr. Turrill.

Dr. Kellogg stated that the Indians use the herb *Eritrichium hirsutum* as a dye, under the name of "Puccoon," the same given by Eastern Indians to the Bloodroot, *Sanguinaria Canadensis*. Dr. Cooper remarked that in Oregon a species of *Trillium* was called "Bloodroot" by the settlers, though in no way related to the *Sanguinaria*, which does not grow on this side of the mountains.

Dr. Blake showed a chart illustrating by curves the variations of the barometer as influenced by the moon.

The observations were made at Iowa Hill, Cal., in 1855–6, and the oscillations mapped from October to March, to be further completed hereafter.

From the 3d to the 7th day after the new moon, the oscillations of the barometer are but slight. From the 7th to the 11th the oscillations are more marked, and the greatest disturbance takes place between the 12th and 16th days of the moon; from the 17th to the 21st days there is again a barometric calm, followed by greater disturbance from the 22d to the 26th days and still greater oscillations from the 27th to the 3d day of the new moon.

These curves, so far as they had been carried out, plainly pointed to an influence of the moon on the movements of the atmosphere. The reason why the barometric changes do not exactly coincide with the phases of the moon is probably owing to the centres of disturbance taking place at different places in different months, their effect not being perceptible at other places until some hours, or even days after. It has already been pointed out, for instance, that a storm at the Sandwich Islands does not affect the barometer here until two or three days after its occurrence. In reply to some remarks made by Dr. Kellogg supporting the above conclusions, Dr. Blake stated that the influence of the moon on the atmosphere was very different from its effects on the ocean. He considered that instead of the regular ocean tides, which were most marked at the new and full moon, the atmosphere was at these periods more liable to sudden changes at some parts of the earth's surface, which produced the great barometric oscillations.

Special Meeting, May 8th, 1871.

President in the Chair.

Obadiah Livermore and James Garland were elected resident members.

Donations to the Cabinet: About sixty species of land and fresh water shells from all the Territories west of the Rocky Mountains, except Arizona, by Mr. Hemphill. Several of them are new, and others very rare.

On account of the small attendance of members, who did not know generally of this meeting, further business was postponed.

Regular Meeting, May 15th, 1871.

President in the Chair.

Donations to the Cabinet: Two specimens of bone of the Right Whale, taken at Ounalaska Bay, Behring Sea, 1869; also one piece of bone of a Right Whale, taken at Monterey, Cal., March, 1871, were presented by Captain C. M. Scammon, U. S. Revenue Marine.

Mr. Carlton, the Secretary, said that, inasmuch as he should be compelled to resign the position of Secretary after this meeting, he wished to make an explanation in regard to the minutes. He had kept the minutes, in great part, not by engrossing them in the record book, but by pasting therein the reports of each meeting which had appeared in the *Bulletin*. In compiling the annual report, many of these printed slips had been cut out for use therein, and thereby the minutes had been rendered incomplete. He asked to make this statement, so that no blame should attach to him after his departure.

Dr. Cooper said that, as the work of compiling the annual report had devolved upon him, he would explain that the slips which had been cut from the minutes had been preserved, and were obtainable at any time.

On motion, Mr. Carlton was exonerated from blame.

The new Constitution was read by sections, and, with sundry amendments, was adopted; after which the Academy adjourned.

REGULAR MEETING, JUNE 5TH, 1871.

The President being absent, Mr. H. G. Bloomer was called to the Chair.

Mr. A. D. Hodges, Jr., was elected resident member.

Donations to the Cabinet: A bundle of rods, having the appearance of dried willow switches, was presented to the Academy. It was sent from the northern part of Vancouver's Island, with no information accompanying it except that they were "skeletons of a kind of fish." It was thought by some to be the internal structure of a species of zoophyte allied to *Virgularia*. Some dried plants were received from Professor Gay, of England, forwarded by Professor Gray, of Cambridge.

Mr. E. Durand presented some of the borings from an artesian well near the Eighth street sugar refinery; also some silico-argillaceous slate from the corner of Pine and Powell streets, accompanied by remarks on the same. Mr. Bloomer exhibited a very prolific specimen of *Fritillaria lanceolata*, collected by Mr. Dunn.

Professor Bolander presented nine species of grasses of the genus *Stipa*, three of which were entirely new, with the following description:

The Genus Stipa in California.

BY HENRY N. BOLANDER.

The following well-marked species of the *genus Stipa* have been collected by me, thus far, in the State of California:

1. *Stipa setigera Presl.*—Dry hill-sides of the Coast Ranges and the foot-hills of the Sierra Nevada, New Mexico, and southward. April and May.

2. *Stipa eminens Cav.*—Dry hill-sides of the Coast Ranges and the foot-hills of the Sierra Nevada. April and May.

3. *Stipa Bloomeri Bol.* (*Sp. nov*).—Root perennial; fibres tomentose. Culms two to two and a-half feet high; cæspitose, smooth. Sheaths striate, smooth, shorter than their internodes. The uppermost, somewhat inflated sheath, includes the eight to ten inches long branches of the panicle. Ligules exserted,

acute, smooth. Leaves erect, linear, smooth, involute, four to ten inches long. Panicle erect, open, fusiform. Lower and uppermost branches appressed; central, moderately spreading; two—rarely three—in a whorl; subdivisions in threes; few-flowered, scabrous. Pedicles about the length of the erect spikelets. Spikelets four lines long; glumes equal, ovate—lanceolate, acuminate, bristle-pointed, exceeding the palet one-eighth of an inch; lower distinctly three—upper three to five-nerved, scabrous at the nerves. Lower palet two lines long, oblong or fusiform; coriaceous, dotted, fuscous, densely silky pubescent; upper but little shorter, oblong, boat-shaped, blunt at the hyalinous apex, silky pubescent in the centre. Awn one-half to three-fourths of an inch long, twisted below and bent at about the middle; below the bend pubescent, above scabrous, articulate. Stamens three. Anthers a line long, bearded at the deeply two-cleft apex; the feathery stigmas short and densely crowded.

Sandy soil. Bloody Cañon, near Mono Lake, and also near Sonora Pass. September (1866).

This species is closely allied to *St. Bertrandi Ph.*, yet quite distinct.

This beautiful species may most appropriately and deservedly bear Mr. H. G. Bloomer's name, and commemorate his services to Botany on this Western coast.

4. *Stipa chrysophylla Desv.*—Dry, sandy soil. Bloody Cañon, near Mono Lake.

5. *Stipa occidentalis Thurb.*—A very variable species, of wide range over our western mountains. On loose, sandy soil, at four to five thousand feet altitude. It obtains a height of three to four feet, and assumes a reed-like appearance; but becomes very much reduced in size at high elevations and rocky expositions. The small and reduced specimens bear bearded awns, while those of larger size bear awns almost entirely smooth. This species is much esteemed by sheep-growers.

6. *Stipa viridula Trin.*—In various places on the northern Coast Ranges and the Middle Sierras. From three to five feet in height.

7. *Stipa comata Trin.*—On sandy soil. Bloody Cañon, near Mono Lake.

8. *Stipa (Lasiagrostis) Stillmani Bol. (Sp. nov).*—Root perennial, almost woody; fibres tomentose. Culms cæspitose, erect, terete; three to five feet high, glaucous, smooth, (four and five leaved). Nodes pubescent. Sheaths striate, smooth, somewhat inflated, bearded at the top, all save the lowest; much shorter than their internodes. Ligules very minute. Cauline leaves distichous, linear-lanceolate; fourteen to eighteen inches long, and one-quarter of an inch wide; smooth above, retrorsely scabrous below and at the margins. Stem leaves shorter; the uppermost very much reduced in size.

Panicle erect, linear oblong, contracted; interrupted below and dense above; six to ten inches long. Branchlets in fives, threes and twos; very short, unequal; one or few-flowered; appressed. Glumes six to seven-eighths of an inch long, equal, lanceolate, acuminate and bristle-pointed; hyalinous, white; lower three-nerved (closely at the base)—upper five-nerved; all nerves save the excurrent scabrous middle evanescent. Palets one-third shorter than the glumes; nearly equal, chartaceous, pubescent, especially at the short obconical callus.

Lower palet convex, three-nerved, awned from below the two-cleft tip; upper boat-shaped, two-nerved, bifid at the apex. Awn tortuous, scabrous, one-fourth of an inch long, slightly bent above the middle. Stamens three; anthers smooth, one-fourth of an inch long.

Blue Cañon, Sierra Nevada, July, 1870.

Dr. J. D. B. Stillman was a pioneer botanist of California, who, when the most of the first settlers were bent only on collecting the auriferous treasures of the placers, performed a journey through the northern part of the State for the purpose of making a collection of California plants, which he forwarded to Dr. Torrey. A number of new species were contributed by him, and the collection was of great service to the veteran botanist in making up his reports on the flora of this coast, as appears by the frequent references by him to the collection, in the Pacific Railroad and Mexican Boundary surveys.

In acknowledgment of this service, Dr. Torrey named a new species of *Leptosyne* after him. No subsequent explorer has succeeded in finding this species. In order to carry out the intentions of Dr. Torrey, and beyond all peradventure to connect the name of Dr. Stillman with the flora of this State, I take great pleasure in naming this most excellent and showy species after him.

9. *Stipa* (*Lasiagrostis*) *Kingii Bol.* (*Sp. nov*).— Root perennial, fibrous. Culms cæspitose, erect, terete, smooth; six to fifteen inches high; bear two small leaflets linear near the base; free from nodes. Sheaths striate, smooth. Ligules exserted, acute, bifid. Cauline leaves tufted; six to nine inches long; linear terete; retrorsely scabrous.

Panicle erect, simple; linear oblong; branchlets in threes and twos; scabrous, appressed, unequal; less than an inch long; two to three-flowered.

Glumes one-eighth of an inch long; somewhat unequal, oblong, obtuse and erose at the apex; hyalinous, tinged with purple at the base. Palets nearly equal, pubescent, chartaceous; as long as the lower glume; lower convex; awned from below the minutely two-cleft obtuse tip. Awn scabrous; half an inch long; bent at the middle. Upper palet with a minute tuft of hair at the obtuse bifid apex.

Stamens three; anthers bearded at the tip and divergent at the base.

No. 6076 of Catalogue.

Meadows and open woods near Mount Dana, seven to twelve thousand feet altitude. September, 1866.

Dr. Cooper presented a paper on the shells collected by Mr. Henry Hemphill in the adjoining States and territories.

On Shells of the West Slope of North America.

No. II.

BY J. G. COOPER, M. D.

At our last meeting, Mr. Henry Hemphill presented about sixty species of land and fresh water shells, chiefly from Nevada, Utah, Idaho, Oregon and Washington Territory, among which were ten or twelve not before in the Academy's collection, besides many of much interest on account of new localities, or from exhibiting greater or less amounts of variation, and thus showing the connection between permanency of specific characters and wide geographical range of distribution.

I therefore offer the following notes on the most important additions thus made to our knowledge of these creatures, with a few others made by myself since the article on this subject published on p. 150 of this volume, which brought it down to this year.

I take this opportunity to thank Mr. Tryon for his complimentary notice of my synopsis on p. 92 of this volume. In the Journal of Conchology, he considers it "full of errors," because I reduce many of his "species" to varieties; but admits that it will please all *conservative* conchologists, which is just what I hoped of it. He blames me, however, for considering any western species identical with eastern, in which opinion I followed almost exactly his own views, given in the same Journal, Vol. I, pp. 165, 247.

1 Sphærium Spokani *Baird*. Young ones found near Spokan R., W. T. (*Hemphill*), show that this is probably a good species, more circular than any figured by Prime.

2 Pisidium compressum *Prime*. Found plenty at White Pine, Nevada, and Owen's River, California, by Hemphill and quite distinct from the Clear Lake form.

3 Pisidium occidentale *Newc.* Specimens from Portland, Oregon, and the San Diego mines, are undistinguishable from those found here.

4 Succinea Oregonensis *Lea*. Also found at San Diego mines, while near the town, S. rusticana *Gld.*, is the prevailing form (*Dunn*). I am doubtful, however, whether these can be maintained as distinct species, many being intermediate.

5 Macrocyclis Voyana *Newc.* San Diego, *Dunn*, Alameda County, *Yates*, *Hemphill*. Common at San Diego, and are twice as large as types, but similar in surface and flatness, though the mouth is less twisted. Very rare in Alameda, and intermediate. The common smooth species (*concava ?*) is found with it here, but not at San Diego. The animals differ in the two species, as found near together at this bay, and from M. Vancouverensis, of Oregon.

6 Anguispira solitaria *Say*. Specimens brought from the Cœur d'Alêne Mountains, Montana, by *Hemphill*, leave no longer any doubt as to this being the true *solitaria*, and distinct from *A. Cooperi* found near it.

7 Aplodon Columbianus *Lea*. A few found in Hell Gate Valley, Montana, by *Hemphill*, are large and very well developed, while those of Odotropis devia *Gld.*, from Deer Lodge Valley, at a lower elevation, are only half as large as coast specimens, or even less. Neither had been before recorded from east of the Cascade Mountains.

8 Pupilla Rowellii *Newc.* From Georgetown, El Dorado County, *Rowell*, to San Gorgonio Pass, *Voy*; and the latter careful explorer has also found it at Indian Valley, Plumas County, at about 4,000 feet elevation.

Alexia *Leach*. Shell elliptic-ovate, spire short, of 5 to 8 whorls, body whorl very large, rounded at base, aperture about half the length of the shell, with from one to five lamellar teeth on the parietal wall, and a labrum either simply thickened or expanded, and with teeth within its margin. Of family Auriculidæ.

9 A. setifer *Cp.* Outline from ovate to lanceolate, smooth or faintly ribbed longitudinally, pale to dark purplish horn-color, often striped (by erosion of the riblets), spire acute, whorls 6 to 8, the last nearly three-fourths of total length, aperture about two-thirds of length, peristome thickened and slightly expanded, especially in front, the most perfect with a tubercular tooth on middle of outer wall, and less developed ones below it, lower lip curving up to parietal wall, leaving a slight umbilical fissure behind it, and ending in a strong horizontal fold that winds like a flat tooth into the aperture; parietal wall with a flat horizontal tooth near its middle, and one or two more at regular intervals above it; thus showing five teeth in the best developed specimens.

Young, with a single row of close-set bristles revolving on an impressed line just in front of the sutures, but lost in adult, though the groove usually remains. Altitude, 0.30 to 0.40; diameter, 0.08 to 0.14 inch. Animal, yellowish white translucent; eyes black, tentacles transparent, faintly wrinkled; muzzle strongly wrinkled. *Habitat*, Mission Creek, San Francisco, near head of tide-water, abundant. This pretty and conspicuous shell seems to have escaped notice until this year, though extremely abundant for an area of a half a mile along Mission Creek. As I cannot find it in any other locality, I have suspected its introduction attached to the boats or nets of Chinamen, but cannot find that any such species is known from China, and it seems too numerous to have been introduced within twenty years. The *A. myosotis* found on the Atlantic coast, is supposed to have been imported accidentally from Europe. They live for three weeks or more out of water if kept damp, and belong rather to the terrestrial than the aquatic group, though never living far from brackish water. Their nearest allies in California are the Pedipes unisulcata *Cp.*, described in Vol. III of these proceedings, page 249, f. 29, and Melampus olivaceus *Cpr.*, both southern species; while no *Alexia* is known this side of Panama.

10 Leptolimnea, n. sp.? Fish Springs, Nevada.

11 Leptolimnea, n. sp.? Near Walla Walla, Washington Territory, *Hemphill.* Both new to our fauna, but may have been described by eastern concholo gists before this time.

12 Limnophysa *var.* Gabbii, *Tryon.* Sacramento Valley *Rowell;* Islais Creek, S. F. Co. These specimens agree closely with those I got in Clear Lake, but the difference between this form and the eastern L. catascopium as pointed out by *Tryon,* disappears in a large series from all three localities, some of each being twice as large as Mr. Gabb's types. L. Adelinæ *Tryon,* appears merely a smaller, umbilicate form, but having been first named, must include L. Gabbii if retained as distinct from L. catascopium.

13. L. bulimoides *Lea.* Port Neuf River, Idaho, and Los Angeles, California, *Hemphill.* From these widely distant localities, specimens show as little difference as are often found in those of other species from adjoining counties.

14 L. Binneyi *Tryon.* Birch Creek, Idaho, *Hemphill.* Only half as large as types, and much resembling "L. Brownii," *Tryon,* of Nebraska (see Binney, in L. and F. W. Shells, Vol. II, p. 56, f. 86). From the amount of variation observed in L. catascopium and its Pacific analogues, I am inclined, however, to consider these as merely a dwarfed variety of L. Binneyi, if that is a distinct species. The L. Brownii *Tryon,* of Ohio, the original type, seems, however, different. (See Amer. Jour. of Conch., Vol. I, 229, pl. 23, f. 15.)

15 L. obrussa *Say.* Washington Territory, Birch Creek, Idaho, and San José, California, *Hemphill.* These distant localities give exactly similar specimens of this species, undistinguishable also from Atlantic States types. It is not rare in all northern California.

16. Physa ampullacea *Gld.* Owens River, California, *Hemphill,* These are of the large form figured by Binney in L. and F. W. Shells, p. 79, f. 135, and are very interesting as showing such a permanency of form so far south of latitude 49°, where I discovered them in 1853. Binney's figures may be of a Klamath Lake specimen, and differ some from my types (f. 133), more resembling *var.* propinqua *Tryon,* of which Mr. Hemphill also brings a few from near White Pine, Nevada.

17 Physa *var.* virgata *Gld.* Stockton, *Mr. Randall*; San Jose, *Carlton,* San Diego Mines, *Hemphill.* These all agree very well, but rarely show the extreme shouldered form of the Colorado Desert variety, P. humerosa *Gld.*

18 Aplexus hypnorum *Linn.* Malade River, Idaho, Utah, *Hemphill;* Sacramento River, *Museum Cal. Acad.* The first are typical, and from the nearest point authentically recorded. The last is a single splendid specimen, finer than Binney's figure, 259 (op. cit. p. 155), and may be A. elatus *Gld.,* of Lower California and Mexico. It is possible, however, that it came from the head-waters of the Sacramento River.

19 Gyraulus parvus *Say.* Cœur d'Alêne Lake, Montana, *Hemphill,* a very small var., fully distinct from G. vermicularis *Gld.,* which he found as far north as the Dalles, Oregon.

20 Ancylus patelloides *Lea.* The locality in the Geog. Cat. is wrong, it being the upper Sacramento River, *Dr. Trask.* Specimens from near Spokan River, Washington Territory, *Hemphill*, are so small and fragile, that I refer them with doubt to this species. their outline agreeing best with it, though approaching that of A. Kootaniensis *Bd.*, which I call a variety of it in my synopsis, on p. 101.

21 Acroloxus Nuttallii *Hald.* (Binn.) This interesting species was found common in the lower part of Snake River, Washington Territory, by Mr. Hemphill, and shows the peculiar sinistral apex very plainly, many of the specimens being half an inch long. One very small specimen, found by Mr. Yates, in Alameda County, seems the same, agreeing in dark reddish color, thickness, outline, sinistral apex, etc.

22 Assiminea Californica, *Tryon* (*Cp.*) "Hydrobia" *Tryon.* Although belonging to the marine family *Littorinidæ*, this little shell has habits similar to those of the *Alexia*, being found with it along Mission Creek in immense numbers. It also inhabits Islais and Oakland Creeks. I find the animals of all these localities alike, aud agreeing with the generic characters as given by authors. It is the first of the genus yet determined to exist in the United States, though some eastern "*Hydrobias*," etc., have been suspected to belong to it. The animal lives a week or more in a bottle dampened with salt water, while the *Pomatiopsis*, though similar enough in shell to have been confounded with this, will die quickly in salt water. The eyes are near the end of erect tentacles.

23 Valvata sincera *Say.* Specimens from near Salt Lake (*Hemphill*), seem to be this Mississippi Valley species, not before reported from west of the Rocky Mountains.

Besides the above, Mr. Hemphill brought from the San Diego mines and surrounding mountains, none of which rise over 7,000 feet above the sea, the following, showing that the species found there are, in a great degree, distinct from those of the neighborhood of the Bay, only about thirty-five miles to the south-west.

24 Lysinoe Traskii *Newc.* The typical, thin flattened form.

25 Hyalina arborea *Say.*

26 Conulus chersina *Say.*

27 Pseudohyalina Mazatlanica *Pf.*

28. Vallonia minuta *Say.* Nos. 25 and 26 were found by Mr. Voy, 40 miles north of these mines, with "Ps. minuscula *Lea*," teste Newcomb. Were the last not young of No. 27?

29 Limnophysa humilis *Say.*

30 Physa diaphana *Tryon.*

The only fresh water shells brought from near the Bay were:

31. Limnophysa bulimoides *Lea.* Rare.

32 Physa Gabbii *Tryon*, vars. "Traskii" *Lea*, and D'Orbignyana *Lea.*

33 Planorbis subcrenatus *Cpr.*, common.
I found the same species there in 1862.

34 Pomatiopsis intermedia *Tryon.* Having recently found a colony of this species near the city, I have observed the following habits, additional to what Stimpson gives of the types. Many specimens I found in the water, but close to the surface, on cresses, etc., were accompanied by eggs (May 6th) enclosed in capsules like those figured by Stimpson as of *Amnicola porata* and adhering to plants. Most of the specimens, however, lived on a sloping bank, constantly moistened by spring water, shaded by a dense growth of herbage and bushes. These had no eggs with them, and, as they were much larger and more robust than those in the water lower down, I supposed these to be the different sexes. As no other species of this family occurred in the stream, there could be no mistake about the eggs found. They lived in a damp glass for over a month. On a careful comparison of the animals of the two former under the microscope, I found that those in the water were of the same species, but that they were of *both sexes*, and that the difference in shells was caused by their being encased with black oxide of iron, by which growth was retarded and the whorls often forced to form a loose spiral, especially near the mouth, as in the so-called "*Valvata pupoidea*" Gould. I have also received this form from Santa Cruz and other localities, and formerly thought it was a distinct species. The animal is inky black above, foot white beneath, and a *large white patch around eyes.* The encrusted ones merely show the colors less distinctly. The form agrees with that of *P. lapidaria.* Mr. Binney's figure of "*Amnicola*," p. 81, also represents the under surface of this genus, as he refers the species to this genus on p. 94.

Professor Bolander read a communication from Professor Asa Gray, of Cambridge, inquiring about the intended invitation of this Academy to the American Association for the Advancement of Science. Dr. Cooper stated that an invitation had been extended; but to set all doubts at rest, it was unanimously resolved that the American Association for the Advancement of Science be again invited, by this Academy, to hold their annual session for 1872 in the city of San Francisco.

Mr. H. Heynemann advised the propriety of requesting the Chamber of Commerce and other bodies of the city to unite with the Academy in the invitation; and it was resolved that this question be discussed at the next meeting.

On motion, Mr. Elisha Brooks was appointed to bring the action of the Society before the Board of Trustees of the Academy, and urge immediate action in the matter.

Regular Meeting, June 19th, 1871.

President in the Chair.

H. B. Janes and Charles E. Parker were elected resident members.

A. D. Hodges, Jr., was elected Recording Secretary.

Donations to the Cabinet: Professor Davidson presented a collection of plants from Alaska, in the vicinity of Sitka Sound, collected by Rev. J. O. Raynor, Chaplain of the United States Army.

Donations to the Library: Washington Astronomical and Meteorological Observations (for 1868); "Transactions of the Albany Institute" (sixth volume); "Fifty-third Annual Report of the Trustees of the New York State Library;" "Bulletin of the Museum of Comparative Zoology at Harvard College" (Volume 2, No. 5); "American Journal of Fine Arts" (June); "Proceedings and Communications of the Essex Institute," and various other pamphlets.

A communication was received from the authorities of the Odd Fellows' Library, tendering to the members of the Academy the freedom of the Library. A vote of thanks was returned, with the corresponding privilege of the freedom of the Academy rooms to the officers of the Library.

Dr. Gibbons presented a plant which had been gathered from near Half Moon Bay, and which grew along the coast in that vicinity. It was of fibrous structure, and had been utilized by the people along the coast in making ropes. It was found near the edge of the ocean, in the barren sands. Where one of these plants grows, a cone of sand accumulates around it.

Mr. Bloomer thought it was the *Franseria Chamissonis*.

Dr. Cooper presented an ear of Indian corn, which he said was a curiosity. It was well known that the male and female flowers were usually separate, and so rare was it that they were intermingled on the same stem, that a prominent botanist lately asked the question through the *American Naturalist*, if such a thing had ever been seen. This was a case in which it existed in the ear.

Dr. Blake presented two specimens of *algæ*, which he had found growing in a boiling spring in Pueblo Valley, Nevada, 100 miles north of Winnemucca, the temperature of which was at least 160 degrees. Many diatoms were found with them.

Professor Davidson was present with an instrument improved by himself, to determine the difference in longitude between two different points. He entered, before the Academy, upon a very minute explanation of the *modus operandi*:

The principle on which his apparatus works is by instituting an electric and a galvanic current between the points, and on breaking the connection at one point, it registers at the other the precise moment at which the break occurred. He illustrated by supposing the two points to be San Diego and San Francisco, (which two points he has lately been working between). The current is established by wire connection above ground, the ends of the wire being sunk in the earth, making the earth supply one-half of the circle. An operator at each point is supplied with the necessary instruments, which include a clock or barometer, so connected that the instant the break occurs it is noted with the accuracy of a hundredth part of a second. Then making allowance for the time of the transmission of the electric wave, and comparing the time at each point, would give the exact difference in longitude. Extraordinary accuracy is attained by the aid of a transit instrument.

This instrument is a combination of improvements made by himself, by which, with the same instrument, both latitude and longitude can be determined with great facility and accuracy.

Professor Davidson also explained his rapid method of taking latitude. His combination instrument has been adopted by the corps of Topographical Engineers, and the engineers of Europe are taking pattern from it. The two old style separate instruments cost $2,100. This combined instrument costs $1,200.

Dr. Gibbons said he had several times made reference in the Academy to oscillations of his hanging barometer, which he had attributed to slight earthquake motion, but some members thought what he saw was but the effect of the wind. He had since noticed several times the same phenomena. On the 9th and 10th of April last he noted several distinctly, and on the 11th, according to the papers, there was a terrible earthquake in China, killing 2,800 people and overthrowing buildings. His theory of earthquakes was that some of them were caused by the gases of the earth passing from one sub-surface cave to another. It was but natural to suppose that just prior to an earthquake the pent-up gases should render the crust of the earth in a state of tension in various points. He had no doubt that the barometrical motion was the result of earthquake movements.

Professor Davidson mentioned a peculiar wave-like ripple which he noted in San Diego Bay, May 26th, at 7:10 A. M., and which he thought could not possibly have proceeded from a breeze.

Dr. Gibbons was appointed a Committee to draw up resolutions of respect for the late Gregory Yale.

Adjourned Meeting, June 26th, 1871.

President in the Chair.

The Society proceeded to the special business of this meeting, which was the election of officers under the new Constitution. The following were elected:

PRESIDENT.

Dr. JAMES BLAKE.

VICE-PRESIDENT.

Prof. GEO. DAVIDSON.

CORRESPONDING SECRETARY.

Dr. J. G. COOPER.

RECORDING SECRETARY.

A. D. HODGES, Jr.

TREASURER.

ELISHA BROOKS.

LIBRARIAN.

S. A. L. BRANNAN.

DIRECTOR OF MUSEUM.

H. G. BLOOMER.

Regular Meeting, July 3d, 1871.

President in the Chair.

Donations to the Museum: H. G. Hanks presented a specimen of potash-alum, which had been found by Mr. W. B. English at Silver Peak, in the State of Nevada, where it existed in large quantities. He thought that perhaps potash might be found near it in paying quantities. An excess of sulphuric acid and some soda is contained in it.

Dr. Blake presented a curious specimen of calctufa, found by himself in the desert, about 20 miles north of Mill City, which substantiates the belief that at some previous day the water must have stood at a much higher level than now. He also presented the bone of an *equida* found in the Humboldt river bottom while workmen were excavating for a canal. He stated that he was making endeavors to procure the remainder of the specimen. He also presented several crystals of uncertain species, found by him near Black Rock, Nevada.

An Indian relic, a stone mortar and pestle, by Dr. Bennet. Professor Davidson said the pestle was the largest he had ever seen, but he had seen larger Indian mortars.

A letter from George Deitz, of Victoria, was read, and stated that the "bones" supposed to be *Virgularia*, were taken from a species of fish of the eel order, by fishermen near Burrard's Inlet. The writer said if the Academy desired it, he would forward a specimen of the fish itself.

Professor Davidson read a letter from Dr. A. Gray, the distinguished botanist, in reply to a letter written by Professor Davidson on behalf of the Academy, for the purpose of inviting the session of 1872 of the American Association for the Advancement of Science in San Francisco.

The Association meets next August, in Indianapolis, when the invitation must be made.

The business was on motion referred to the Board of Trustees.

Professor Davidson made a statement of much scientific interest, embodying the results of his observations regarding the surface geology of the coast as affected by upheavals. He stated that he had found the central position of the upheaval to be somewhere in the vicinity of San Pedro, thence declining rapidly toward San Diego, but slowly northward. He had found four principal terraces, from 20 to 150 feet high, running back to six miles from the present beach.

Mr. H. G. Hanks made a report that the "desert ship," said to be now on a desert many miles from the ocean, does not prove to be such, and even its close resemblance to a ship did not seem to be admitted. He had received various letters which he would submit to the Academy, but which the writers did not desire should be published.

Professor Davidson said he had also received a letter, assuring him that the "desert ship" was a myth.

Regular Meeting, July 17th, 1871.

President in the Chair.

Mr. Hodges having left the city, B. P. Avery was elected Recording Secretary.

Donations to the Library: Professor Davidson donated a volume on "Harbors of Alaska," and photographs of the sea lion and seal now at Woodward's Gardens.

Dr. Blake presented a written communication regarding the supposed fish bones which were sent down from Burrard's Inlet by Mr. Deitz, which he said proved on examination not to be fish bones, but sponges, and probably of quite a new form. He said they were interesting from the fact that there were but two other genera which at all resembled them, and which were peculiar to the Pacific. He exhibited transverse sections on glass, which were examined by the members of the Academy.

Donation to the Cabinet: Dr. Stout presented a specimen of *Pityophis catenifer*, called usually the King Snake, some four feet in length.

Dr. Gibbons said Professor Smith, of Sydney, was present, who was connected as Vice-President with the Royal Society of New South Wales, and who was here for the purpose of inquiring into the rainfall of the Coast. Professor Smith was introduced, and made a few remarks tending to establish relations between his Association and the California Academy of Science.

Professor Davidson wished to correct an error in the Proceedings for 1870, page 122, line 8 from bottom, so as to read "white" for "gray."

Regular Meeting, August 7th, 1871.

President in the Chair.

E. V. Joice was elected resident member.

The following Trustees were elected for the remainder of the year, according to the new Constitution: *Ex-Officio*, Dr. J. Blake, B. P. Avery and Elisha Brooks. Also Gen. John Hewston, Dr. C. M. Hitchcock, F. L. A. Pioche and S. Hubbard.

Donations to the Cabinet: Fœtal sharks in alcohol, by Dr. Russell.

Professor Davidson presented the petrified bone of an animal, found fifty-four feet from the surface, while boring a well in San Diego.

A specimen of coal from Sitka, presented by Mr. Turrill. Mr. Dall stated that the coal contained too much shale and iron pyrites to be of any great value.

Dr. Gibbons presented a pipe fish (*Syngnathus*).

Professor Whitney read a criticism on Ehrenberg's last publication on Infusorial deposits on this continent.

Professor Davidson read a criticism by Dr. Petermann on a report given by himself. He explained his position, and lucidly marked out with chart and pointer the course of the great thermal currents, showing the remarkable analogy between the "Kurosiwo" current and the great Gulf Stream.

Dr. Blake read a letter from Mrs. Toland, describing the adoption of a nest of young orioles by her *male* canary-bird.

In answer to an inquiry by Judge Hastings, Professor Whitney stated that, since the survey of Salt Lake by Capt. Stansbury, twenty-two years since, it had steadily risen up to last year, but that now a subsidence had commenced. Similar changes had been noticed in all the salt lakes of the Basin.

Dr. Blake stated that he travelled with Capt. Stansbury over banks of salt now quite under water.

Dr. Gibbons exhibited a specimen of *Polygonum aviculare*, which he thought might be useful for fixing drifting sands, as it grows on barren, sandy soil, and produces much spreading foliage.

Regular Meeting, August 21st, 1871.

President in the Chair.

Mr. W. H. Dall read the following paper:

Notes on California Mollusca.

BY W. H. DALL.

Terebratella occidentalis, Dall.

In examining the brachiopods in the State Geological Survey collection, and other collections existing in California, my attention was directed to a shell which has gone under the name of *Waldheimia Grayi* of Davidson. Davidson's species was originally described from Japan, and is a true *Waldheimia*. The Californian species is a *Terebratella*, and apparently undescribed. Having examined typical specimens of *W. Grayi*, I have no hesitation in considering the Californian species as distinct and new. It may be characterized as follows, from the type specimen of the State Geological Survey.

Spec. char. Shell, variable in size and shade of color, usually of a flesh tint, deeper on some of the lines of growth. Sculptured by radiating ribs variable in number (9 in the typical specimen), with rather smooth interspaces, only crossed by more or less prominent lines of growth. Hinge line long, somewhat arched in the middle; area wide, sharply carinated, flat, crossed by transverse lines of growth. Apex not prominent, usually eroded. Foramen large, incomplete, deltidia widely separated and differentiated from the area by deep grooves. Typical specimen .75 in. long, .6 in. wide and .2 thick. Habitat, coast of California. Monterey, Cooper and Dall. Catalina Island, Cooper. Cab. Cala. Geol. Survey No. 6. This species closely resembles, in general appearance, *Waldheimia Grayi*, Dav., with which it has been confounded; but belongs to a different genus.

Ostrea virginica, Gmel.

My attention having been called to specimens of oysters, which had been transplanted over the Pacific Railroad to the coast of California, when about three-fourths of an inch long, and made during one year a large and healthy growth, I observed a notable difference between the new growth and the old. The Eastern species is usually characterized by a white shell, with a rather smooth surface, varied by irregular lines of growth, and faint radiating ridges. The new growth of the species transplanted into California waters is characterized by purple radiating rays of color, and by very strong radiating folds or interlocking grooves and ridges. These latter are also characteristic of the Californian native species. So it would seem as if the foreign ones had, in their new abode, taken on, to some extent, the characters of the natives "to the manner born." A similar peculiarity has been noticed by foreign naturalists in the *Ostrea edulis* of England, which when transplanted to the oyster beds of the Mediterranean, takes on some of the characteristics of the native Mediterranean species (*O. cochlear*). These observations are not without interest, from their bearing on the variation of species, and the various doctrines of evolution and selection of organic forms.

Dr. Blake read a short communication on some diatoms he had collected at a hot spring in Pueblo Valley, Humboldt county, Nevada, where they were growing in water the temperature of which was 163 deg. F.

The forms were very abundant, a small portion of the mud not larger than a pin's head, containing many hundred individuals, amongst which could be recognized more than fifty different species. The most interesting point connected with the discovery of these diatoms, was their almost perfect identity with the species found in beds of infusorial earth in Utah Territory. So close was their identity, that there can be but little doubt that the Utah beds must have been formed in an inland sea, whose temperature was probably about the same as that of the water of the Pueblo spring. The fact that these diatoms can grow in such abundance in water of so high a temperature, affords an explanation of the total absence of every other form of organized beings in the infusorial beds, as such an elevated temperature would be totally incompatible with the existence of every other form of living beings. The time at which these infusorial beds were deposited was probably during the Miocene period, as we have evidence that at that period Spitzbergen and other Arctic regions had a temperature some fifty or sixty degrees above that of their present climate.

He also read an article on Prismatic Dolerite, an interesting form of volcanic rock found near Black Rock, Nevada.

Columnar Dolerite.

The specimens of this rock were presented to the Academy some three or four meetings since, and I then stated that I believed they were examples of the crystalized form of some volcanic rock, most likely related to basalt. Not having examined them particularly, and the surface of the mineral being much weathered, I gave a specimen to Mr. Durand, who at the next meeting of the Academy presented a memoir on the subject, in which he stated that the crystal was Amphibole. Not, however, being satisfied that my first opinion was incorrect, I prepared a thin section of one of the crystals, or crystalline prisms, and looked at it through the microscope. This section I now present to the Academy, and even an examination of it with the naked eye suffices to prove that it is a compound rock, made up of heterogeneous substances, embedded in a dark greenish matrix. With the microscope we detect crystals of augite, nephiline or labradorite, and titanite. I believe the transparent crystals are nephiline; so perfect is their transparency, that at first I concluded that they were holes where the rock had been ground out; but on using polarized light, I discovered they were doubly refracting crystals. I am not aware that any of these compound rocks have been found in such small prisms. Some of the smaller prisms measure not more than 0.10 in. across, and in the specimens I have some three to four inches long. There can be no doubt but that originally they were aggregated into masses, and that their separation is the result of weathering; in fact, amongst my specimens are some in which many prisms are still attached to each other. The locality from which they were collected was at Black Rock, in the State of Nevada, but I did not collect them myself. I found them here, they having been sent down as tin ore. On account of the roughness of their surface, caused by weathering, I have been unable to measure their angles.

Dr. Gibbons remarked on the waves of temperature which seem to range from S. E. to N. W. along the coast of this State, south of this city, following its trend, while they run nearly on the meridian lines further inland.

Professor Whitney gave an account of the investigations carried on during the progress of the Geological Survey of California, having for their object the determination of the value of the barometor as a hypsometrical instrument, the expectation being that, after a sufficient stock of observations shall have been accumulated and reduced, it will be possible to designate the hours of the day for each month, when the results will approach nearest to the truth; and in general, to give practical rules in regard to the times of observing and the method of reduction, the following of which will secure a closer approximation to accuracy than can now be attained.

An elaborate series of observations with this end in view was begun on this coast, some ten years ago, by Col. R. S. Williamson, of the U. S. Engineers; but the work was suspended by the Engineer Bureau just before being completed. Col. Williamson's results, however, were published in the form of a superb quarto volume, as an "Engineer's Paper," and this contains a large amount of valuable material; so that the work of the Geological Survey is only to be looked upon as supplementary to that so ably commenced by him.

The stations at which observations are being carried on at present, under the direction of the Geological Survey, are along the line of the Central Pacific Railroad, and their elevations are presumed to be accurately known from the levellings of the railway surveyors. The points selected are San Francisco, Sacramento, Colfax and Summit, approximately 0, 30, 2400 and 7000 feet above the sea level. The observations have already been continued at these points nearly a year, and are made at the Smithsonian hours—7 A. M., 2 P. M. and 4 P. M. The greatest care has been taken that the instruments should be kept in perfect order, well-placed for accurate results, and carefully and punctually observed. The observations of the past ten months have already been partially worked over by Professor Pettee, of the Geological

Survey, and the results obtained indicate very clearly that valuable assistance will be derived from the completed series in the reduction of the copious barometric determinations of altitude made during the progress of the Survey.

Regular Meeting, September 4th, 1871.

Professor Davidson in the Chair.

Donations to the Cabinet: Mr. Stearns presented an egg case of the *Ephemera vulgata*, (caddis-fly) England; specimens of Chinese coral; two new species of shells, Florida; fossil *Inoceramus*, from Butte county.

Professor Henry presented the result of the observations which had been made and collected by the Smithsonian Institution on the rainfall of the country, an account of which is now in process of publication.

The rainfall of the United States comes from three different quarters, the Atlantic, Gulf of Mexico and the Pacific. Perhaps the largest comes from the Gulf of Mexico—the bottom, as he termed it, of the trade wind. Although nothing appears more irregular than the rains in the Eastern States, a long series of observations establishes the fact that they are very regular.

The speaker explained briefly the operation of the law by which rarified vapors are carried into upper and colder regions, and there precipitated. He exhibited several charts, showing on what months the maximum and minimum of rainfall was observed to occur in different localities. He also displayed a number of the latest compiled charts, showing by graduated colors the comparative amount of the rainfall in various localities. He explained the fact of the rainfall being wholly absent in Oregon in summer, and heavy in winter, by saying that in summer the return trade wind swept the country at the northward, and in winter it swept over Oregon. In Florida the rainfall was light in winter and heavy in summer, owing to the fact that in winter the trade wind which brought the rain took its course more to the southward. The temperature of Sitka was about seventeen degrees warmer than it would otherwise be, from the fact that the summer trade wind does take its course there.

Mr. Stearns read the following article:

On the Habitat and Distribution of the West American Species of Cypræidæ, Triviidæ and Amphiperasidæ,

*Being corrections to Mr. Roberts' Catalogues * of the "Porcellanidæ" and Amphiperasidæ.*

BY ROBERT E. C. STEARNS.

Mr. Roberts' Catalogues—if the West American species are any criterion—throw no new light upon the distribution of the species enumerated therein; neither are the more accurate statements of authors more reliable in this respect than Reeve, Sowerby and Kiener—whose indefiniteness and errors he has blindly repeated therein—referred to or considered.

The remarks of Mr. J. H. Redfield, on page 88, Volume V, of American Journal of Conchology, on the sins of the late Mr. Reeve in this respect, apply to Mr. Roberts, for it is not too much to expect, or even demand of an American writer, that he should be aware of and correct errors of the kind referred to herein, at least, when said errors occur in connection with American species. Mr. Redfield says: "The frequent errors of statement in regard to habitat are, perhaps, the most mischievous fault that can be brought against the work, for on them are liable to be based erroneous conclusions in regard to the important questions of geographical distribution, and of permanence in species."

If the species, the habitat of which is corrected by me in this paper, were from remote localities or little known, it would be less cause of surprise; but the Check-Lists of the Smithsonian Institution, Carpenter's Reports to the British Association, Dr. Cooper's Geographical Catalogue of the Mollusca, published in connection with the work of the Geological Survey of California, and sundry local lists of my own in the PROCEEDINGS OF THE CALIFORNIA ACADEMY OF NATURAL SCIENCES, were equally as accessible to Mr. Roberts as the monographs from which the catalogues were compiled.

If species appeared in the lists without habitat, it would be far preferable to positive error. Mr. Roberts' catalogues are not alone open to criticism; for others that have appeared in connection with the Journal contain omissions and geographical inaccuracies which might have been avoided by the furnishing of proofs to those investigators who, from residence or special study, possess the requisite data. The criticism herein is not dictated by hypercritical or unkind feeling, but prompted solely by a high regard for the cause in which we are all working—with, let us hope, some degree of usefulness.

1. Luponia albuginosa, *Mawe*, "California," should be *Lower* California. Although this species is credited to the Oregonian and Californian Province in the Smithsonian Institution Check-List, by Dr. Carpenter, (June, 1860), he properly omits it in his Supplemental Report to the British Association, 1863. It is common at Cape St. Lucas and various points in the Gulf of California, and belongs to the "Mexican and Panamic province."

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* The Catalogues referred to were published in connection with the "Am. Jour. of Conch.," Vol. V, Part III.

32. L. Goodalii, *Gray*, is credited to Lord Hood's Island, which is quite indefinite, as many islands have been so named—one in the Gallapagos group, which would connect this species with the Central American fauna. This species, however, is not found there, but pertains to the Indo-Pacific province—perhaps to "Lord Hood's Island" in the Paumotu group.

49. L. onyx, *Linn.*, "San Diego I." If, by the habitat given, San Diego or the islands off that coast are meant, it may be intended for one of the Coronados; but *L. onyx* is not found there—neither at San Diego or at any other point on the west coast of America. As the species in some of its varieties resembles in coloration 69, the blunder on the part of the original author may be thus explained.

68. L. Sowerbyii, *Kiener*, for which no habitat is given, is found in the Gulf of California, and consequently belongs in the same province with No. 1. Some authors have confounded this species with L. picta, *Gray*, which latter is African. In Sby's Conch. Illust., L. picta is credited to "Guaymas;" while L. Sowerbyii, through its synonym, "zonata, *Lam*," is without habitat.

69. L. spadicea, *Swains.*, "New Holland," is a Californian, credited by Dr. Cooper to "Santa Barbara, San Diego and islands," which is correct, being confirmed by my published and manuscript lists. It is a well-marked species and quite distinct from 49. It is figured in "Chenu's Manuel," Vol. I, fig. 1715—the outline of which is well enough, but the dark spots so prominently represented might lead astray.

4. Aricia arabicula, *Lam.*, is properly credited to "Acapulco," though its specific centre is in the neighborhood of Mazatlan, Gulf of California, where it is quite common. Its occurrence at Panama is exceedingly rare. Professor C. B. Adams found but "7 specimens on the reef"; while of fifty-nine (Luponia) punctulata, *Gray*, credited in the List to "Mazatlan-Panama," he collected "335 specimens." Mazatlan is quite likely an error, for in the great mass of material from that place, and from other points on the Gulf of California which has passed under my examination, I have never detected a specimen. It is sometimes washed up dead by the winter storms at Cape St. Lucas.

We find in the Genus Trivia of Mr. Roberts' list, numbered "10, T. depauperata, *Sowb.*, California," which gives us one species more than we claim; unfortunate? specimens of "5. T. Californica, *Gray*, California," after receiving hard treatment in the surf and gravel on the beach—where Mr. Sowerby's specimens were, without doubt, obtained—were finally recompensed by specific honors. Having collected numbers of specimens at various points along the coast, all of which have been carefully examined and compared, I have no hesitation in placing Mr. Sowerby's species as a synonyme of T. Californica, which extends southerly to the Gulf of California, where specimens are occasionally detected.

23. Trivia Pacifica, *Gray*, "Gallapagos," is correct; but the species is also found in the Gulf of California, and it is from the latter place that most of the specimens in cabinets have been obtained; it is not a common shell, and from its resemblance to

39. T. suffusa has been confounded with the latter, and the latter has, in some instances, been wrongly credited to the Gallapagos. T. suffusa appears to be the W. Indian analogue of T. Pacifica.

29. T. pulla, *Gask.*, "Gallapagos Islands;" quite likely correct; it is a rare species; Carpenter reports one specimen in the Mazatlan collection of Reigen and I have it in my cabinet from the Gulf of California.

31. T. radians, *Lam.*, "Mazatlan–Ecuador;" these localities are correct, but it can justly claim a more northern extension than Mazatlan, as it was collected by Mr. Gabb, in 1867, at San Juan, Lower California, and Dr. Cooper probably collected it at San Pedro, in the Oregonian and Californian province, as he credits it to that place, which is about a *thousand miles* north of Mazatlan. It is said to extend south of the equator to Peru, from which place, I think, I have received specimens. It belongs to the W. Mexican and Panamic province.

34. T. sanguinea, *Gray* "Mazatlan–Ecuador." As to the southern limit of this species I have no data; but its northern line must be moved about the same distance as the previous species, viz.: to Catalina Island, off the coast of California, and it belongs in the same province with 31.

36. T. Solandri, *Gray*, "Pacific Ocean;" from which it would be inferred that this species was an Indo-Pacific, rather than a West American form. Its specific centre is the Gulf of California, where it is quite abundant; it has been collected on the coast of California by Dr. Newcomb, also by the late Mr. Hepburn, as far north as Santa Barbara, * and Dr. Cooper credits it also to San Nicholas Island. It has not been reported south of Acapulco, and belongs to the northern part of the Mexican and Panamic province.

38. T. subrostrata, *Gray*. "West Indies." Undoubtedly correct. In the Mazatlan catalogue (species 444), Dr. Carpenter mentions a *Trivia* closely resembling this West Indian form, which, on the strength of Dr. Gray's identification, was listed under the above name. That the solitary Mazatlan shell referred to is identical with the West Indian, is highly improbable.

The highest northern station on the west coast of America at which any representative of the Porcellanidæ (Cypræidæ) has been detected, is the rocky point known as Bodega Head, some fifty miles north of the entrance to San Francisco Bay, in latitude about 38° north. This is one hundred and forty miles farther north † than the species (Trivia Californica or any other related form) has been reported prior to my Bodega collection in June 1867.

Passing to the Amphiperasidæ—the catalogue of which is published in connection with the Porcellanidæ—it will not be irrelevant to direct attention to the paper of Professor Gill "On the Relations of the Amphiperasidæ," published

* See my lists of Hepburn's and Newcomb's collections at Santa Barbara, etc., in the Pro. Cal. Acad. Nat. Sci., Vol. III, pp. 283–286, and pp. 343–345.

† I refer to American species.

in the Am. Jour. of Conch., Vol. VI. pp. 183–187. The marked difference in the form and plan of structure of the shells of this family, with the exception of A. ovum (which, in a general way, resembles Cypræa) as well as the anatomical differences indicated by Professor Gill, require that the forms included in the catalogue referred to should be removed from a consecutive classification. That they more nearly approach the form known as Pedicularia is readily seen. As the shells of the latter are rare in collections, and are quite important to the student in this connection, I would suggest an examination of the red and purple corals of the Indo-Pacific waters, upon which, by careful scrutiny, specimens may frequently be found, of the same color as the coral to which they are attached.

7. Volva avena, *Sowb.*, "Santa Barbara–Panama," has never been confirmed so far north as Santa Barbara.

36. V. variabilis, *C. B. Ad.*, "Cape St. Lucas," has a more northern limit, having been collected at San Pedro, California, by Dr. Cooper, and Carpenter credits it to Santa Barbara, ("Jewett.") I am inclined to believe that V. avena = V. neglecta of C. B. Ad., Mr. Sowerby's name having priority by twenty years.

10. V. Californica, *Sowb., MSS.*, "California," has never been confirmed from any point within the Oregonian and Californian Province, and is undoubtedly an error.

31. V. similis, *Sowb.*, for which no habitat is specified, should be credited to the Gulf of California.

All of the West American species are well represented in my collection, though, with the exception of V. variabilis they may be justly considered as rare.

Mr. Stearns gave a diagram of the animal, *Trivia Californiana*, of which worn specimens are called *T. depauperata*, Sby. The animal feeds on corals, and grows at Monterey; also at Bodega Head, its northern limit.

Professor Henry referred to the rapid strides which science was making in England, and attributed it to the advantages there given to those men who are pioneers in original discoveries.

Dr. Blake exhibited, under a powerful microscope, specimens of *Diatoms* from a hot spring in Nevada, the temperature of which was 163 degrees. He said they were more numerous there than in any other locality, six or eight hundred occurring in a bit of mud the size of a pin's head. Most of them were identical with the fossil species described by Ehrenberg, from near Salt Lake, but many were new. He found about fifty-two species, of which thirty are the same as Ehrenberg's, who mentioned about sixty-eight. He mentioned particularly the red *algæ* living in the spring, and found in salt beds in many parts of the world.

Mr. Hanks exhibited, under the microscope, crystals of cinnabar from Lake county, crystallized in chalcedony. The effect produced by the magnifying power of the microscope was most beautiful. It was evident from the form of the crystals as magnified, that the crystallization must have taken place before the hardening of the chalcedony.

Mr. Hanks also displayed, under the microscope, beautiful spars in silicified wood; also a gold crystal from the Ida mine, Owens River, the only known locality in which microscopic crystals have been found; also a specimen of *metacinnabarite*, a new mineral peculiar to California, and recently described.

Regular Meeting, September 18th, 1871.

President in the Chair.

Donations to the Cabinet: Dr. Kellogg presented a new plant with the following description:

Madia radiata—Kellogg.

BY A. KELLOGG, M. D.

Specific char. Stem erect; annual; branches alternate, loosely spreading 1 to 3 feet high; stipitate glandular and viscid throughout, fistulous. Lower leaves narrowly-lanceolate; middle and upper leaves ovate, sub-cordate at base, lance-pointed sessile, remotely denticulate, chiefly dense stipitate glandular above, 3 to 5 nerved (rarely 7) succulent, 3 to 6 inches in length, $\frac{1}{2}$ to $1\frac{1}{3}$ in breadth; successively diminishing to ultimate peduncles. Inflorescence centrifugal. Flowers large (as in Layia and Madaria), $1\frac{1}{4}$ to 2 inches, loosely corymbose. Rays about 13 (or duplicating in early blossoms). Receptacle (in young state) convex; chaff between disk and ray united; both ray and disk achenia fertile, etc.

Found near the mouth of the San Joaquin River, and presented to the Acad. about three years since; then past its prime, but not until now in good condition.

As the plant has the showy rays of Madaria, yet differs in its fertile disk achenia, its position is between Madia and Harpecarpus. Should these genera be revised, it would form the type of a conspicuously radiated section of Madia, under the designation of *Macromadia*.

Dr. Blake referred to the animal life which he had found in hot springs, at Calistoga, of 168 degrees of temperature, and the study of which he had made a specialty.

In springs as well as in California, he had found filamentous algæ in water having a temperature ranging from 120 to 163 degrees. In water of a lower temperature—say 110 degrees—they were also found, but with a character greatly modified. Those found in the hottest waters are so small as to be barely perceptible, even under the highest powers of the microscope. He thought that the extensive fossil deposits of diatoms in Utah and Nevada, indicated that the waters in which they lived were of a high temperature.

A member said he had detected microscopic animalculæ in boiling water, the green appearance of which led the non-scientific observer into the error of supposing the water contained copper.

Dr. Blake said this upset the theory of those scientists who hold that animal life was impossible before the earth had cooled.

Regular Meeting, October 2d, 1871.

President in the Chair.

James S. Jamison and J. B. Easterbee were elected resident members.

H. G. Hanks exhibited a curious formation which was found in the stomach of a deer. Dr. Blake said it was a silicious concretion which was formed from particles which the animal had taken with its food. The specimen excited interest, particularly from the fact that the formation seemed to be laid on in scales—an unusual mode.

Mr. Hanks also read a paper containing particulars of the peculiar phenomenon reported by the ship *Transito d'Alvarez*, when in latitude 45 deg. 33 min., longitude 125 deg. 25 min. west, or about 85 miles west of Cape Lookout, on the Oregon Coast. The phenomenon consisted of a peculiar yellowish haze surrounding the vessel, similar to the haze which covered this city just prior to the great earthquake. The atmosphere became so darkened around the ship that the cabin lamp had to be lighted. Birds, affrighted, came flocking to the vessel, and were caught without difficulty. Numbers fell on the deck, dead.

A sediment was deposited on the vessel, and the captain furnished Professor Hanks with a very small portion. This Mr. Hanks subjected to a very careful chemical and microscopic examination. It revealed silicious matter, and also a peculiar cellular formation, which burned somewhat like asphaltum.

He had no evidence that the silicious matter was a portion of the sediment. It might have been a portion of the dust on the deck before the peculiar deposit fell. What the other substance was could not be determined, as the quantity of sediment furnished was so small that the reactionary effects of the acids could only be observed under a microscope. Mr. Hanks regretted that the sample furnished him was so small in quantity as to preclude better results.

Dr. Kellogg thought that the difference in showers might to a certain extent account for the deposit. It was not impossible that showers of various substances formed in the atmosphere, somewhat in the same manner as do rain showers.

Mr. Hanks said the existence of cosmical dust was established beyond a doubt; and also the fact that this dust is constantly settling on the tops of mountains.

Dr. Cooper alluded to the fact that the meteorites which have fallen within the last few years were more composed of carbonaceous matter and less of iron than formerly. He thought a possible explanation of the sedimentary shower might be found in the frequent burning of lignite beds, which takes place on Whidby's Island, near the Straits of Fuca. These burning beds are sometimes covered by sand. It might be that the dense smoke arising from the fires would bear upwards with it fine silicious particles, which it caught passing upward through the sand.

Dr. Gibbons said he had no doubt that there were extraneous substances in solid form, but in a state of minute division, carried through the atmosphere to an immense height. They are also carried by winds and by smoke. All these are sources of atmospheric cloud. The lower strata of the atmosphere being heavier than the upper, they would seem to be better adapted to floating these particles. But yet they are carried and do remain an immense distance up in the atmosphere. Winds take up sand and carry it hundreds, perhaps thousands of miles. Immense quantities of sand are in this way borne from the coast of Africa, five hundred or a thousand miles. The presence of silica in the sediment tested by Mr. Hanks was, therefore, easily accounted for.

There are numerous sources of the presence of this extraneous matter in the atmosphere. Volcanic eruptions have darkened the air for miles. The speaker had often been puzzled to distinguish between clouds of vapor and clouds of smoke. During the past two or three days the sky had been filled with clouds, which appeared to be dense volumes of smoke.

Regular Meeting, October 7th, 1871.

President in the Chair.

Charles T. Yale was elected a resident member.

Dr. Blake called attention to a donation of crystals of borate of lime, by Mr. Mosheimer, formed artificially in purifying crude borax from Borax Lake. Dr. Cooper stated that it had been proved that borax could be made much cheaper from the waters of this lake than from the borate of lime beds of Nevada.

Dr. Blake stated that, in a recent visit to the Geysers, he had collected specimens of the algæ found growing in the waters at different temperatures.

The highest temperature in which he had found any living organism was in the water of a spring, the temperature of which was 198 degrees. In this spring only two forms of confervæ were found; one very delicate, hair-like form, resembling the Hydrocrocis Bischoffii, but larger; the other form was a filament with globular enlargements at intervals. In a spring, the temperature of which was 174 degrees, many oscillariæ were found, which, by the interlacement of their delicate fibres, formed a semi-gelatinous mass. But two forms of diatoms were found in this spring, the most abundant being one with a rectangular silicious skeleton. In a spring of the temperature of 134 degrees, layers of filamentous green and red algæ were freely formed as the water flowed over the rocks. These layers consisted of oscillaria, and also contained the delicate Hydrocrocis Bischoffii in large quantities. The only diatom found was apparently of the same species as that contained in the 174 degrees spring. In the water in the creek of Geyser Cañon, the temperature of which was about 112 degrees, there were large quantities of algæ, forming layers often two or three inches thick, covering the bottom of the pools. Under this was a deposit of black mud, formed, most likely, by the sulphuret of iron discharged from the springs above. In this deposit but two forms of diatoms could be detected, the same as found in the 174 degrees spring. The Doctor observed, however, that these deposits were examined without any previous treatment. It is possible that when freed from the earthy and organic matters, one or two other species may be found. There can, however, be no doubt that the waters of the Geysers do not afford a congenial medium for the production of diatoms. In the heated waters of Nevada Springs, and in those of Calistoga, they flourish in the greatest abundance, as many as thirty or forty different species being found in one spring; whilst here, in springs the temperature of which ranges from 195 degrees to 112 degrees, not more than two or three species have been met with, and but very few individuals of each species. Undoubtedly the cause of this absence of diatoms is to be found in the character of the waters, which appear to be all acidulated by the presence of free sulphuric acid, so that no alkaline silicates can exist; and as the diatoms are undoubtedly dependent for the silica that forms their skeletons on the soluble alkaline silicate, it is evident that these waters cannot afford a congenial place for their development. Other forms of algæ seem to flourish in the greatest luxuriance in these mineralized waters. The Doctor had never before seen such masses of oscillaria as are found in the bed of the creek of Geyser Cañon, and their presence in the highly-mineralized waters of a spring, the temperature of which was 174, would show how great is the range of the conditions in which these forms of plant-life can be developed.

Dr. Cooper alluded to the formation of microscopic plants in white globular masses in dilute sulphuric acid.

Dr. Kellogg said such formations were common in electric batteries, even forming on the surface of copper plates so as to interfere with their efficiency. He also mentioned a cryptogam which was not destroyed in an oven, and did not see why it would not live in water at 212 degrees.

Dr. Blake said that these facts had some bearing on the question of spontaneous generation.

Mr. Durand referred to a late examination made by him of the salts precipitated from the vaporous exhalations at the Geysers. He found large quantities of sulphate of ammonia, which is very scarce in the natural state.

Dr. Cooper announced the discovery by himself of a fossil tooth like a saurian's, but considered by Professor Agassiz as possibly related to *Archegosaurus*, before known only in the carboniferous. Having been found in the alluvial drift of Mare Island, its exact position is uncertain; but if carboniferous, it must have been transported from the northern Sierra Nevada, at least.

Regular Meeting, November 6th, 1871.

President in the Chair.

Eighteen members present.

Donations to the Cabinet: Professor Davidson presented a specimen of "cryptomorphite," obtained by A. W. Chase, of the Coast Survey, resembling in appearance French prepared chalk. Professor Davidson said it was found in nodules varying in diameter from four or six inches to as many feet. It was the best substance for polishing that he had ever seen, as it left not the slightest scratch. It was found in Nevada in extensive deposits, the locality of which the discoverer declined to disclose.

Dr. Blake said he had analyzed the substance, and found it to contain boracic acid and lime, being a form of borate of lime.

W. G. W. Harford presented shells of the *Helix Ayresiana*, found on San Miguel Island in abundance.

Mr. Hanks, on behalf of Capt. Wakeman, presented a specimen of the flying fox, from Navigator's Island; also on behalf of Mr. Raymond, a specimen of an *Athoracophorus*, brought here living from Australia, in fern-leaves.

Mr. Harford exhibited a "Colorado Turkey" (Wood Ibis, *Tantalus loculator*). Several of the species have been shot near Stockton, but it was very scarce on this part of the Coast. He also exhibited a part of a fossil sea-turtle, found near the top of a mountain on San Miguel Island.

Mr. Harford also displayed several Indian curiosities dug by himself and W. G. Blunt, who are studying the traces of the extinct race of Indians formerly occupying the San Miguel, Santa Rosa and Santa Cruz islands. They were taken from Indian graves or pits, one of which he mentioned as being about twenty-five feet in length. The bodies had been thrown in irregularly. The skulls showed marks of violence, many of them being smashed in. The curiosities consisted of glass beads, shell and bone arrow-heads, pipes, rude ornaments, paint, etc. In one of these pits only stone relics were found, everything in it appearing of much older data.

Professor Davidson said the explorations had proved the islands to have been extensively populous. It was not improbable that, centuries ago, a Japanese or Chinese junk may have been wrecked, and the crew drifted to one of these islands, and mixed with the natives.

Mr. Hanks presented samples of the diamond deposit of South Africa, brought from thence by J. H. Riley—one of the first layer, which has to be pierced to get to the diamond deposit; another of the deposit in which the diamonds are found, and another of pebbles found associated with the diamonds. The last, it was remarked, bore great similarity to the pebbles found at the mouth of the Klamath river, where microscopic diamond dust was found; also at the Pescadero, Santa Cruz county. Mr. Hanks remarked that it was very singular that so many microscopic diamonds are found loose on this coast, and yet that a diamond in place has never yet been found.

Dr. Gibbons exhibited several half-grown apples, which bore many insects attached to the rind, affecting the growth of the apple by causing indentations where they appeared. They would not usually be observed by a person eating the apple; and thus might be introduced into the stomach in large numbers.

Dr. Gibbons gave some statistics regarding the rainfall of the Pacific coast, extending backward during a period of twenty-one years. The earliest date at which the rainy season set in was November 9th, 1852, and the latest December 31st, 1854. Dr. Gibbons said his inquiries tended to show that there was no distinct connection between the times of the commencement of the rainy season and the quantity of rainfall. But, as an average, those seasons which commenced early had more rainfall than those which commenced late. By all the data which we have, we can form no deffinite idea of the quantity of rain which will fall during any season.

Judge Hastings read a paper propounding questions upon the Darwinian theory of natural selection.

Dr. Cooper said if the Judge would wait until the National Association met in this city, the questions would give them material for discussion for an indefinite period of time.

Professor Davidson said the recent developments made by the aid of telegraphic communication proved that San Francisco was four minutes further west from Greenwich than had heretofore been supposed—the old calculation being 8 hours, 9 minutes, 34.19 seconds, and the present being 8 hours, 9 minutes, and 38.13 seconds.

Regular Meeting, November 20th, 1871.

President in the Chair.

J. Augustus Whiting, chemist, was elected a resident member.

The President read a letter from the Secretary, B. P. Avery, stating that ill-health prevented his being out nights, and therefore tendering his resignation as Secretary. The resignation was accepted.

Dr. George Hewston was elected to fill the vacancy.

Several journals and pamphlets were noted as donations to the library.

Donations to the Cabinet: The President called attention to a letter from Mexico, containing a specimen of fibre from Mexico, very similar in appearance to the ramie. It was sent here merely for commercial purposes, to test its value in the market.

Mr. Morrill said the letter accompanying it was from Mr. Romero, for a long time minister to the United States. He said the fibre was used to a great extent in that country. It was stronger than cotton, grew in great quantities on the coast, and for rope was worth ten cents a pound, but he thought it worthy of a better use. It was indigenous to that country, and was also cultivated in a rude way. The Mexican name is *mercatilla*. It grows in the State of Guerrero, down to latitude 10 deg. 13 min., being an annual, from five to nine feet high—highest in damp soil. In Southern California, Mr. Morrill thought the *mercatilla* might be grown with good success. He had experimented in latitude 18 deg. 30 min. with this, and also with the ramie, and thought in that latitude it could be grown with success equal to the ramie.

Dr. Blake made some remarks on the extent of the deposits that had been formed by the hot spring at Puebla, in Humboldt county, Nevada.

He had caused specimens of the earth to be taken at different depths, and from spots situated in different directions and distances from the spring. The farthest spot at which these explorations had been made was at a distance of 115 yards from the spring, in a northwesterly direction, and here, to the depth of five feet, the earth contained a large number of diatoms of the same species as those obtained from the spring—in fact, a large portion of the soil was composed of diatoms, evidently formed in the water of the hot spring. From the earth obtained to the south of the spring, few diatoms were found, and in these but two or three were of the same species as those growing in the hot spring. The time in which a small surface like the outlet of the Pueblo hot spring, about thirty yards long and two feet broad, would require to produce thousands of cubic yards of this infusorial earth, almost transcends the power of the imagination to conceive; and yet this process can only have been going on during the present geological epoch, or since the surface of this portion of the globe has been subject to any disturbance.

The earth is made up of fine particles of clay and sand, with, he thought, fully a third of diatoms. It also contains many silicious concretions, and as he is convinced by the formation of the ground that these could not have been carried there by water, he concluded that they must be silicified organic remains. On making a thin section of one of these concretions, the microscope showed that this was the case, a pair of legs of some coleopterous insect being plainly visible in the quartz. The greater part of the concretion seemed made up of petrified *algæ*. It is impossible to say, without further exploration, how far this deposit of diatoms extends. He hoped, however, to again have the opportunity of examining the place, when he would certainly endeavor to ascertain the limits of this most interesting deposit.

Dr. Kellogg read the following paper:

Leptosyne gigantea Kellogg.

BY A. KELLOGG, M.D.

Root of woody structure, and like the stem, stout. Stem 2 to 8 feet high, 2 to 5 inches in diameter (concentric rings of annual growth, 3 to 8, each about half-inch, pith about an inch), branches whorled, truncated, or abruptly terminated, ultimate pedunculoid tertiary branches leafy, chiefly at the obtuse end of secondary stems or branches. Leaves bipinnately divided, segments linear-filiform, sub-spatulate, entire or slightly emarginate, three-nerved; glabrous, fleshy, alternate, petioles stout, slightly expanded at the insertion, striate nerved (6 to 9), 1 to 3 inches long, or a third of the lamina. Peduncles alternate, often bracted, involucre double, outer series foliaceous, 5–7 linear; inner 12–15, membranaceous, colored (y.) ovate lanceolate, acuminate, nerved 16–20); receptacle convex; chaff membranaceous, colored (y.), oblanceolate about 3–7 nerved, incurved, subconcave, deciduous with achenia. Rays about 15, ligulate yellow, disk florets yellow, ring at the summit of slender tube naked. Achenia oblong or somewhat obovoid, obcompressed, slightly incurved, obscurely 3 to 5 nerved, surrounded by a somewhat thickened, narrow marginal wing, one-nerved on the inside; not a vestige of pappus upon the coroniform cup.

The herculean proportion of this species at all stages of size, as seen upon this Island as well as Santa Barbara, stems at length leafless (no young plants noticed), the singular abrupt, club-like ends of the caudiform branches, etc., seems clearly to indicate a distinct species. Before learning fully the habit of growth, from mere floral analysis, we were inclined to view it only as a variety (of the old Tuckermania) *Leptosyne maritima*. This new plant was collected by Mr. W. G. W. Harford, under the auspices of Capt. S. Forney, of U. S. Coast Survey, near Cuyler Harbor, San Miguel Island, about 40 miles off the coast of Santa Barbara, Cal.

This plant is also found on Santa Barbara Island, in some ravines, reaching to 10 feet in height; on exposed cliffs and plateaus it rarely exceeded 5 feet, with a broad canopy of golden flowers and all-pervading honey-comb odor, of great magnificence and beauty, highly deserving culture. Its herculean stem and strength of limb defies the fiercest cold winds and fogs, continuing in bloom for several months. The section of stem (about 10 inches in length) before the Academy—by no means the largest—is 4 inches in diameter.

Regular Meeting, December 5th, 1871.

President in the Chair.

Twenty-eight members present.

Donation to the Cabinet: From A. Garratt, Tahiti, 203 species of shells, corals and radiates. The thanks of the Society were voted for the donation.

Dr. Blake exhibited a curious little fish, which he said he had picked up in the market.

Henry Hemphill donated several species of rare shells—*Helix Idahoensis*, Newcomb, *Helix strigosa*, Gould, from Central Idaho; *H. fidelis*, Gray, from Dalles, Oregon; *H. Cooperi*, Binney, *H. Germona* Gld, from Astoria, Oregon; *Monoceros lugubris*, Sby, *M. paucilirata*, and *Ocinebra gracillima*, Stearns, from Todos Santos Bay, Lower California.

Professor Whitney made an interesting verbal report of the progress of the State Geological Survey.

Dr. Blake introduced Salvador Morhange, Consul General of Belgium, who read a paper descriptive of White Island, New Zealand—a scene of wild grandeur and desolate sublimity. The paper was a graphic picture of one of the most wonderful volcanic and geyser phenomena in the world.

Professor Marsh, of Yale College, was introduced. He had been traveling since June with a large party, for the main purpose of collecting and investigating the vertebrate fossils of the Rocky Mountain region.

In the upper cretaceous formations of Kansas, his party had made probably one of the finest collections in the world. One interesting discovery was the fact that the *Mosasaurus*, or its allies, were in possession of hind legs—a fact not hitherto acknowledged.

Many minute vertebrates, from the tertiary formation of Wyoming, have been gathered. The investigations will furnish a theory for clearing up quite a number of the geological puzzles, especially the relations of the ancient fresh water lake basins east and west of the Rocky Mountains. The discovery of a distinct *Miocene fauna* in Wyoming was an interesting result of their investigations; also, that the Pliocene basin, in Oregon, contains a large number of fossil horses, and two or three of rhinoceros.

Professor Whitney exhibited some fossils sent by Mr. J. E. Clayton to Professor Joseph LeConte, and by the latter handed over to him for examination. They consist of a number of fragments of trilobites and brachiopods, which show conclusively that the strata in which they are embedded are of the age of the Potsdam sandstone, or the lowest member of the Lower Silurian—the so-called primordial rock of Barrande. The locality in which these fossils were discovered is near Eureka, Nevada, about 100 miles south of Elko, on the Central Pacific Railroad. The discovery is an interesting one, as the primordial fauna had not been previously found west of the Big Horn Mountains, longitude 106 deg. Among the forms recognized are: *Agraulos Oweni*, M. and H., or a species closely resembling this; *Lingulepis prima*, *Obolella*, *Conocoryphe*, *Paradoxides*, &c.—all very characteristic of the primordial rocks.

Dr. Blake read a paper on the composition of some of the waters of the geysers, the remarkable feature of which was the enormous amount of ammoniacal salts they contained.

The following paper was presented in behalf of Mr. Garritt:

Descriptions of New Species of Shells from the South Sea Islands.

BY ANDREW GARRITT, OF TAHITI.

Genus Mitra Lam.

Mitra (Costellaria) crispa, Grt.

Shell oblong, sub-fusiform, solid; somewhat shining; bluish ash or yellowish ash; spire turreted, acute; half the length of the shell; whorls seven or eight; flattened, angularly shouldered above; longitudinally-ribbed; ribs large, slightly angular, intersected by small, flattened, transverse, more or less waved ridges; base contracted; aperture white or flesh color; fauces elegantly lyrate; columella violet, with four or five plaits.

Length, sixteen mill.

Habitat, Samoa and Viti Islands.

A rare species, found in sandy mud, in the upper region of the laminarian zone. Its pale color, violet columella and crisp-like surface, are its most obvious characters.

Genus Gibbula, Risso.

Gibbula affinis, Grt.

Shell small, globosely conical, cinereous, articulated by transverse series of small, sub-quadrate, slate-colored spots; whorls five, flattened, last one gibbose, spirally ridged, ridges small—the one on the periphery the larger and more remote than the others, and the whole surface decussated with fine, elevated striæ; base convex; umbilicus small, crenulate and spirally grooved within; aperture rounded, with a slight angle at the columella, and pearly within; outer lip thickened and crenulate.

Height, five mill; diameter, six mill.

Habitat, Viti and Samoa Islands.

Not uncommon under stones or reefs, and often found associated with *Gibbula concinna*, Dkr., which it closely resembles in shape. The latter species is girdled by beaded ridges, and has a smaller umbilicus than our species.

Gibbula filosa, Grt.

Shell small, depressly globose, conical, ashy-white or tawny-yellow, apex rose-color, and the whole surface with revolving brownish lines; whorls five, convex, the last gibbose; spirally-ridged, ridges flattened, and the whole surface with fine raised spiral striæ; base flattened convex; umbilicus small, spirally-grooved within; aperture roundly sub-quadrate, pearly white; peristome thickened and crenulate on the inner edge.

Height, five; diameter, seven mill.

Habitat, Viti and Samoa Islands.

More rare than the preceding species, and inhabiting the same station.

Gibbula striata, Grt.

Shell small, rather thin, globosely conical, grayish-brown, rarely crimson, delicately mottled with whitish; whorls five, convex, last one gibbose, sub-angulated at the periphery, closely lineated with large, unequal-sized, elevated spiral striæ; umbilicus whitish, small, with deep spiral grooves within; aperture roundly sub-quadrate, pearly-white; outer lip rather thin.

Height four; diameter, five mill.

Habitat, Viti and Samoa Islands.

A very rare species, only found in the condition of dead shells.

Gibbula prasina, Grt.

Shell very small, thin, sub-pellucid, depressly globose, dingy green, with paler mottlings; whorls four, strongly convex, the last one very large, rounded, lineated with small, closely-set, spiral ridges, which become obsolete on the base, and cancellated with microscopical, raised lines of growth; umbilicus very small, simple; aperture rounded, green within, and articulated with dark dots; outer lip thin.

Height, three; diameter, four mill.

Habitat, Viti Islands.

A few examples were gathered from the under side of loose stones on shore reefs.

Genus Thala, H. and A. Adams.

Thala exquisita, Grt.

Shell elongate, slender, fusiform, solid, shining, light pink, with whitish shades, and sparingly dotted with brown; whorls eight or nine, flatly convex, longitudinally and transversely ridged; ridges small, closely-set, with small nodes at their intersections; base contracted and slightly recurved; aperture very narrow, nearly half the length of the shell; outer lip thickened and crenulate within; columella with five small plaits.

Length, twelve mill.

Habitat, Paumotu Islands.

A rare and beautiful species found washed up on sandy beaches.

Thala violacea, Grt.

Shell solid, elongate, slenderly fusiform, shining, violet; whorls six or seven; flatly convex, regularly granulated throughout; base slightly recurved; aperture narrow, half the length of the shell; outer lip thickened and crenulate within; columella with five or six very small plaits.

Length, seven mill.

Habitat, Samoa and Viti Islands.

A rare species found under stones or reefs.

Genus Cantharus, Bolten.

Cantharus filaris, Grt.

Shell solid, elongate, slenderly fusiform, light brownish, with whitish mottlings and spirally lineated with deeper brown; whorls seven, convex, longitudinally and spirally ridged; ridges small, granulated at their points of intersecting; the transverse ones alternately larger and smaller; base contracted and produced into a short, slightly-twisted canal; aperture oblong, ovate, tawny-yellow and lyrate within; columella with several small nodules.

Length, sixteen mill.

Habitat, Samoa and Viti Islands.

A very rare species found under stones on reefs.

Genus ENGINA, Gray.

ENGINA ALTERNATA, Grt.

Shell abbreviately fusiform, solid, rapidly tapering towards the base; longitudinally ribbed; ribs slightly nodular, the sutural row of nodules the larger; spire short, pointed; whorls seven or eight, the last one ventricose, longitudinally striated and spirally grooved; aperture little more than half the length of the shells; outer lip thick, crenulate, sinuous above and toothed within; columella somewhat flattened, slightly grooved on the edge and furnished with a row of papillæ; parietal region lirate. Color: ribs white, under a pale luteous epidermis, and the interstices deep brown. Fauces white or livid.

Length, fourteen mill.

Habitat, Samoa and Viti Islands.

A very rare species found under stones on reefs.

ENGINA GIBBOSA, Grt.

Shell small, ovate rhomboid, rather thick, light brown, with pale transverse ridges; whorls seven or eight, flatly convex, the last one gibbose, longitudinally, stoutly ribbed; ribs rounded, ten or twelve in the body-whorl, crossed by small transverse ridges and elevated striæ; base much contracted and slightly recurved: aperture nearly half the length of the shell; outer lip with five teeth; columella slightly rugose.

Length, eight mill.

Habitat, Viti and Samoa Islands.

Not uncommon under stones on reefs.

ENGINA BELLA, Grt.

Shell oblong ovate, sub-fusiform; apex acute, base contracted and slightly twisted; whorls eight, flatly convex, last one gibbose, longitudinally nodosely-ribbed; ribs stout, rounded ten to eleven on the body-whorl; interstices decussated with raised striæ; aperture less than half the length of the shell; outer lip with five small teeth on the inner edge, and the columella slightly rugose; color ashy-white, with three transverse white bands, the upper one following the suture, and the nodules between the bands yellowish, with brown margins.

Length, six mill.

Habitat, Viti and Samoa Islands.

A very rare and handsome species found on the outer reefs.

Genus FISSURELLA, Brug.

FISSURELLA FOVEOLATA, Grt.

Shell depressly conical, oblong, oval, rarely ovate, ashy-white, more or less mottled with slate color; radiately ribbed, ribs closely-set, prominent, alternately larger and smaller, from thirty to thirty-two in number, intersected by close concentric thin ridges, and the interstices deeply punctured; fissure a little anterior, oblong, sub-quadrate, anterior outline slightly concave, convex posteriorly and the sides flattened; base crenulate; interior radiately grooved.

Length, sixteen; height, eight; diameter, twelve mill.

Habitat, Samoa and Viti Islands.

A rare species, remarkable for the elegance of its sculpturing.

FISSURELLA FENESTRATA, Grt.

Shell depressly conical, ovate, ashy-white, rarely rayed with slate, radiately ribbed; eleven or twelve of the ribs large, rounded, increasing in size posteriorly, with small ones interposed, all crossed by thin concentric ridges, which form vaulted scales on the posterior ribs; interstices finely clathrate; fissure a little anterior, oblong, sub-quadrate, slightly contracted anteriorly; base irregularly crenulate; interior radiately grooved.

Length, fifteen; height, seven; diam. twelve mill.

Habitat, Viti and Samoa Islands.

A very rare species. It can be readily distinguished by its three large posterior ribs being much more developed than the others.

Genus PITYS, Beck.

PITYS MAUPIENSIS, Grt.

Shell umbilicate, sub-discoid, thin, sub-pellucid, elevately striated, striæ crowded, finer beneath, brownish, more or less tessellated with dark brown, and sometimes the body adorned with zigzag stripes; spire convex, apex flat; suture rather deeply impressed; whorls six and a half, rounded, regularly and slowly increasing, the last one slanting inward from the shoulder; umbilicus small, deep, about one-fifth the greatest diameter of the shell; aperture vertical, narrow, luniform, fauces with four, columella with one, and the parietal region with three lamellæ; peristome thin, simple.

Diam., three; height, one and a half mill.

Habitat, Maupiti Island, Society Islands.

A common species, peculiar to the above location, where it occurs under dead wood and among stones. It belongs to the same group as *Pitys modicella* Fer. and *P. multilamellata*, Grt.

PITYS TANEÆ, Grt.

Shell umbilicate, discoid, thin, sub-pellucid, brownish horn color, tessellated and rayed with deep brown; plicately ribbed, ribs small, oblique, acutely curved, somewhat irregularly disposed, rather distant, but finer and more crowded beneath; spire convex, flattened at the apex; whorls six and a half, convex, slowly and regularly increasing, slightly sulcate near the suture, last one acutely carinate, flattened above, not descending in front, convex beneath, and angular near the umbilicus; suture well impressed; umbilicus large, perspective, freely showing the whorls, a little more than a third the greatest diameter of the shell; aperture oblique, rhomboid-lunate, wider than deep; parietal region with a small revolving lamella; peristome thin, simple.

Diam., four and a half; height, one and a half mill.

Habitat, Maupiti Island, Society Islands.

A very abundant species, found on the ground in damp forests. It belongs to the group represented by *P. fabrifacta*, *ficta* and *Huahinensis*.

[ERRATA. — On page 122, *ante*, eighth line from bottom, for "grey," read "bright."]

ANNUAL MEETING, JANUARY 2D, 1872.

President Blake in the Chair.

Twenty-six members present.

Prof. K. G. Ehrenberg, of Berlin, Prussia, and Charles Darwin, of Kent, England, were elected honorary members.

The President delivered his annual address, reviewing the progress of scientific research, and exhibiting the advance made by the Academy the past year; also, calling the attention of the members to the present system of education, and offering suggestions for improvement in the prevailing methods of instruction.

Reports of the Director of the Museum and of the Curators, were read and accepted.

The Treasurer submitted his Annual Report, showing a balance on hand, from Dec. 31st, 1870, of $8.35: and amount received from members during the year 1871, $1,271.00, making a total of $1,279.35. The disbursements for the same period amount to $1,166.50, leaving a balance on hand, at this date, of $112.85. There are, however, outstanding liabilities, which amount to $125. 50, which will, when paid, leave us in debt for the year, in the sum of $12.65, to be met by unsettled monthly dues. On motion, the report was accepted and ordered filed.

The election of officers for the coming year being in proper order, the following gentlemen were elected:

PRESIDENT.

GEORGE DAVIDSON.

VICE PRESIDENT:
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C. N. ELLINWOOD.

On motion of Dr. Henry Gibbons, the thanks of the Academy were unanimously tendered to the retiring President for the diligence and fidelity with which he has performed his official duties.

Donation to the Museum: A valuable collection of mounted specimens of Lepidoptera was presented by Henry Edwards, Esq.

Regular Meeting, January 15th, 1872.

Vice-President in the Chair.

Twenty-five members present. On nomination of the Trustees, W. G. W. Harford and H. G. Bloomer were elected life members, in recognition of important services rendered to the Academy.

Donations to the Library: American Naturalist, Dec., 1872. Report of Lib. Company of Phila., Jan., 1872. The Eng. and Mining Jour., Nos. 25 and 26. Am. Jour. of Science and Art, Jan., 1872. Appeal for Restoration of the Strasbourg Library. Am. Chemist, Vol. II, No. 6. W. H. Dall on the Limpets, etc., of the West Coast of America, 1871. Sitz. ver. Kon. Ak. Wiss. Bay. zu Munchen. Bd. I and II; Abhandl. 1, 1870. Sitz. ber. Kais Ak. Wiss. lxi, Bd. II and III, 1870. Sitz. der. Nat. Ges. Isis, Oct.–Dec., Dresden, 1870. Mém. Imp. Acad. Sci. St. Petersburg, XVI, Sci. vii, Nos. 1–8. Verh. Batav. Gen. v. Kunst. en Wetens., XXX–XXXIII, Batavia, 1863–4–6–8. Abh. Her. Lenkenburgische Natf. Ges. Frankfort, 1870. Bericht. do., 1869–70. Abh. Nat. Ges. zu Halle, 1870–71, 2 Parts. Arachniden. Australiens. Koch. Nurnberg, 1871. Jarb. Kais. Kon. Geol. Reichsanstalt, Wien., 1870; Verhandl. do. Wien, 1870. Denkschr. v. Chr. E. H. v. Meyer, von C. E. Zittel, Munchen, 1870. Denkschr. Naturf. Verein zu Riga, 1870. Zur. Ges. Forsch. Phosphorite des. Mittel Russl., Riga, 1870. Tydsch. v. Ind. Taal Land und Volkenkunde, Batavia, 1864–8. Batavische Genootsch. Dl. I–VII. Zoöl. Garten, Frankfurt am Main, 1870, 12 Nos. Verhl. K. K. Zoöl.-bot. Ges. Wien., Bd. XX, Hft. i–iv. Zeitschr. Deutsch. Geol. Ges., Berlin, May, 1870–Jan. 1871, XXII Bd. Sver. Geol. Unders., 36–41. Bull. Soc. Imp. Nat. Moscow, 1870, Nos. 1–2. Of. Finsk. Vet. Soc. Förh., Helsingfors. XII, 1869

*According to the Constitution, the number of Trustees is seven; the President, Treasurer and Recording Secretary, being *ex-officio* Trustees.

–1870. Ov. Kong. Dansk. Vidensk. Selsk. Förh. Nachr. K. Ges. Wiss. d. Georg. Aug. Univ. Göttingen, 1870. Schrift. Ver. Verbr. Nat. Kenntn. Wien., 1868–70, 9th Bd. Corresp Naturf. Vereins zu Riga, 1870. Der. gegenart. Staude, des Seident. v. Dr. J. J. Rein, Frankfurt, 1868. Verh. Schweiz. Naturforch. Ges. Solothurn., 1870, Abh. herausg. Naturw. Verein zu Bremen, Bd. II, 1871. Die ausgest. u. aussterbend. Thiere der jungst. Eraperiode, Wien, 1870. Kurz. Ber. Ergebr. nein. Ausfl. ober Agram an den Plattensee. Kat. Biblio. Batav. Gen. Wetensch. und Kat. der Ethnol. afd. Mus. Genootschap. Batav., Batavia, 1870. Proc. Phil. Soc. Glasgow, VI, No. 4, VII, Nos. 1–2. Six Charts, Sveriges Geologiska undersoknung.

Dr. Hewston exhibited a forked limb of a mangrove tree, encrusted with a species of Ostræa, of large size, collected by his son at Magdalena Bay, Lower California.

Dr. Blake remarked, that he had recently noticed in a deep water-course back of the Mission Dolores, the trunks of large redwood trees (*Sequoia sempervirens*), buried to a depth of thirty feet below the surface.

Mr. C. D. Gibbes presented a communication upon meteorological observations which he had made in the Sierra Nevada in the winter of 1862–3. His locality was at Red Mountain, the commencement of the eastern summit range which incloses Lake Tahoe, and in latitude 38 deg. 42 min.; longitude, 119 deg. 56 min. It has an elevation of about 9,000 feet above the sea; but his observations were made about half way up the mountain. In August, 1861, he had discovered on this mountain upon the southeast face of rocks, bushes and large pines, numerous small blood-red patches, which looked as if from some wounded animal; but were found over an extent of twenty or thirty acres, and on the trees, as high as could be seen; they seemed as if driven and deposited by a storm from the southeast, but no specimens were obtained for examination and identification. At 8,000 or 9,000 feet, he frequently noticed the *Protococcus nivalis*, or "red snow."

The meteorological observations show that the thermometer did not fall below 8 deg. during the winter; that the southwest winds gave bad weather, with gales, snow and clouds; west and northwest winds, brought clear weather. The annexed table gives the characteristic features of the winter. There was no rain throughout the given six months; and there were forty-six clear days and nights out of ninety-nine. In November, when the weather was clear, the record notes the days as "clear and pleasant;" and in

December, as "clear, and no wind;" "clear and pleasant." January and February, were very variable.

Date.	Mean Temperature.			Max.	Min.	Days of snow.	Depth of snow. Feet.	Clear days and nights.
	Sunrise.	Noon.	Sunset.					
September, 1862	..	..	..	..	..	1	1.0	..
October "	..	..	..	..	..	3	3.0	..
from Nov. 19, "	31.0	44.6	36.1	48	26	0	..	8
December, "	24.4	31.3	27.7	48	8	5	1.9	17
January, 1863	21.7	26.9	25.0	38	10	12	7.1	13
to Feb. 25, "	19.8	25.4	22.5	38	12	11	6.0	8
Mean....	23.2	30.0	26.6		Totals	32	19.0	46

Dr. Stout moved that a committee of three be appointed to report on the exchanges of Publications of the Academy, especially those of foreign societies, giving a brief record from whom received, the titles of the same, and an abstract of the contents. The Chair appointed Dr. Stout, Dr. Ellinwood and Prof. Bolander to act as said Committee.

Dr. Hewston, Dr. Stout and Dr. Cooper were appointed by the Chair to serve as a Committee on Publication for the current year.

Regular Meeting, February 5th, 1872.

Vice-President in the Chair.

John O. Earl, C. M. Bates, M. D., Chas. A. Wetmore, Henry Carlton, O. D. Munson and I. Bluxome, M. D., were elected resident members.

The following amendment to the By-Laws of the Academy, as recommended by the Trustees, was adopted:

"The Officers of this Society are prohibited from incurring any indebtedness on behalf of this Society, unless authorized by the Board of Trustees, or by a vote of the Academy at a regular meeting."

Donations to the Museum: A specimen of sulphate of baryta and sulphate of lime, Dreelite, from the Redington quicksilver mine, Lake County, by Mr. Durand. Dr. Kellogg stated that the Colonial Museum, Wellington, New Zealand, had sent to the Academy a donation to its Museum, which was now on the way here; it consisted of the skins of birds, seeds of shrubs, etc. A curious crystallization of Oxide of Zinc, by Mr. Durand.

Donations to the Library: Volume V. of the U. S. Ex. of the 40th Parallel, under Clarence King, Geologist, on the Botany of said Exploration, presented by U. S. Engineer Department.

Report of the Board of Health of the State of California, 1870–71, from T. M. Logan, M.D., Secretary.

Mr. Hastings made some remarks in connection with his investigations of Davidson's improved retort for manufacturing gas from hydro-carbons; and also expressed the hope that the Academy would encourage inventors to exhibit and explain their inventions at our meetings.

Dr. Henry Gibbons and Drs. Kellogg and Cooper were, on motion, appointed a Committee to furnish suitable subjects for discussion at the meetings of the Academy.

Regular Meeting, February 19th, 1872.

Vice-President in the Chair.

Twenty-four members present.

Oliver Eldridge, William Alvord, Samuel M. Wilson, Ralph C. Harrison, F. W. Von Reynegom, George E. Gray and A. J. Chambers were elected resident members.

Prof. Rudolph Gottgetren, of Munich, Bavaria, was elected a corresponding member.

In behalf of the Committee on selecting subjects for discussion, Drs. Kellogg and Gibbons submitted their report, which was adopted.

Donations to the Museum: In behalf of Messrs. Nelson and Doble, of this city, Mr. Harford presented a sample of steel, being the first cast-steel manufactured in the State; it is somewhat imperfect, a portion of the iron being still visible. Quartz crystals, colored red by cinnabar, from Mr. Durand. A mat, or sack of *Macropiper methysticum*, from Mr. James Owens, by Dr. Kellogg.

In reference to the last-named gift to the Museum, Dr. Kellogg made the following remarks: "The plant here presented is a species of Pepperwort root from the Sandwich Islands, known among the natives as *Ava* or *Awa*: at his request, a specimen had been sent by Mr. Pond, from the said islands; but this sack was from one of the Navigator Islands — it is the *Macropiper methysticum*; the thick, woody and rugged rhizome only is used, chiefly for intoxicating and medicinal purposes; the root is mostly used by the islanders in the fresh state, macerated in water, or often fermented into a beer beverage. For the cure of venereal diseases and nameless ailments, they drink themselves drunk, when a copious perspiration ensues which lasts about three days, after which they are pronounced well. In tincture, it has a great reputation as a cure for chronic rheumatism and similar complaints; for the mucous membranes, especially in lower forms of inflammation, its action is like cubebs, and it is of the same family.

The natives too frequently contract habits of dissipation, and excessive indulgence begets a morbid desire most disastrous in its consequences, such as flushed face, bloodshot eyes, weak and trembling limbs, paralysis, etc.

It would be an interesting subject for the microscopist to examine the medullary rays of this root, and note its similarity to that of the Morning Glory: in ascertaining the qualities of a plant, a great deal is predicated on form; botanical qualities have a certain botanical form.

Dr. Henry Gibbons stated that this plant was mostly used in the form of an intoxicating drink. Navigators tell us that formerly much ceremony accompanied the drinking; the King took the first glass, after which, his subjects being informed by messengers, were at iberty to take their drink.

Donations to the Library: Die Pacific Geisenbahn in Nordamerika, von Robert von Schlagintweit; Californien Land und Feute, of the same author, by Dr. Stout. Dr. Stout mentioned the important points contained in the volumes presented by him, and noticed that the suggestions made by the author, in his remarks deprecating the reckless destruction of our forests, were worthy the attention of the State Legislative Committee on Forest-trees.

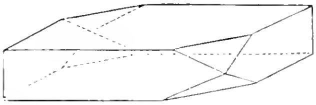
Dr. Stout, for the Committee on Foreign Publications, submitted a report in reference to the foreign correspondence of the Academy, and, on his motion, the thanks of the Academy were voted to the numerous foreign societies for publications received from them.

Dr. Stout read a translation of a portion of "L'Homme Tertiare," by M. L'Abbé Bourgeois.

Mr. Durand read the following, in reference to the specimen presented by him:

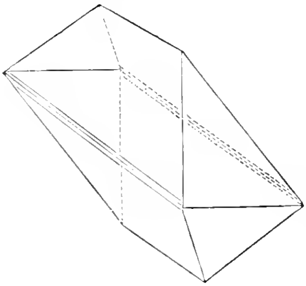
Note on Crystals of Quartz of a red color, by the interposition of Cinnabar.

These crystals are hollow, and present small crystals inside. They have the form of a short, orthogonal rhomboidal prism, having planes on the four obtuse



angles of the two bases; planes generally small but sometimes large, and thus changing the general prismatic form into the form of an octohedron. This form belongs to the orthorhombic system, entirely different from the crystalline system of the quartz.

Crystals of cinnabar are also found having exactly the same shape, but are not hollow like the quartz crystals. The crystalline form above described, is



not that of cinnabar; that crystal may be an example of dimorphous cinnabar, or a pseudo-morph of a third mineral, and very likely this mineral may be sulphate of baryta; which mineral has not yet been found pure in the California mines, but is quite common with cinnabar in the Spanish mines. This mineral has been found near the surface in the Redington quicksilver mine, in Lake County, California.

Dr. Blake offered the following resolution, which was unanimously adopted:

Resolved, That the Trustees of the California Academy of Sciences be requested, at their earliest convenience, to forward a petition to the Legislature, through the San Francisco delegation, praying for the continuance of the State Geological Survey as at present conducted.

Regular Meeting, March 4th, 1872.

Dr. Kellogg in the Chair.

Seventeen members present.

Donations to the Library: Am. Naturalist, Jan. and Feb., 1872. Am. Chemist, Jan. and Feb., 1872. Eleventh An. Rep. of Dept. Pub. Instruction, State of Kansas, 1871. Am. Jour. of Science and Art, Jan. and Feb., 1872. Am. Jour. of Microscopy, Jan. 1872. Monatsbericht der Königlich Preussischen Akad. der Wissenschaften, Berlin, Sept. and Oct., 1871. Report of the Geolog. Survey of New Hampshire, 1871. Bulletin Essex Inst., Aug., Sept. and Oct., 1871. Eng. and Mining Jour. Description of some new or little known species of Oaks, from North-west America, by Robert Brown.

Donations to the Museum: Specimen of Jasper, from a large vein of the same, near Murphy's Camp, Calaveras County, and a specimen of Tourmaline, presented by H. G. Hanks.

A letter announcing the death of M. Sebastian René LeNormand, of Lenaudiere, France, a corresponding member of the Academy, was read by the Secretary, and on motion, Mr. S. C. Hastings and Dr. Stout were appointed a Committee to prepare and transmit a suitable memorial in reply to the communication.

Communications were read from the President, and from Rear-Admiral Sands, of the U. S. Navy, suggesting the adoption of appropriate resolutions and a memorial to Congress by the Academy, relative to an appropriation of a sufficient amount of the public moneys for the purpose of making observations of the transit of Venus across the sun, in 1874. The Secretary stated that immediate action in connection with Congressional appropriations required a reply from the Trustees prior to a regular meeting of the Academy, and accordingly the Trustees had acted in the matter, in pursuance of the request contained in the letters referred to, and had forwarded a reply expressing the sentiments of the Academy. On motion, the Academy endorsed the action of the Trustees.

The concluding portion of the report of the Committee on Foreign Publications was read by the Secretary: also a translation by Dr. A. B. Stout, of a paper by G. V. Frauenfeld, K. V., (Vienna, 1870,) on the "Extinct and Perishing Animals of the Earliest Epochs."

Dr. Ellinwood read the following abstract from the Transactions of the Society of Natural Sciences of Neufchatel, 1869–70, on the principal discussions which occurred at the Archæological Congress at Copenhagen, 1869, pertaining to the shell mounds of Denmark:

M. Desor gives a brief resumé of the principal discussions which occurred at the Archæologic Congress at Copenhagen, in 1869.

He mentions the large and well-classified collections of antiquities in Denmark, where the entire population is interested in them.

It was in Denmark that the first classification of pre-historic antiquities was made, and the ages of stone, bronze and iron established.

At this meeting of savants there occurred an interesting discussion of the Kjökken-möddings, or shell-mounds, found here and there along the coast. These mounds consist of oyster-shells and other mollusks, bones of fishes, mammifera and aquatic birds. The deposits are ten to fifteen feet in thickness, and one hundred to two hundred feet in width. Utensils are found in these mounds, made of stone, of horn, of bone and of silex. Vases, too, of imperfectly baked clay; also coals and cinders. It is concluded that these mounds were made by the collection, at these places, of the products of fishing and hunting by the primitive inhabitants of that country, and during the age of stone.

There are no traces of cereals, nor fruits, nor agriculture of any kind, found in the mounds, and no traces of domestic animals—the dog excepted.

M. Desor completes his communication by an account of an excursion by the Society to the shell mounds at the head of the bay of Roeskild. Workmen had made trenches into the interior of these mounds, for their exploration.

Specimens of the shells there found were presented; bones, potteries, and silex also; these latter in the form of tools for opening and emptying the shells.

In the opinion of the Congress, the people who collected the products of their fishing and hunting at these feasting-places on the coast, now marked by the shell-mounds, furnished the stock for the present inhabitants of that country.

In continuation of the same subject, Mr. Stearns briefly alluded to his examination and researches, in the year 1869, of the mounds and shell heaps at Point Penallis, Tampa Bay, Florida, near the supposed landing-place of the expedition of De Soto.

These mounds are of two kinds; the mounds proper, being formed of earth, and used for burial and perhaps other purposes, and the others, formed of the shells of mollusks; the latter should, for the sake of distinction and propriety, be called shell-heaps; they are composed of irregularly-alternating, thick strata of shells, and thin strata of ashes; these alternations were owing to a periodicity between the visits of the Indians to the places where these heaps were formed, the selection of a site for a heap being dependent upon the abundance of mollusca of the species considered edible by the Indians, in the adjacent waters; and after the stock of food in the locality was exhausted, it would be left, and the party would remove to another. During the interim between these visits, vegetation, in the form of rank grasses and vines, which are of rapid growth in that country, soon covered the deserted spot; and in the course of several months or a few years, as the case might be, when the locality was again visited, the surface of the heap was burned over, and this being repeated, in the course of years the shell-heaps assumed the form and character in which we find them, and upon being cut through present the appearance of a more or less regular stratification.

The shells found in these heaps are of the same species as are now found living in the neighboring waters; they consist principally of the oysters (*Ostræa Virginica*), conchs (*Busycon perversum* and *Melongena corona*), scallops (*Pecten dislocatus*), and other less common forms.

In the earth or burial mounds, which are of more regular shape and of less size generally than the shell-heaps, were found human remains, which with the exception of the larger bones of the legs or arms, generally crumbled upon exposure to the air, though handled with extreme care. In the shell-heaps and near them, as well as in the burial or earth-mounds, were found fragments of pottery, arrow-heads of chalcedony, and other implements made of stone or shell. Near the Point Pinallis mounds, a remarkable vase made of Steatite, shaped somewhat like a common soup-tureen, had been obtained; through the kindness of Mr. Rothammer, this valuable specimen of aboriginal workmanship was obtained by me for the Smithsonian Institution, and is now in its collection; the material of which this vase is made was probably obtained at Apalachicola, near which place a deposit of soapstone exists; and the material of which the arrow-heads are made, was, without doubt, obtained at the elevated and now fossilized coral reef in Hillsborough Bay, known as Ballast Point, not far from the town of Tampa.

The great incentive to the invasion and conquest of Florida by DeSoto, was the reputed wealth of the country in gold and pearls; and fabulous accounts were given by the ancient narrators of the abundance of the latter in the possession of the natives or in the hands of the soldiers of that famous expedition. It is highly probable that but few of the rank and file of DeSoto's army were sufficiently familiar with pearls to know anything about them; and if true pearls were found by them in the possession of the Indians, the latter must have obtained them from the freshwater mussels of the rivers, (Unios); and as not one mussel in ten will yield a pearl, and not one pearl in ten will be as large as a pin's head, and not one in one hundred be of proper color, it is much more reasonable to suppose that the so-called pearls were the smooth glossy shells known as *Marginella conoidalis*, which species is quite abundant between tide-marks on the west coast of Florida, and of which a great quantity was found a few years ago in an ancient mound in the city of St. Louis, Missouri. This supposition is strengthened when it is considered how highly certain species of shells are esteemed as ornaments, or for use as money, by barbarous tribes in many parts of the world, even at this day, and the factitious value which is frequently attached to some species of shells by uncivilized man.*

*See article entitled "Shell Money," in American Naturalist, Vol. III, pp. 1-5.

Dr. Henry Gibbons read a translation from a recent medical journal, *The Oriental and Medical Gazette*, published in Constantinople, by the Imperial Society of Medicine, which contained an article on the mounds of Asia, Africa and Europe, by Dr. Ab-dul-lah Bey, in which the writer advanced the idea of the common origin of the mounds of said countries with those of this continent. Many of the mounds referred to by the writer contained arrow-heads and shells belonging to species not common on the old continent at the present time; hence, he deduced from these facts the common origin of the mounds of both hemispheres, and that they are to be attributed to the same race of people.

Dr. Kellogg remarked upon the subject of the similarity of the types of men, and expressed the opinion that it would eventually be admitted that these relics found in different parts of the world were the products of the same race.

Regular Meeting, March 18th, 1872.

Vice-President in the Chair.

Twenty-three members present.

H. H. Bigelow and W. M. Hughes were elected resident members, and Charles F. Davis, of Lima, Peru, a corresponding member.

Donations to the Museum: Six specimens of silver ores from the Tintic District and vicinity, Utah Territory, from Sam'l. Purdy, Esq., through Mr. C. D. Gibbes.

Dr. Blake read the following in reference to a branch of the great Japanese warm stream:

In the "Alaska Coast Pilot" Mr. Davidson has announced that the result of his own observations and of his studies of the different available authorities, has led him to the conclusion that a branch of the great Japanese warm stream was deflected from the northern edge of the main stream as it approached the coast of North America, westward of Queen Charlotte's Island, and thence swept along the coast of Alaska, following the general direction of the coast to the north-westward, westward, and finally to the south-westward, after leaving the region of Kadiak Island. Dr. Petermann, in a recent review of the subject, called attention to the need of other observations, and hopes that Prof. Davidson will publish all his authorities. But the latter has not had time to make out an abstract of his authorities and observations. On the recent trip of the U. S. Coast Survey schooner *Humboldt*, from San Francisco to Unalaska Island, he advised Mr. Dall, who had charge of the party, to make as many observations on the currents and temperature of the water as his opportunities would permit. This he has done, and in the report he writes to Mr. Davidson as follows: "I made careful observations for currents all the way, and the results are very interesting and appear to confirm, as far as they go, your theory of the currents of this region. That there is a broad (200 or 300 miles) warm current setting to the westward, south-east from the Unimak pass, south of the [Aleutian] Islands, there can be no doubt." Short as this announcement is, it has a very important bearing upon the course of the great ocean current of the North Pacific; and, practically, it bears upon the great circle route between our northern coast ports and Japan.

Dr. Stout read a copy of a memorial which had been presented to the State and National Legislatures in reference to the cultivation of the Cinchona tree, asking for a suitable selection for and the dedication of a portion of the public domain for the purposes of botanical gardens and sanitariums, to be located on the public lands which were about to be donated by the National Government to this State.

On motion of Dr. Stout, it was voted that the Academy, through its officers, should recommend and urge the passage of the bill now before the State Legislature, in such a manner as should best promote the objects thereof, and aid in its final adoption.

Regular Meeting, April 1st, 1872.

Vice-President in the Chair.

Ten members present.

Thomas P. Madden was elected a life member; John Williamson, William H. Knight, Eugene E. Dewey and Albert S. Evans, were elected resident members, and E. S. Purdy, of Cairo, Egypt, a corresponding member.

Donations to the Museum: A specimen of a new mineral from the New Almaden Mine, (*Aragotite*) by Mr. Durand. A section of a species of Cactus, from the desert southeast of San Bernardino, by Dr. Henry Gibbons, who remarked, that from experiments made in the Eastern States, it had proved to be a material of superior quality for the manufacture of paper.

Description of a New Mineral from the New Almaden Mine.

BY F. E. DURAND.

This mineral, of a very bright, pure, yellow color, is found impregnating a crystalline siliceous dolomite; it can be very easily separated from the dolomite by sublimation. In warming in a glass tube a small amount of the substance, it volatilizes when dark red, and gives a strong, yellow sublimate that appears amorphous, but which, when under the microscope, shows some very fine needle-like crystals.

If heated very quickly, it carbonizes and gives a residue of carbon, and produces an empyreumatic odor. Strong acids have no action upon it.

When tested for sulphur or arsenic, it does not appear to contain any trace of these substances; nor any metal.

This mineral seems to be a kind of volatile hydro-carbon, probably belonging to the class of Idrialine.

When treated by the ordinary solvents of carburetted compounds—oil of turpentine, alcohol, or ether—it appears to be entirely insoluble.

On some specimens of cinnabar from the Redington mine, the same substance is found in small scales. In fact, all the characters show that this mineral is a new substance, and for it, I have adopted the name of Aragotite.

Remarks were made by Dr. Henry Gibbons, in reference to Ozone, and by Dr. Blake, in connection with experiments made by him some time ago to ascertain the proportion thereof in the atmosphere.

A letter was read from Admiral B. F. Sands, in reply to a communication of the Academy, in reference to governmental action in the matter of the observation of the transit of Venus, etc. (See Meeting of March 4th, *ante*.)

Regular Meeting, April 15th, 1872.

Vice-President in the Chair.

Twenty-four members present.

James S. Hutchinson and William S. Watson were elected resident members.

Donations to the Museum: Skin of an albatross and head of a wild-cat, by John Williamson. Specimens of Metacinnabarite, by Henry Carlton.

Prof. Whitney made some remarks on a mass of meteoric iron, which is in the possession of Mr. Cronise, the weight of which is about ninety pounds. He explained on the map the region where these meteorites have been found, showing them to occur in a line from Mexico to Oregon; specimens of meteoric iron of gigantic size had been reported from Port Orford, but recent search by the U. S. Coast Survey had failed to reveal any in that locality.

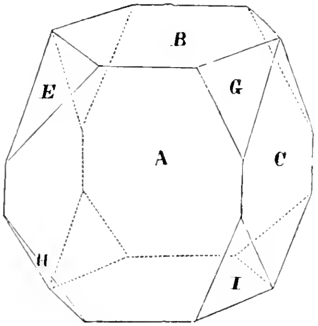
Mr. Durand presented the following paper:

Notes on the Crystallization of Metacinnabarite.

BY F. E. DURAND.

The specimens of Metacinnabarite, formerly found, were too imperfect to allow any determination of the crystalline form; but lately some very good specimens have been received, and it is now possible to determine their form.

Fig. 1.

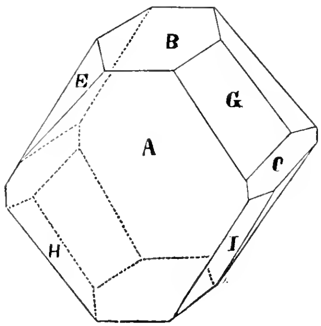


Figs. 1 and 2 show the form of the crystal—although the new specimens contain remarkable crystals. The study of this mineral is difficult; the large crystals being an agglomeration of smaller ones.

But the consideration of Fig. 2 shows that this mineral crystallizes in the orthorhombic system.

The planes A, B, C, are the primary planes of the rectangular prism, and E, G, H, I, eight modifying planes irregularly placed on the eight triedral angles of the prism, the equation of the modifying planes will be, a : mb : nc.

Fig. 2.



From this modification results a body of fourteen planes.

When the modifying planes, E, G, H, I, assume greater importance, the crystal has the appearance of fig. 2.

The consideration of these two different forms, which can be explained easily by a simple modification, is a very strong presumption that this curious mineral belongs to the orthorhombic system. I regret that I had no instrument to measure the angles, and add some precise measurements to the present description.

Dr. Stout, of Committee on Foreign Exchanges, made a report of progress in the translation and review of foreign publications.

Dr. Gibbons made some remarks on the recent movements of the barometer.

Regular Meeting, May 6th, 1872.

Dr. James Blake in the Chair.

Twenty members present.

Richard J. Bush was elected a resident member.

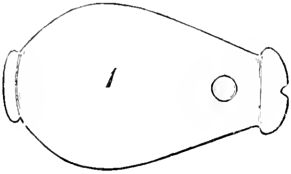
Donations to the Library: Smithsonian Reports, 2 vols., 1869 and 1870. Engineering and Mining Journal. Proceedings of Acad. Nat. Sciences of Philadelphia, Jan., Feb., March and April, 1872. Proceedings of the Boston Society of Nat. Hist. Proceedings of the Royal Geographical Society of London. Canadian Naturalist. Monatsberich der Koniglich. Preuss. Akad. der Weissenschaften zu Berlin. Am. Jour. of Arts and Sci., April, 1872. Am. Naturalist, April, 1872. Bulletin of Essex Institute. Am. Chemist. Effemiridi della Societa de Letture e Conversazioni Scientifiche. A description of the genus Protostega. On the Reconstitution of the Municipal Lib. of Strasburg. Bulletin de la Société Malacologique de Belgique.

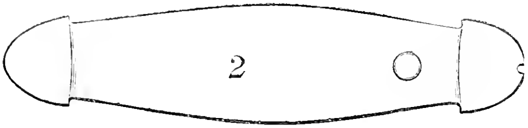
Dr. Blake exhibited several Indian relics found in the mountains of the Coast Range, 1730 feet above the level of the sea, in stratified rocks, and expressed the opinion that they were imbedded in the rocks when the latter were below the surface of the ocean.

On some recently discovered Aboriginal Implements.

BY JAMES BLAKE, M. D.

As the evidences are multiplying of man's presence on the earth at periods far anterior to the time that has usually been allotted to him, every well-authenticated fact bearing on this subject becomes of importance, as tending to afford that cumulative mass of evidence which will be necessary to dissipate the misconceptions that generally prevail on this point. There can be no doubt but that, up to the present time, the earliest traces of man's existence on the earth have been found in this country. The skull that was found in the Pliocene deposits at Table Mountain is undoubtedly the oldest human skull that has yet been discovered. But besides this, many stone mortars have been found in the same deposits, evidently showing the existence of man at this early period of animal development. I myself have seen the spot from which one of these mortars was removed, some ten feet beneath the surface of the Pliocene gravels in the Sierras, and some hundred feet above the level of the Sacramento Valley. The objects I now have to submit to the Academy afford still further important evidence bearing on this fact. They are two implements cut in serpentine, evidently fashioned by the hand of man, or of some animal capable of using its anterior extremities so as to fashion objects to meet its wants, and apparently possessed of sufficient intelligence to make nets, or to use lines for catching fish, as this would seem to be the use to which these stone implements were applied—viz: as sinkers. The instruments are cut in serpentine, the surface of which is slightly weathered to a depth of about 1-30th of an





inch. One, (Fig. 1) is pear-shaped, 3¼ inches long, 5½ inches in circumference at its largest part; near the smaller end is a hole, and immediately over it is a notch passing across the end of the instrument. The other instrument (Fig. 2) is cylindrical, thicker in the middle than at the ends; the length is 5½ inches and the circumference. in the middle, 3¾ inches; there is a hole through one end of it about an inch from the end, and above the hole is a notch, passing across the end. They are carved quite true. The ground in which they were buried formed part of a rolling hill within a few feet of the summit of the Coast Range of mountains, and at an elevation of about 1730 feet above the sea. They were buried about eight feet from the surface, four feet being alluvial soil and the other four feet being argillaceous shales, evidently undisturbed. These and four other instruments were found within the space of about two square feet. At the time they were found, the side of the hill was being cut away so as to make a milk house. A great deal of alluvial soil had been previously removed when leveling the ground for the house, but no instruments had been found until the shales were dug into—precluding the possibility of their having fallen into a crack in the rock. A microscopical examination of the dirt that was still found adhering in the holes in the instruments, showed that it was the same as that of which the shales were made up. In company with Prof. Whitney, I visited the locality where they were found, and we saw not the slightest doubt but that the instruments were taken out at the place indicated. As to the geological age of the rock in which they were imbedded, it is to a certain extent undetermined; Prof. Whitney is of the opinion that it is cretaceous, but it certainly cannot be later than the older Pliocene. However, further investigations, which will determine this point, will be undertaken on the return of Prof. Whitney from Inyo County. Should the rock prove to be cretaceous, these remains would certainly afford the oldest traces of the existence of some carving animal on the earth. In my recent scientific serials, I find the announcement of the discovery of what is believed to be signs of man, in some bored sharks' teeth, from the Suffolk Crag, the representative of the older Pliocene in England.

The death of F. L. A. Pioche, a life member, and benefactor of the Academy, was announced, and on motion, a committee, consisting of Dr. J. Fourgeaud, Dr. Henry Gibbons and O. Livermore, were appointed to draft appropriate resolutions, expressive of the sentiment of the Academy, and submit the same at a subsequent meeting.

Regular Meeting, May 20th, 1872.

Vice-President in the Chair.

Nineteen members present.

Donations to the Museum: Stalactites and stalagmites from the cave of Kilauea. Lava, pumice, sulphur and sulphur crystals, gypsum, scoria and other specimens from the Sandwich Islands, from J. S. Christie, U. S. Consul, by I. W. Raymond.

A letter was received from Prof. C. G. Ehrenberg, returning thanks for his election to an Honorary membership in this Academy.

Dr. Blake read the following paper:

On the Absence of a Rim to the Great Basin to the North of the Pueblo Butte.

BY JAMES BLAKE, M.D.

Having been engaged in investigating the geology of the Pueblo range of mountains, last summer, I was struck with the absence of anything like a rim to the Great Basin in this direction. In going north from the Humboldt river near Mill City, the highest elevation we crossed before reaching the Pueblo Mountains did not exceed 300 feet; and the divide between the waters of the Queen's river and King's river is, I believe, still lower—probably not more than 150 feet. To the north of Pueblo Butte, nothing but some low ranges intervene between that point and the head waters of the Owyhee, a tributary of the Columbia; so that there can be no doubt but that the waters of the Great Basin must have drained off, to a great extent, in this direction, through the valley of the Columbia. A considerable residue, however, must have disappeared by evaporation, as on my journey out, I found a mass of granite, about 100 feet above the level of the plain between Battle Creek and Mill City, still partially encased by a calcareous deposit that must have been formed as the waters evaporated. I believe the lowest level of country will be found between the Umshaw and Rattlesnake range of mountains: although, as already stated, the divide I crossed between the Rattlesnake and Vicksburg mountains did not exceed 300 feet in height.

Mr. Henry Carleton, a member, submitted to the Academy a description and drawing of a double fluid barometer, invented by him. "It is quite simple; consisting of a barometer tube of large internal diameter of the usual length filled with mercury, and plunged into a cistern partially filled with mercury, and having no communication with the external air, except through a smaller tube which enters through the top of the cistern. This smaller tube has a diameter only the one-twenty-fourth that of the barometer tube. The cistern, above the level of the mercury and the lower third of the small tube, are filled with a light non-volatile fluid, such as glycerine, which has been found to answer very well. When the mercury in the larger tube falls one inch, the glycerine would be forced up the smaller tube, if the column of glycerine did not partly compensate for the loss of atmospheric pressure. In my experiment, the mercurial column fell only half an inch, instead of one inch, and the corresponding rise in the glycerine column was twelve inches. To read off the rise and fall, I compared its readings with a standard mercurial barometer, and graduated the inches on a very large scale on the small tube. The instrument which I constructed last May was very sensitive, and exhibited changes of the one-two-hundredth of an inch very clearly, both for weather, and in ascending and descending a flight of stairs."

Dr. Blake made some remarks in reference to the geology of a portion of Napa county, recently visited by him, stating that he had discovered another petrified forest at a much greater elevation than the one previously known; the trunks of some of the trees measuring one hundred and fifteen feet in length; the forest which he had visited was in a northwesterly direction from the other; the surface for about one hundred and fifty yards square, is covered with petrified wood.

Dr. Henry Gibbons remarked that several eminent scientists had stated that there was an excessive amount of cerebral disease prevalent, and desired to know whether the electric condition of the atmosphere might not have some relation thereto.

Regular Meeting, (deferred to) June 5th, 1872.

President in the Chair.

Forty members present.

Donations to the Library: Description of a gigantic Amphibian, by G. Krefft, presented by Thomas Davidson. Eng. and Mining Jour. R. Comitato Geologico D'Italia, Nos. 5 and 6, 1872. Contributions to the Icthyology of the Lesser Antilles. Am. Chemist. Monatsbericht der Konigtichen Preus. Akad. der Wessenchaften zu Berlin. Overland Monthly. Ann. Report Trustees Mus. Comp. Zoology of Cambridge, Mass. The Horticulturist, Vol. I, No. 6. De l'emploi de l'Eau en Chirurgie, par Dr. Alphonse Amussat, Fils; Traitement du Cancer du col de l'Uterus par le Galvano, Caustique, Thermique; and several other papers, (13 pamphlets, 8vo.) by the same author.

Donation to the Museum: Specimen of the bark of the *Dirca palustris*, by Dr. Kellogg.

Dr. Fourgeaud, of committee in the matter of the decease of our late member, Mr. Pioche, submitted the following resolutions:

Resolved, That in the death of our associate, F. L. A. Pioche, the California Academy of Sciences has lost one of its most valuable members, as distinguished for his love of the Arts and Sciences, as for his wide-spread liberality. That, while deploring his loss with heartfelt pain, we will ever cherish his memory, and the recollection of the many noble qualities which endeared him to us during life.

Resolved, That we tender our sincere sympathies to his brother, Leopold Pioche, residing in France; that these resolutions be placed in our records, and that a copy of them be sent to the family of our deceased friend.

A life-like medallion in plaster of the deceased, executed by the sculptor, P. Mezzara, was presented to the Academy by that gentleman, and the thanks of the Academy were unanimously tendered him for his very acceptable present.

Dr. Kellogg presented specimens of the bark of a shrub of the strongest fibre of any hitherto known—obtained in this vicinity by tons, and in the valley of the Mississippi by millions of tons; the bark presented was in the crude condition as it came from the ramie machine. The entire shrub, wood and bark, is suitable to work into the finest quality of paper. If desirable to separate the bark, it is done in the easiest manner possible—by making a circular section at the base and lifting the bark so as to seize it, the whole tree to the very tips can be instantly stripped.

On the State University grounds may be seen a tree, four and a half to five inches in diameter; the fibre mixed with silks and satins is equal, if not far superior to ramie: whether it can be cultivated as well, is left to future experiment. Even as crude, coarse fabric, it may prove a substitute for jute, of which a large quantity is annually imported into the Southern States for baling cotton.

The tree is familiar to us as moose-wood, leather-wood, etc., (*Dirca palustris*) but has not hitherto, as we are aware, been brought forward as proper paper or fabric material.

Description of a New Species of Mangelia, from California.

BY ROBERT E. C. STEARNS.

Mangelia interlirata, Stearns. Shell of a dark reddish brown, small, solid, slender, fusiform; whorls, eight, prominently sculptured with 8-10 strong longitudinal and 10-12 thread-like revolving ribs, the latter of a darker shade and meeting, but not crossing the former: aperture linear, less than half the length of the shell; outer lip simple, somewhat thickened, externally and posteriorly, slightly notched; number of specimens, four, of which two are measurably perfect. The dimensions of the largest is

Long. ·27; Lat. ·09 inch.

Habitat, Monterey, California, where the above specimens were found dead on the beach by Mr. Harford and myself.

A larger and more perfect specimen than either of the four above mentioned, also from Monterey, was given by me to Dr. Cooper, in 1865, for the State Museum, but does not appear to have been described by him. I think that the same form, which is quite rare, has been detected at San Diego by Mr. Hemphill, but am not positive. It is with some diffidence that I place it in *Mangelia*, although it seems to accord exceedingly well with the typical figure *M. striolata*, of Schacchi. (Vide Adams's Gen. pl. 10, fig. 10*a*.)

M. Octave Pavy was introduced by Dr. A. B. Stout, who presented the introductory letter from the American Geographical Society, of New York.

The President invited him to present his views of the polar regions, and the means by which he proposed to reach the pole. To aid the explanation, a large chart of the whole polar region had been prepared.

M. Pavy gave a succinct account of the different attempts to reach the pole in the search for a northwest passage. The routes for these undertakings had nearly all been to the east of the American continent; but he was about entering a passage hitherto untried. He announced his belief in an open polar basin existing throughout the year; that this basin was surrounded by a belt of ice, which was the real and hitherto unconquered difficulty to progress; and that he proposed to penetrate this belt by discovering a channel traversed by a warm current from the south. Of the six entrances to the polar basin, those lying between America and Europe were impracticable; because, beyond certain latitudes powerful currents were encountered, sweeping down from the north and bringing great drifts of ice through which a ship could not penetrate. But that through Behring strait a warm current flowed to the north, and a clean passage through the ice-belt to the open polar sea. M. Pavy brought forward numerous illustrations and reports of previous navigators to prove the existence of this open polar sea beyond the belt of ice surrounding it, and maintained that the Gulf stream sank, at a certain latitude, where it met the ice-bearing current from the north, and reappeared on reaching the polar basin; having retained its heat and become of less specific gravity than the water around the basin. M. Pavy then traced on the chart the course he intended to pursue. After passing Behring strait, he would take a direction northwest, reaching Wrangell land, north of the coast of Siberia. This land he believed to be a continent, stretching toward the pole as high as latitude 80 deg. or 81 deg., and thence far to the eastward; on the northern shores of this land he expected to find a much milder climate. The branch of the great Japan warm stream that flows through Behring strait, and thence changed its course to the northwestward and swept around the Wrangell continent, whirling eastward into the polar basin, where it met the waters of the Gulf stream, and overcoming them, swept through the channels into Baffin's Bay, and through the channels east and west of Spitzbergen, and along the shores of Nova Zembla.

He claimed that the woods of Siberia were carried by this stream to the northern shores of the above islands; and that woods of Kamschatka, and even from Japan, had been borne by it and discovered on Spitzbergen and the western shore of Greenland. He claimed that the Bowhead whale sought the open polar sea for its warmer waters and breeding grounds. In his undertaking he proposed to reach Wrangell land by the first of September; from that time until May, 1873, he would cross Wrangell land, northward, by dogs and sledges, to about latitude 80 deg. or 81 deg.; thence to the edge of the ice-belt, and there leaving his dogs and sledges, launch his india-rubber raft and steer for the pole: that reached, he would return south by way of Smith's sound.

Prof. Davidson combatted his views of an open polar sea and a polar continent; contended that the current of Behring strait was not deflected to the westward, as was claimed by M. Pavy, and that from its small volume, as measured by its velocity and cross-section through Behring strait, it was not capable of clearing a channel through the ice of the polar region. The experience of explorers and whalers, was all in favor of the impenetrability of this body of ice. He compared the volumes of the Gulf stream and the Behring strait stream entering the polar basin, and showed that the highest latitude reached, north of Behring strait, was nearly seven degrees lower than by the Spitzbergen and Smith's Sound routes. He denied the finding of Japan or Kamsckatka woods on Spitzbergen, or on Greenland; and quoted Wrangell to show the direction of the current of the polar waters along the eastern Siberian coast. The Russian American Company and American whalers prove the direction of the current through Behring strait, and he quoted McClintock showing the existence of woods on the western shores of Prince Patrick Island and Bank's Land, to disprove the existence of a Wrangell continent to the westward of the latter Islands.

Prof. Davidson said the current charts of the North Pacific Ocean, of recent authorities, were very erroneous, and that his report of 1867, upon the Japan current and its branches, has been verified this year, in part, by the observations of W. H. Dall, Acting Assistant of the U. S. Coast Survey. He also said that Plover island, discovered by Kellett to the southwestward of Herald island, was in reality the eastern point of Wrangell land; the space between this low conical point and the high mountains of Kellett to the westward, was occupied by a low, flat region, covered with grass in August and September, 1867.

Although M. Pavy actually produced no authorities for many of his statements, he would not accept some of the authorities named by Prof. Davidson, who promised to produce them at the next meeting.

The following paper was read:

On the Depression of the Colorado Basin.

BY GEORGE E. GRAY, CHIEF ENGINEER SOUTHERN PACIFIC RAILROAD.

Lieutenant R. S. Williamson, in his report on explorations for a route for the Pacific Railroad, refers to a line from San Gorgonio Pass to the San Diego and Fort Yuma wagon road. He says: "It was evident the surface was below the level of the sea, and that they were traveling in the bed of what was once either a lake or the head of the Gulf of California. A distinct water-line was visible on the rocks, and the barometer indicated a depression below the sea-level of nearly 100 feet. It is highly probable that further from the base of the mountains, the depression would have been greater."

E. A. Phelps, assistant engineer, under my directions, has just completed a survey of a route for the branch line of the Southern Pacific Railroad, *via* San Gorgonio Pass, to Fort Yuma. Mr. Phelps followed along the east side of the valley, while Lieutenant (now Colonel) Williamson's route lay upon the west side. Mr. Phelps's line, on leaving the summit of the Gorgonio Pass, descended with easy grades a distance of about 65 miles, where we reach tide-water level; then descending gradually for 24 6-10 miles, to a point on the stage road opposite Dry Lake, where we reach the lowest point but one on the line, being 203 feet below tide; then with an undulating grade to Salt Creek about six miles, the lowest point in the line, being 215 feet below sea level; then gradually ascending for about 20 miles, where we rise to the sea level.

The total length of line below sea level is 50 6-10 miles. The bed of Dry Lake, opposite the stage road, is at least, by estimate, 100 feet lower than any point on our line.

There is a distinct water line on the eastern slope of the mountains, coinciding with the present sea level, as far as the eye can see, in a southerly direction. This water line or ancient shore line is still more plainly visible on the mountains bordering the western side of the basin.

The Chowilla valley, lying within this basin and traversed by our line, is covered with vegetation, such as sage-brush and arrow-weed; also mesquite trees, which grow from 10 to 30 feet high, and 15 inches in diameter. Water can be found in this valley by digging from 6 to 10 feet, numerous wells which now furnish water having been excavated by the Indians.

Lieutenant Williamson's report of the west side of the basin and our result down the east side, prove conclusively that a large area of the Colorado basin is below the sea level, sloping gently from the mountains on its border towards the centre, where it reaches a depression assumed to be at least 300 feet below the level of the sea.

Lieutenant Williamson's elevations were obtained from barometrical observations, while ours were by leveling from the tide waters of San Francisco Bay.

The elevation of the Colorado river at the crossing at Fort Yuma, was found to be about 117 feet above tide, which coincides nearly with Lieutenant Williamson's barometrical observations.

Mr. Stearns remarked the great abundance of several species of fresh-water shells, such as *Amnicola longinqua*, *Tryonia protea* and *T. clathrata*, *Physa humerosa*, and *Planorbis ammon*; also *Anodonta* (sp.), which are found in a semi-fossil state, in windrows, within the region referred to by Mr. Gray and Col. Williamson; and which species quite likely may still be found living, in some portion of that country as yet unexplored. The presence of these fossil shells indicates that the basin of the Colorado was at one time an extensive fresh-water lake.

Regular Meeting, June 17th, 1872.

President in the Chair.

Twenty-two members present.

Dr. J. B. Pigné-Dupuytren was elected a resident member.

Donations to the Library: Am. Jour. of Conchology, Vol. VII, Part iv. Documents and Charts of U. S. Signal Office. Eng. and Mining Jour. Am. Naturalist, May and June. Monatsbericht der Koniglic. Preuss. Akad. der Wissenschaften zu Berlin. Rectification of Conrad's Synopsis of the Naiads of North America, by Dr. Isaac Lea.

Dr. Hewston exhibited specimens of the leaf and fibre of the *Agave americana*, from Arizona.

Mr. Stearns announced the death of the following scientific men:

Edmund Ravenel, of Charleston, S. C.; Robert Swift, of Philadelphia, who died at St. Thomas, W. I.; Dr. Hubbard, of Long Island, N. Y., and Dr. William Stimpson, of Chicago, who died at Ilchester, Md. In referring to the death of the latter, Mr. Stearns made the following

Remarks on the Death of Dr. William Stimpson.

BY ROBERT E. C. STEARNS.

Mr. President:—It devolves upon me to impart to the Academy the sad news of the death of my esteemed friend, Dr. William Stimpson, late Director of the Chicago Academy of Sciences, and successor to the late Robert Kennicott as scientific head of that institution. Dr. Stimpson was also a corresponding member of this society, as well as many of the principal scientific associations in this country and Europe; and both at home and abroad he was recognized as a most thorough investigator in his department of study, and everywhere his scientific services are appreciated and his loss will be deplored.

From boyhood, it may be said, even to the hour of his death, he was a diligent and enthusiastic worker in the enchanting domain of Natural History; first studying with Agassiz soon after the latter settled at Cambridge; at one time shipping as one of the crew on a fishing smack, that he might the better pursue his investigations upon the easterly margin of this continent, especially along the shores of New England. His researches include the entire coast, from Nova Scotia to Key West.

In 1851 he published the "Shells of New England," with notes on their structure, as well as valuable geographical and bathymetrical data; in 1854 appeared his "Synopsis of the Marine Invertebra of Grand Manan, or the region about the Bay of Fundy, New Brunswick;" and numerous contributions were made by him to various scientific journals up to the time of his appointment as zoölogist to the United States Surveying Expedition of the North Pacific and Japan Seas, under Commanders Ringgold and Rodgers; (of the results of which expedition a part only has been published, relating principally to Molluscan and Crustacean forms): subsequently his "Review of the Northern Buccinums," Check-list of the Shells of the East Coast of North America from the "Arctic Seas to Georgia," "On the Structural characters of the so-called Melanians of North America," and "Researches upon the Hydrobiinæ and allied Forms," besides other contributions of more or less importance which have appeared from time to time.

His MSS. relating to the invertebrates of the North Pacific Exploring Expedition, illustrated by numerous drawings, the labor of years, and ready for publication, were all destroyed by the great fire which devastated Chicago, and consumed the building and collections of the Academy of Sciences of that city. Of this terrible conflagration and its result to him, Dr. Stimpson wrote, "My own books, collections, MSS. and drawings—twenty years' work—all gone!"

His health, which for some years had been declining, induced him of late to seek, in winter, the milder climate of Florida; and it was upon the eve of one of these winter expeditions to that State, (in January to March, 1869,) that I had the pleasure of joining and afterward working with him in the field; and of learning, by personal contact, his worth and scientific ability, and his modest estimate of himself.

I shall never forget the delightful season passed in his company, the pleasant toils of each day, and the rehearsal of each day's triumphs in the evening, as we sat in front of the blazing fire of pitch-pine, which lighted up his face with a glow less genial than the smile which played round his lips; or when some joke more pungent than usual was uttered, the explosion of laughter which followed, and which was joined in by none more heartily than himself.

"No hidden snare was in his speech,
Nor malice in his sunny smile."

The destruction of the Chicago Academy's building and its contents, involved the loss not only of its own collections, but also much and very valuable material belonging to other institutions, which had been sent to Dr. Stimpson to work up. After the disaster and consequent suspension of labor in connection with said Academy, he at once took the field, though in infirm health, in the endeavor to restore, as far as possible, by new collections, the losses which had occurred.

One result of that awful fire, and the most disastrous of all to science, was the shock which it gave to our friend, whose constitution, already enfeebled, was but poorly prepared for such a blow. In a letter received by me from a mutual friend in Washington, dated December 20th, 1871, he writes: "Stimpson has paid us a call; we have fitted him out, and he has gone to Florida and the West Indies; his health is very bad, he could scarcely look worse and be alive; it is feared he will never regain his health — his severe affliction and great loss by the Chicago fire has too much changed the once energetic Stimpson for him to ever recover, I fear."

In a letter received by me from him, dated September 13th, 1871, (before the fire) he says: "I have a constant cough and difficulty of breathing, with occasional hemorrhage." In his last letter to me, and probably one of the last he ever penned, he said, writing from Key West, April 19th, 1872: "I have been dredging in Coast Survey steamers here and to the westward all winter, but have not got as much as I expected, on account of continued bad weather. * * * * My health is very poor — lungs badly filled up with tubercles, etc., and have frequent hemorrhages—cannot do anything requiring any physical exertion without great distress."

But, fellow members, I will not further extend my remarks in reference to the deceased, or enlarge upon his personal merits or scientific ability and services.

From what I have said, you will perceive how bravely he worked in the good cause, even in the hour of adversity; with what determination he again went forth to labor, though burdened with disease.

This solemn event, though foreseen, still found us unprepared; and now that it is passed, we learn that anticipation cannot shield us from the pain of separation. As we approach his grave, we think not less of his high intellectual attainments and scientific ability, we think more highly of the friendship we enjoyed, of the friend that is gone. Never again, save in memory, shall we feel the pressure of his hand, or hear his cheerful voice.

Farewell, dear friend, brave toiler in the glorious cause; we who knew you and loved you will never forget you; in our hearts your memory will ever be green!

If he who makes two blades of grass to grow where but one grew before, is a public benefactor—so was he whose death we lament; for his life was a continued effort to increase the sum of human knowledge.

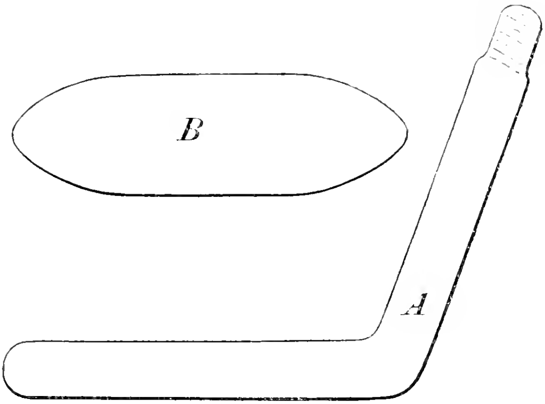
The following resolutions, offered by Mr. Stearns, were on motion adopted:

Resolved, That the California Academy of Sciences has learned with the deepest regret of the death of Dr. William Stimpson, and deplore the loss of one whose labors in the service of science entitle him to the grateful remembrance of his fellow men.

Resolved, That we extend our heartfelt sympathy to the family and friends of the deceased.

Resolved, That a copy of these Resolutions be forwarded to the family of the deceased, and to the Chicago Academy of Sciences, of which he was a prominent officer.

Prof. Davidson exhibited a specimen of the Boomerang, formerly used by the Indians in the vicinity of Los Angeles. These articles are very rare, and are in fact not known to most of the Indians themselves; in his intercourse of twenty-two years with the aborigines on the Pacific coast of the United States, he had not heard of the boomerang. This specimen was procured from the natives by Mr. Samuel Shrewsbury, of Santiago Cañon, 25 miles from Anaheim. They exhibited its powers by throwing it, skimming the surface of the ground more than 100 yards and then rising 50 or 60 feet in the air; but they could not make it return, and in fact had never supposed it possible. They had another kind, but so far he had not been able to find a specimen among their people.



This is made of a hard wood, of close texture, and the elbow is the natural bend of the branch; its weight is 15 ounces, length 30 inches, width 2 inches, and thickness a little over half an inch. The accompanying sketch, A, exhibits the boomerang on a reduced scale, and B exhibits a cross-section, natural size.

Prof. Davidson stated that a communication relative to the disappearance and diminution of magnitude of some of the stars in the constellation of the Lion, had appeared in the San Francisco journals, but on examination he found the stars in their usual places, and of their usual magnitude.

The President stated that he had called upon M. Pavy to renew the discussion of the questions brought forward at the last meeting, relative to the currents within the polar basin, and especially with regard to the authorities. He had not been able to meet him, but would nevertheless lay the results of his researches before them. The circulation in the polar basin was indicated by the position of the ingress and egress of warm waters, and their volumes; by the observations of explorers; by the position and species of drift-wood; and by the limits of animal life and human habitations. Authorities were brought forward to illustrate and sustain his previous positions, and especially to disprove the existence of a Wrangell continent, by the deposits of wood on the western shores of Bank's Land and Prince Patrick Island; "There was far more drift-wood on the north-west coast of Prince Patrick Island than anywhere else on the polar coasts of the entire Parry archipelago." These deposits had been particularly denied by M. Pavy. The route to the pole from the Siberian region was not new, but first proposed in 1810.

An analogy was drawn between the polar regions of Mars and those of the Earth, to show the persistence of ice and snow at the poles.

Prof. Davidson explained the method which he had adopted, whilst making experiments for the Government at the U. S. Branch Mint at San Francisco, for determining the difference of two weights of supposed equal weight, by the system of "cross-weighing"; and by the same operation determining the statical moment of the arms of the beam. The statical moment, he designated as the length-weight of the arms, with their adjuncts of pans, etc.

The variable flexure of a beam renders untrustworthy any experiments by cross-weighing; but the method is available where the beam is rigid, and not liable to irregular derangements. As is well known, the method of cross-weighing consists in placing two supposed equal weights in the pans of an adjusted beam, and establishing their equilibrium by adding fractional weights to the apparently lighter one. The weights are then interchanged, and the beam again brought into equilibrium, as before. The difference of the two weights was then assumed approximately, from the relation of the additional fractions to either pan.

Prof. Davidson solved the conditions algebraically, and gave the following example of the method; wherein L represents the column of observations noted in the left pan, and R, those of the right pan; l, the length-weight of the left arm, pan, etc.; r, the length-weight of the right arm, pan, etc.; 100^a, 100^b, the two weights supposed to be equal; 1.08, 1.36, etc., the fractional additions in grains to establish equilibrium.

	L.		R.
(1)	$l+100^a+1.08$	$=$	$r+100^b$
(2)	$l+100^b$	$=$	$r+100^a+1.36$
(1) — (2):	$100^a+1.08-100^b$	$=$	$100^b-100^a-1.36$
$\therefore$	100^a	$=$	$100^b-1.22$
(1) + (2):	$2l+100^a+1.08+100^b$	$=$	$2r+100^b+100^a+1.36$
$\therefore$	l	$=$	$r+0.14$

Whence it is determined, that the 100^a ounces-weight is 1.22 grains lighter than the 100^b ounces-weight; and the length-weight of the left arm, pan, etc., is 0.14 grain greater than the length-weight of the right arm, pan, etc.

He then explained the means he had adopted to detect and measure, in grains, the flexure of overloaded beams; and pointed out the erroneous mechanical construction of many beams supposed to be "standard."

Regular Meeting, July 1st, 1872.

President in the Chair.

Eighteen members present.

Benjamin Smith, Alexander Austin and James R. Finlayson were elected resident members.

Donations to the Library; Cal. Horticulturist, June, 1872. Eng. and Mining Jour. Monograph des Poissons de Cuba, by Felipe Poey. Bulletin of Essex Inst., Vol. IV, Nos. 1 and 2. Illustrations of Zygenidæ and Bombycidæ of North America, by Richard H. Stretch.

Donations to the Museum: Sixteen specimens of minerals and a collection of plants from the Pioche mining district, Nevada, by F.

E. Durand. In behalf of Capt. Windsor, Dr. Hewston presented a package of the Yerba Buena (or *Micromeria Douglassii*), from Oregon, and read a letter from that gentleman, in which he gives the statements of hunters and Indians affirming the medicinal virtues of that plant; which were also corroborated by Prof. Bolander and Dr. Stout.

The following communication was read by Mr. Stearns:

On the Economic Value of certain Australian Forest Trees and their Cultivation in California.

BY ROBERT E. C. STEARNS.

Australian forest trees propagated from the seed, with perhaps a few exceptions, thrive remarkably in California; the climate and soil appear to be nearly or quite as favorable to the growth of these exotic as of the native forest forms.

In many of the principal towns in this State, especially in and around San Francisco, in the neighboring city of Oakland and adjoining towns on the easterly side of San Francisco bay, fine specimens of many of the Australian forest species are exceedingly numerous. The most popular of these belonging to the genera *Acacia* and *Eucalyptus*, have been planted for ornamental and shade purposes; the light feathery fern-like foliage of some of the Acacias, their gracefulness, beauty and color combined with rapid growth, present so many advantages as to fairly entitle them to popular esteem. Of the Acacias recommended by Dr. Mueller on account of their economic value,* I am not aware of any being cultivated in this State for that object. *A. decurrens* (= A. mollissima) also *A. lophantha* and some other species, are frequent, and highly prized for ornamental purposes: from twenty to thirty species are enumerated in the catalogues of the principal nurseries

The many valuable properties of the species mentioned in the footnotes, combined with rapidity of growth, would warrant cultivation on an extensive scale, which if judiciously conducted would be highly advantageous to the State and yield a handsome return upon the capital invested. Mueller says that the wood of A. DECURRENS, popularly known as the "Black Wattle or Silver Wattle," can be used for staves, but its chief use would be to afford the first shelter. in treeless localities, for raising forests. Its bark rich in tannin, and its gum not dissimilar to Gum Arabic, render this tree also important.

A. HOMALOPHYLLA, has a "dark brown wood, is much sought for turner's work on account of its solidity and fragrance; perhaps its most extensive use is in the manufacture of tobacco pipes."

A. MELANOXYLON "is most valuable for furniture, railway carriages, boat building, casks, billiard tables, pianofortes (for sound-boards and actions) and

*A. decurrens, *Willd*, also A. homalophylla, *Cunn*, and A. melanoxylon. R. BR.

numerous other purposes. The fine-grained wood is cut into veneers. It takes a fine polish and is considered equal to the best walnut." Under favorable circumstances it attains "a hight of eighty feet with a stem several feet in diameter." This species requires a deeper and moister soil than *A. decurrens* and *A. lophantha*, which are especially recommended for their ability to resist drought, and therefore particularly applicable to treeless and sterile areas in the southern part of California, and the adjoining country, where the temperature does not decline below ten degrees.

The peculiar yellow displayed in the China silks and other articles, is obtained from the yellow flowers of a species of Acacia, and is of an exceeding permanent character.

The Acacias are easily propagated from seed, as I have (with some species) practically tested; and it is not unlikely that the flowers of most of the species, which are yellow, might be equally as valuable for the dyer, as the variety cultivated or used by the Chinese.

Of the Eucalypti, E. GLOBULUS is very common in California, and easily cultivated: it is the Blue Gum of Victoria and Tasmania. "This tree is of extremely rapid growth and attains a height of 400 feet, furnishing a first-class wood: shipbuilders get keels of this timber 120 feet long; besides this they use it extensively for planking and many other parts of the ship, and it is considered to be generally superior to American Rock Elm. A test of strength has been made between some Blue Gum, English Oak and Indian Teak. The Blue Gum carried 14 lbs. weight more than the Oak, and 17 lbs. 4 ozs. more than Teak, upon the square inch. Blue Gum wood, besides for ship building, is very extensively used by carpenters for all kinds of out-door work, also for fence rails, railway sleepers—lasting about nine years—for shafts and spokes of drays, and a variety of other purposes." *

Of the rapid growth of this species of Eucalyptus and the facility with which it is propagated, most people in California who have had any experience with it are familiar; but as perhaps few persons who have specimens of it growing upon their grounds or in their yards are aware of its value otherwise than for ornamental purposes, I have deemed it a matter of interest as well as of importance to quote from Dr. Mueller's valuable paper. Having propagated the Blue Gum from the seed and raised many specimens under not particularly favorable circumstances, I can indorse the remarks of the author from whom I have quoted. An instance of rapid growth immediately under my observation, is that of a specimen purchased by me of a nurseryman, which at the time of planting (Jan. 5, 1871) measured from the ground level to the extreme tip six and one-half feet, and in about eleven months (Dec. 8, 1871) had reached a height of a trifle over fifteen feet; the diameter of the stalk when set out was half an inch, and at the final measurement one and three quarters inches. I am prepared to hear of instances far exceeding my figures, but it should be borne in mind that we had very little rain after this tree was planted, and furthermore

*Vide "The Principal Timber Trees readily eligible for Victorian Industrial Culture, etc., etc., by Ferd. Von Mueller."

that the locality was upon nearly the highest ground in Petaluma. This tree was occasionally, but only moderately watered during a part of the time. Other trees of this species planted at the same time, also made a remarkable growth; specimens raised by me from the seed, whose growth I have noted, show a gain of ten a half inches in twenty-one days, or half an inch per diem.

The development of the lateral branches is as surprising as its perpendicular growth.

George C. Potter, Esq., of Oakland, informs me that specimens upon his grounds nine years old, show a diameter of twelve inches.

Of the large plantation of Eucalyptus of the Blue and Red species made a few years ago by Mr. J. T. Stratton,* of Alameda, I hear indirectly that the trees have done well. I hope at a future meeting to be able to learn from Mr. Stratton, and inform the Academy more definitely of the success thus far, and prospects of this highly commendable and important enterprise.†

The many valuable properties of the Eucalyptus attracted the attention of the French Government several years ago. A specimen in the Jardin d'Acclimation at Algiers, excited the admiration of the Emperor while on a visit to that place, and upon measuring the tree it was found, according to the Paris *Moniteur*, to have made "a height of thirty feet and a diameter of six inches in two years." Since that time it has been extensively cultivated in Algiers, and of late it has been stated that it "is making rapid progress in the south of France, Spain and Corsica, especially on account of its alleged virtues as a remedy for fever. It furnishes a peculiar extractive matter, or alkaloid, called Eucalyptine, said by some to be as excellent a remedy against fever as quinine.

In Spain its efficacy in cases of intermittent and marsh fevers has gained for it the name of "fever tree." It is a powerful tonic and diffusible stimulant, performs remarkable cures in cases of chronic catarrh and dyspepsia, is an excellent antiseptic application for wounds, and tans the skins of dead animals, giving the fragrance of Russia leather. The tree prefers a marshy soil, in which it grows to a great height very rapidly. It dries the earth under it by evaporation from its leaves, and shelters it from the sun, thus preventing the generation of marsh miasm."‡

Of the medicinal properties of *E. globulus* we have additional testimony in a recent number of the Practitioner,§ where Dr. M. C. Maclean relates the results of his experiments on patients in the Hospital Wards at Netley, England. He says in connection with certain cases of chest aneurisms and cardiac asthma: "With the exception, perhaps of the subcutaneous injection of morphia, I know no remedy so efficacious in allaying pain, restoring dyspnœa, calming irritation, and procuring sleep in such cases, as to be compared to *E. globulus*." He also refers to the use in Germany of a tincture made of the

* Report of the Commissioner of Agriculture, 1870, p. 232.

† I do not refer to other forest plantations made in California, by Mr. Aiken or Mr. Edwards, and which I sincerely wish may be successful, for the reason that in this paper the chief object has been to call public attention to certain Australian forms.

‡ Harpers Magazine, March, 1872; Scientific Record, p. 630.

§ No. XLI, p. 268, Nov., 1871.

leaf, which "has been used successfully in ʒij doses in the treatment of intermittent fevers." It appears that it is not only used medicinally in form of a tincture, but also that cigars are made from the leaves, and its palliative influence obtained by smoking.

"German physicians, as appears from medical journals, have found a tincture of the leaves of the *Eucalyptus globulus*, or Australian gum-tree, to be a remedy for intermittent fever. Dr. Lorimer gave it to fifty-three patients, of whom forty-three were completely cured. In five others there was a relapse, owing to a failure in the supply of the tincture. In eleven of the cases quinine had been used without effect, and nine of these were cured by the *Eucalyptus*."*

Other species of the Eucalypti, of great value and well worthy of consideration, are recommended by Dr. Mueller.

E. AMYGDALINA, *Labill*, which is sometimes met with 400 feet in height; one specimen in the Dandenong ranges measured 480 feet,† surpassing in altitude the gigantic Sequoias of our own State; the wood of this species is said to be well adapted for "shingles, rails, housebuilding, for the kelson and planking of ships, and other purposes;" in rapidity of growth it equals *E. globulus*, but is not so easily satisfied with any soil.

E. DIVERSICOLOR, *F. v. Mueller*, a native of S. W. Australia, sometimes reaching 400 feet in height, with a proportionate growth of stem. The timber is excellent, and young trees are reported as doing well even "in dry exposed localities in Melbourne." It is regarded by Dr. Mueller as a valuable shade tree for avenues, as it makes a dense growth.

The EUCALYPTUS CITRIODORA, *Hooker*, a native of Queensland, "combines with the ordinary qualities of many Eucalypts the advantage of yielding from its leaves a rather large supply of volatile oil of excellent lemon-like fragrance."

E. GOMPHOCEPHALA, *Candolle*, grows to a height of "fifty feet, wood close grained, hard and not rending."

EUCALYPTUS MARGINATA, *Smith*. "The Jarrah, or mahogany tree of S. W. Australia, famed for its indestructible wood, which is attacked neither by Chelura nor Teredo nor Termites, and therefore so much sought for jetties and other structures exposed to seawater, also for underground work, and largely exported for railway sleepers. Vessels built of this timber have been enabled to do away with copper-plating. It is very strong, of a close grain and a slightly oily and resinous nature; it works well, makes a fine finish, and is by shipbuilders here considered superior to either Oak, Teak, or indeed any other wood." The tree does not grow as rapidly as the Blue Gum, in the neighborhood of Melbourne, but Dr. Mueller expresses the opinion that it would make a rapid growth in a more favorable locality.

The E. ROSTRATA, *Schlecht*, the Red Gum of Victoria, is a very valuable species for the "extraordinary endurance of the wood underground, and for this reason highly valued for fence-posts, piles and railway sleepers; for the

*Annual Record of Science and Industry, 1871, p. 586.
†Trans. and Pro. of the Royal Society of Victoria, Part I, Vol. VIII, p. ix.

latter it will last a dozen years, and if well selected, much longer. It is also extensively used by shipbuilders, for mainstem, sternpost, innerpost, deadwood, floor timbers, futtocks, transoms, knightheads, hawsepieces, cant, stern, quarter and fashion timber, bottom planks, breasthooks and riders, windlass, bowrails, etc. It should be steamed before it is worked for planking. Next to the Jarrah from W. Australia," this is the best wood for resisting the attacks of seaworms and white ants. This species reaches a hundred feet in height, which is also the height of the next and last of the Eucalypti referred to herein, viz: E. SIDEROXYLON, *Cunn.*, which produces a wood of great strength and hardness, and desirable for carpenters, shipbuilders and wagonmakers, being suitable for wheels, treenails, belaying pins, and is considered the strongest wood in the colony; also valuable for railway sleepers, underground work in mines, etc.

The wood of the Gums is "so soft at first as to render the felling, splitting, and sawing up of the tree, when green, a very easy process, but when thoroughly dry becoming as hard as oak." *

When we consider the fact of the great number of farms in California that are nearly or wholly destitute of wood, and the great and continuous expense entailed by our system of fencing, the importance to the farmer of dedicating a portion of his land to the cultivation of forest trees, from which he can obtain fuel and fencing materials, is too palpable to admit of debate. The comparatively small expense and labor with which the cultivation of a few acres for the purposes I have named is attended, its absolute feasibility and practicability, with the beneficial results that would flow therefrom, should commend itself at once to every farmer, as a few acres of timber land for economic purposes would add much more than the cost to the cash value of a farm. The boundaries of a farm should be marked by a row or rows of trees, thus defining its limits by living monuments, and greatly adding to its beauty; from these rows, as the trees advance in growth and age, some wood could be cut, and where the farm is of considerable size, enough in the way of trimmings or prunings to supply the fuel of the house. In the treeless areas of the southern part of the State, the varieties of Acacia above named would prove an important aid in assisting by their protection the planting of other species of timber; as they are easily taken care of and will stand excessive drouth. They would also be useful as is our Monterey Cypress, (*Cupressus macrocarpa*) for belts to break the force of the winds in exposed places, and it is to be hoped that before many years, timber belts for this purpose will be common wherever the coast winds prevail, as a protection to orchards and vineyards.

We have many native trees well adapted for timber or wind-breaks, and while calling the attention of land owners and others to the exotic forms above mentioned and their special qualities as enumerated in Dr. Mueller's excellent paper, I do not wish to be understood as making an unfavorable comparison as against indigenous species, as for some of the purposes mentioned they will answer equally well.

It must be remembered, however, that our forests are unfortunately deficient

* Baird's Dict. Nat. Hist., p. 235.

in many of the hard woods much used in the arts, and which we are now compelled to import from localities more favored in this respect. The aggregate amount annually sent out of the State for the purchase of this material could by proper foresight and enterprise, in a few years, be retained within our borders, and here expended in the establishing of new industries pertaining to the very material, the manufacture of which in other portions of the Union employs large communities, to whose support we are now contributing.

As in Germany, to anticipate a future need, our own *Sequoia sempervirens* or Redwood tree is extensively cultivated, so here by the cultivation of the Australian Eucalypti, we can in a few years supply a positive want, and reap the advantages above indicated.*

Professor Bolander said that a familiar instance of the applicability of trees in tempering climate might be noticed when coming from the eastern side of the valley towards Sacramento and Stockton. While in the valley the wind was hot and uncomfortable, on nearing Sacramento or Stockton, the traveler became conscious of a refreshing coolness, caused by the existence of trees at those places. He had put a thermometer in the open air on a warm day, and then placed it on the green leaves of a tree, and it showed a difference of eighteen or twenty degrees. If our grain fields were surrounded by trees they would be greatly benefited.

Professor Davidson said that this fact was recognized in Iowa, where they set aside one day in the year to plant trees, generally the 1st of May; it was estimated that upwards of one million trees had already been set out.

Dr. Stout testified to the hardihood of the Eucalyptus. He also said that parasites did not attack it, on account of the odor. As to the medicinal qualities of the tree, he had taken a quantity of the leaves and made cigarettes of them, and had constructed also a respirator so that the fumes from the leaves might be inhaled, and had found it of great assistance in cases of sore throat and chronic asthma. For the latter, particularly, it was very effective, and will afford ready relief in case of an acute attack. He had strewn the dried leaves in the basement of houses where there were bad odors, and had found it almost as useful as carbolic acid.

Professor Bolander said that the idea was erroneous that the Eucalyptus was fragile and would not stand. The plant should be

* Twenty-five hundred copies of this article were published in pamphlet form and distributed gratuitously.

bought young for transplanting. These trees should be planted at least during the first year of growth, and they will take root and not be easily overthrown. When kept in pots too long, the roots become deformed; this is the reason why some people think they will not grow. The easiest and best way to cultivate these trees is, to take a box filled with sandy soil nearly to the top, and the remainder covered with sawdust; wet the sawdust slightly, throw the seed over it and gently rap the box with the hand. Keep this under a piece of paper or in the shade, and when the seeds sprout they can be taken out like a small cabbage plant and set out at leisure.

Dr. Stout said that they should not be supported by a rod or stick placed too close to the trunk, since it prevented the branches from growing on the side where the support was.

Mr. Stearns remarked that objections have been made to the Acacias and Eucalypts by persons who have planted them in the neighborhood of San Francisco, for the reason as alleged that they do not withstand the winds. So far as the observations of myself and others who have investigated the matter extend, it is really surprising that so few are prostrated. The fault is not with the trees but the purchaser; as trees of from four to six feet in height are sold at a low price, they are bought by parties who require only a few, in preference to smaller trees, as they make a greater immediate show. As most of the growth of the trees as usually purchased, after having attained a height of six inches, has been made in the pot or box in which they are sold by the dealers, it will readily be perceived that the tap-root which in a natural state descends, is diverted from a perpendicular into a rotary direction, analogous to a spiral spring, and is also crossed and recrossed on itself—with the liability as it increases in size to strangle the tree by one portion of this root making a short-turn or twist upon another part of the same, or by being wound about and restricted by the lateral roots. It is therefore apparent that the better policy would be, even where only a few trees are wanted, (and this remark applies with equal pertinence to all trees) that other things being equal—such as comely shape and healthy condition—the younger and smaller trees are really cheaper at the same price than the larger, and can generally be obtained for much less. For forest culture the smaller trees are indispensable to success.

Again, it is frequently the case that the lower branches are trimmed off to a mischievous extent, which also is a mistake; for where a tree has sufficient space to grow in, but little trimming is necessary, and it is a false taste which seeks to improve (?) upon nature by depriving a tree of its normal physiognomy and distinctive character by carving it into grotesque or inappropriate shapes; it is simply mutilation, and is certain to result in the premature decay and death of the victim. The flattening of the head by certain aboriginal tribes, and the distorted feet of the Chinese ladies, are further and pertinent illustrations of analogous hideous violations of natural form.

Professor Bolander said the trees should be allowed to grow naturally, and the lower branches should never be cut off. At Gen. Naglee's place in San José, where he raised about sixty acres of trees of all kinds, the pruning knife is never used.

Dr. Blake stated, that in a recent visit to the northern part of Humboldt County, Nevada, he had been able to corroborate the statement he made at the Academy some few weeks ago, as to the position of the divide between the waters of the Great Basin and the Columbia River. He had found it, as before stated, some fifty or sixty miles further south than it is at present located on our maps. Not having any means of determining the exact latitude or longitude, he was unable to give the exact geographical position of the divide, but computation from the nearest point (Fort Smith), the position of which had been astronomically ascertained, would place it about in latitude 41.40 S. and longitude 117.53 E. The divide was found to be higher than he had thought before actual measurement. Although the barometrical measurement had not yet been calculated; yet he believed the height of the divide would be from 450 to 480 feet above the level of the Humboldt valley. on about the same meridian. From the northern side of the divide the waters all flowed north, and although they did not directly reach the Owhyee, a tributary of the Columbia, yet there was no marked divide between the flats where they were lost and the streams flowing directly into the Owhyee.

Mr. John Hewston, Jr., exhibited some limbs of a species of Australian acacia, from San Mateo, which were infested by a species of Coccus, and stated that the insect had not only been detected in its depredations upon said tree, but also upon the orange trees.

The following remarks were made

On Coast Surface and Scenic Geology.

BY AMOS BOWMAN.

The process by which the San Francisco peninsula, and the Contra Costa and Alameda hills and valleys, became dry land, was simple, gradual and common-place, and still going on. It was not one of sudden violence. From the salt marshes to the mountain tops, everywhere are found systematic evidences, in the loosened material, the gravels and sands on the surface of the older rocks, to which geological attention has hitherto been most particularly directed, of the ocean's presence in successive stages and in very recent times. What were islands once, among the hills and valleys of California, now farmed and populated, can be traced by the diagrams. * * * * * * We may see with our own eyes the birth and creation of the coast counties and California valleys. The rock we rest upon on a Sunday excursion to San Bruno Mountains, imparts to us in an hour its hoary wisdom. * * * * The scope and scenery of this section of country can be well studied from the older San Bruno mountains, a point easy of access in an hour from the city; but to get to the pliocene hills themselves, that are, of course, under water from that island stand-point, one must go to School-house station, and drive three miles along the Laguna road, to the south-west.

Any one would, on attaining the divide here, in full view of the Pacific, observe a peculiarity in the scěnic outlines of the hills. The geologist suspects "a formation." A broad plateau lies at your feet. * * * All the highest hills, some 700 feet above the sea, within five miles radius of this point, are pliocene. The abundant fossils in them, as determined by the Geological Survey, tell the story. They were of the period just preceding the creation of the species of mammalian animals now living. * * * *

The San Francisco pliocene and its subordinate terraces, down to the recent valley and the salt marshes of the sea of to-day, were next portrayed by a birds'-eye sketch, as they might be seen from a point half a mile in the air, above Goat Island. The same can be recognized from Oakland wharf, or anywhere along the railroad thence to San Leandro, in a favorable afternoon light. What was most remarkable in this was, the testimony it bore of the exceeding regularity and simplicity of the movement upward, whereby the waters of the sea were caused to depart. The terrace lines showed an equal movement, though sagging a little about the road from San Mateo to Spanishtown, and southward rising up again into the redwoods near the summit of the peninsular ridge, opposite San Jose.

Wave-worn beaches and flats on the Mission hills, overlooking San Francisco, show the continuations of the pliocene sea-levels to our very doors. The terrace in the San Bruno mountains which gives scenic individuality in the soft, blue

COAST SURFACE AND SCENIC GEOLOGY.

BY AMOS BOWMAN.

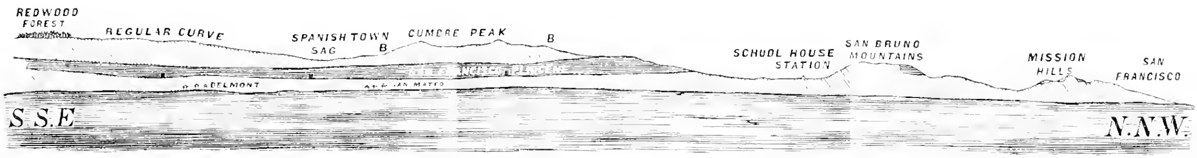


Fig. 1 Profile of San Francisco Peninsula, as seen from Decoto. Length, 26 Miles.

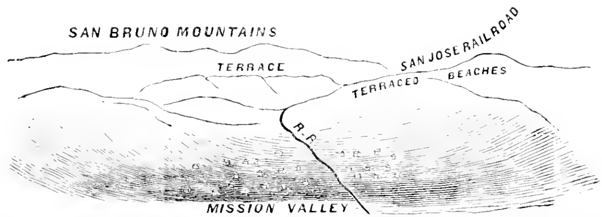


Fig. 2. View South from Corner of Leavenworth and Sacramento Streets, San Francisco

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distance, as seen from San Francisco, is not, as might be expected, of detrital material, but of rock as hard as the pliocene. It appears to be a terrace of marine abrasion rather than of subaqueous deposit, and to belong to the older day of the San Bruno mountains—the cretaceous. * * * *

The remaining peculiar surface and scenic features of the vicinity of San Francisco, are found in the channels of subaqueous erosion, like that continuing from the Mission Dolores through the New Park to the ocean. These were minor Golden Gates when our city hills and Lone Mountain were Alcatrazes, long after the close of the pliocene. It is an open question whether the elongated and level sandy beaches, similar to that found on the north side of Lone Mountain, half way to its top, are ascribable to Neptune or Ventosus.

A discussion followed, in the course of which Prof. Davidson, Mr. Stretch and Prof. Bolander participated.

Mr. Stretch remarked that the terraces of Mono Lake, and also of the lakes in Nevada, indicated a gradual and uniform rise.

Notes on the Silver Mines of Pioche.

BY F. E. DURAND.

The silver mines of Pioche are situated on veins running in an easterly and westerly direction. These veins are of different characters. The Meadow Valley, Pioche, Raymond & Ely, Washington and Creole, appear to be on a vein with a bifurcation, or on two veins crossing each other. Higher on the hill are two other veins, distant about 18 feet; their general direction is also easterly and westerly, and parallel with the first vein. On these second veins are situated the American Flag, Arkansas, Chapman, Huhn & Hunt, Desdemona, Ivanhoe, etc. Farther east is the vein of the Peavine, running north and south. All these veins are enclosed between walls of very hard, stratified quartzite; this quartzite is generally colored by peroxide of iron.

The veins, which are nearly vertical, cut the stratification at right angles; but the convulsions which have produced this fissure have lifted one side, as the planes of stratification do not correspond across the vein. In some places the quartzite is covered by micaceous slate, which lies in unconformable stratification. Above this slate is a very thick formation of stratified crystalline magnesian limestone. The line of contact of the slate and limestone contains a great amount of metallic oxides (iron or manganese), hematite, braunite, manganite and pyrolusite.

The silver veins of Pioche are generally very regular; they are encased in hard rock, requiring little timbering, and there is no water in the mines. The deepest worked mine is about 500 feet below the surface. In the superior parts, the ores are chloride of silver, mixed with crystallized quartz; but generally the ores are carbonate of lead containing silver, very likely in the state of sulphuret of silver. The oxide of iron (xanthosiderite), of a bright yellow color, is common. In some places, as in the Burke mine, the ore is chiefly galena and sulphate of lead. In the deep works of the Meadow Valley, malachite is abundant. In all these veins the gangue is quartz, but the oxidation of the metallic sulphurets has destroyed its cohesion, and this quartz is now very easily crushed.

Mr. Stearns called the attention of the Academy to certain provincial divisions in the marine faunæ of the West Coast of America, suggested by Prof. A. E. Verrill, in the transactions of the Connecticut Academy for 1871; and remarked more particularly on that part of the coast from Cape St. Lucas, northward, that to divide this portion upon the data at present known, so as to make provinces which shall correspond with those of the Atlantic side, is not warranted by the knowledge possessed at the present time; that the topography and geology of the portion of the West American Coast, specified by him, was much more uniform in its character, as well as in the temperature of its waters, than a corresponding extent of the Atlantic coast, to say nothing of the influence of the coast currents which upon this side are peculiar and enter largely in the matter of distribution of species; furthermore, that the MSS. data in his possession which were, to say the least, fully as important as what had already been published, and quite likely more authentic, indicated a greater range for each province, and therefore a less number of provinces than suggested by Prof. Verrill.

Though much had been done by himself and other members of the Academy co-operating with him in the accumulation of data bearing upon the geographical distribution of the mollusca of our coast, still so much remained to be done, in order to make the work thorough and reliable, that it would be merely arbitrary, and necessarily requiring frequent readjustment, to propose at this time any new divisions or subdivisions of the coast into zoological provinces.

As to that part of the West Coast of North America from Cape St. Lucas, including the Gulf of California, thence southerly to a point a few miles south of Panama, with the exception of collections made at a few places in the Gulf of California, also at San Juan del Sur, and its immediate vicinity on the coast of Nicaragua and in the bay of Panama, but little more is known of this vast reach of shore-line, than was years ago.

Mr. Stearns stated that at some future time, as soon as the data collected by himself and his co-workers here are compiled, he proposed to refer to the subject again.

Regular Meeting, July 15th, 1872.

Vice-President in the Chair.

Twenty members present.

Donations to the Library: Proc. Acad. of Sciences of Phila., Oct., Nov. and Dec., 1871, and pp. 1–72 for 1872. Catalogue Phila. Lib. Co. Fifth Annual Rep. of Peabody Acad. of Baltimore. Am Jour. of Science and Art, June, 1872. Am. Naturalist, July, 1872. Nat. History of the Tres Marias and Socorro Islands, by Andrew Grayson. Descriptions of new species of American Birds, by Geo. N. Lawrence; also, Descriptions of new Birds of the Families Troglodytidæ and Tyrannidæ; also, Descriptions of new species of Birds of the genera Icterus and Synallaxis, by the same author. Manufacturer and Builder. Proc. of the Royal Geograph. Society, Vol. XVI, No. 2.

Donations to the Museum: A large collection of botanical specimens, by Dr. Kellogg. Specimen of a rock-bass (*Centrarchus Æneus*), by John Williamson. Twenty-seven species of Indo-Pacific shells, by W. N. Fisher. Samples of Black (Iron) Sand, by Dr. A. B. Stout. Specimen of a Steel (turner's) shaving of Firth steel, thirty-eight feet long as coiled (100 feet when straight), by Mr. Chapman.

Mr. Williamson remarked, in connection with the specimen of a rock-bass presented by him, that it was one of a number sent out from New York by Mr. Seth Green, of which but nine were living, and were now in the pond of the California Acclimatization Society, at Point San Pedro. Of other species the Society had on hand 17,000, which were all doing well.

Dr. Kellogg, in addition to the donation above named, presented the Academy with a large number of electrotype illustrations of California plants.

Mr. Stearns referred to the early knowledge of the existence of coal oil in the United States, as follows:

The existence of coal-oil in Pennsylvania was known in the last century. In Volume I of the Massachusetts Magazine, published in 1789, by Isaiah Thomas and Ebenezer T. Andrews, names which are historical among the earlier printers and publishers in this country, I find, on page 416, the following:

"In the northern parts of Pennsylvania there is a creek called Oil Creek which empties into the Allegheny River. It issues from a spring, on the top of which floats an oil similar to that called Barbadoes tar; and from which one man may gather several gallons in a day. The troops sent to guard the Western posts halted at this spring, collected some of the oil, and bathed their joints with it. This gave them great relief from the rheumatic complaints with which they were affected. The waters, of which the troops drank freely, operated as a gentle purge."

Dr. Stout exhibited samples of black iron sand, and stated that an enormous body of it existed within fifty miles of San Francisco. The sample assayed fifty per cent. of pure iron, of the best quality. The sand was composed of particles, a portion of which were magnetic, and a part not; it can easily be smelted, and he had already had a specimen manufactured. As to the origin, deposition and distribution of the iron sands, a discussion and interchange of views and observations ensued, which were participated in by Dr. Gibbons, Mr. J. Hewston, Jr., Dr. Stout and others.

Regular Meeting, August 5th, 1872.

Vice-President in the Chair.

Twenty-two members present.

J. P. Dameron was elected a resident member.

Donations to the Library: Bull. Essex Inst., March and April, 1872. American Chemist, June, 1872. Monatsbericht der Königlich Preuss. Akad. der Wiss., Berlin, March, 1872. Conspectus Avium Europ., by Dubois, 1872. Proceedings Acad. Nat. Sciences of Philadelphia, pp. 73–120. Am. Jour. Arts and Sciences, July, 1872. Amer. Naturalist, Aug., 1872. R. Comitato Geologico d' Italiano, Bull. Nos. 3 and 4. Vocabulary of the Utah and Sho-sho-ne or Snake dialects, from the Salt Lake City Museum, through Mr. Turrill.

Donations to the Museum: Eight specimens of minerals from Utah, by Samuel Purdy, Esq. Specimen of conferva, from the tules, Sacramento river, by C. D. Gibbes. Two aboriginal skulls, specimens of petrifactions, and sample of granite used in the building of the Mormon temple, all from Utah, also iron ore, from Dutch Flat, by C. B. Turrill.

Description of New Species of Shells from California.

BY ROBERT E. C. STEARNS.

Siphonaria Brannani, Stearns. Shell oval, subconical, helcion-shaped; apex recurved and somewhat twisted, anterior and sometimes quite in line with margin; surface of shell irregularly undulating, of a dark brownish color, and marked with numerous fine whitish radiating ribs which crenulate the margin; shell internally shining, and dark chocolate brown; muscular impression and siphonal groove distinct. Somespecimens are quite irregular in outline, being affected in that respect by the inequalities of the surface upon which they are found. Numerous specimens of this shell were collected at Santa Barbara Island, off the southern coast of this State, in the month of June, 1871, by Mr. S. A. L. Brannan, to whom I am indebted for the specimens from which this description is made. The largest of eighteen specimens measures, long. ·39, lat. ·30 inch, though most of the specimens are much smaller than above dimensions.

Truncatella Stimpsonii, Stearns. Shell cylindrical, solid, light reddish horn-color, or amber; shining, slightly decreasing in size towards apex; closely and strongly longitudinally ribbed, the ribs even, regular and interrupted only by the suture; upper whorls wanting, remaining whorls, 4; aperture oval, somewhat oblique, slightly angulated above; peristome continuous, thickened and moderately angulated at its junction with the body whorl.

Length of largest specimen, ·22 inch; length of aperture, ·06 inch.

Habitat; False Bay, near San Diego, California, where numerous specimens were detected by Henry Hemphill, Esq. This shell is quite distinct from *T. Californica* Pfr. the latter having an almost smooth surface. Specimens of *T. Stimpsonii* are in the cabinets of Messrs. Henry Hemphill, W. G. Binney, and Thomas Bland, the Philadelphia Academy of Natural Sciences and my own.

Mr. Stearns informed the Academy of the death of Major Sidney S. Lyon, a well known geologist, who died at his home in Jeffersonville, Indiana, on the 24th of June last, aged 65 years; his death was from paralysis, occasioned by wounds received during the late civil war, at the commencement of which he was associated with David Dale Owen, Prof. E. T. Cox and Leo Lesquereux, in a geological survey of the State of Kentucky.

Dr. Blake mentioned the appearance of a blight on the fruit in the Sacramento valley this season, apparently a species of Oidium, particularly upon the peaches, a specimen of which he exhibited.

A specimen of a rare mineral from Nevada, where it is found, and which is called *Anatase*, was exhibited by Dr. Blake, who stated that it was a form of titanic acid in crystal, but of no commercial value.

Regular Meeting, August 19th, 1872.

President in the Chair.

Twenty members present.

James Freeborn was elected a resident member.

Donations to the Museum: Fossil bones from the John Day mining region, Oregon, presented by C. D. Voy.

Mr. Andrews exhibited the "gall" made by a species of insect, the larva of which causes the same to move about, and hence are popularly known as "flea-seeds."

Mr. Stearns read the following:

Notes on Purpura canaliculata, of Duclos.

BY ROBERT E. C. STEARNS.

This fine species ranges from Unalashka, south to Monterey, California—most of the specimens heretofore distributed being from the intermediate point of Vancouver Island. Specimens from the last named place, large numbers of which I have examined, are less variable in size and form than those from farther north, and are generally a more delicate shell. One marked peculiarity of the Vancouver specimens is the wide groove or sulcation following the suture, which appears to be constant, as I have found it in all the specimens from this locality; it is inconstant in the more northern and southern specimens. The Vancouver shells average 1⅛ inches in length, and the costæ are very prominent. The specimens from Unalashka are the largest I have seen, the average length of a large number (60) reaching 1 5/8 inches, and a few specimens measuring 1 7/8 inch. A variety from Sitka is of a dingy yellow color, (adults) internally of a brownish yellow, sometimes running into a dark reddish brown; occasionally a banded variety is met with at all of the localities. The shells of this species are generally prolonged anteriorly, which gives a somewhat acute V-shape to that part of the mouth.

Comparing the specimens, from Unalashka to Monterey, including intermediate places, it will be seen that they vary greatly in size, color and general outline, as do the other species of Purpuridæ found within the same limits. The general variation from the Vancouver form is in the much larger and ventricose body-whorl.

The President informed the Academy of the anticipated arrival of Professor Agassiz during the current week, and on motion, John Hewston, Jr., Dr. Henry Gibbons and Dr. James Blake were appointed a Committee of Reception on behalf of the Academy.

Prof. Davidson gave an account of his recent experiments to determine

The Relative Value of great and small Altitudes for Astronomical Observations.

BY GEORGE DAVIDSON.

For this purpose, he occupied a station on the Sierra Nevada at an elevation of seven thousand two hundred feet above the sea, and situated in latitude 39° 20′, longitude 120° 20′. The instruments used were those with which he had been making observations for twenty-two years on the Pacific Coast.

In describing the country, he considered the ridge of the Sierra Nevada peculiarly adapted for the location of an astronomical observatory, and said he had visited two mountain peaks, between nine and ten thousand feet high, near the line of the Central Pacific railroad and telegraph lines.

The climate is very favorable for astronomical work, and in giving an account of the weather, from meteorological records loaned him by S. S. Montague, Chief Engineer of the Central Pacific Railroad, he showed that an average of two hundred and seventy clear days and nights may be expected in each year; and that in the clear nights of winter the sky was marvelously clear and the atmosphere remarkably steady.

At a previous station, Verdi, unfavorably situated for astronomical work, and four thousand eight hundred and seventy feet above the sea, he was able to see the companion of Polaris with a telescope of two inches aperture, twenty-five inches focal length, and a magnifying power of 35. But at the summit station he used a telescope of three (3.0) inches aperture, forty-five inches focal length, and a direct eye-piece with magnifying power of 65, and astronomical eye-piece of poor definition and power, of about 250. The observations were made upon the companion of Polaris, the Moon, Saturn, some double stars, and the Sun.

Polaris.—Every night for a week the companion was visible, not only to his aids, but to the employee with the party. Upon some nights it was found as soon after sunset as Polaris could be seen, the twilight being quite bright.

Saturn.—The rings of Saturn were well divided, and the form of the shadow of the planet on the rings plainly defined, whilst the brighter appearance of the inner ring was plainly apparent. The markings across the body of the planet were visible, but not well defined. With the planet just out of the field of view, one of the satellites was visible. The body of the planet and the outline of the rings were sharply defined and very steady; no jumping, or irregular motion, or blurring. These were seen by the members of the party, and even by strangers unaccustomed to the use of a telescope.

The Moon.—These observations revealed a distinctness, sharpness and steadiness, for which he was wholly unprepared. When there was the slightest unsteadiness in the early evening, the impression was made upon the observer that a very thin, tremulous medium was between the moon and the observer, and not as if a dense medium was immediately enveloping the moon, which is the impression conveyed at moderate elevations. The cusps of the young moon were traced to extreme fine lines of light, with wonderful distinctness; these extremities of the cusps being apparently much finer than the finest spider thread in the instruments. They were traced from three to five degrees further than is ordinarily visible. There was not the least haziness, or unsteadiness, or blurring about them. The mountains were very sharply defined. The outline of the bright limb was so steady, sharp and clear, that the irregularities throughout its border could have been drawn and measured. One large elevation projected so far beyond the general curve of the bright limb, that it would have occasioned an error of one, or one and a half seconds, in the time of immersion of a star at that place; and all around were irregularities that would very seriously affect the time of occultation of a star. When the moon was more than half full, he observed the occultation of a star of the eight and a half or ninth magnitude. He concluded that measures of precision upon the moon, for diameter, etc., made under similar circumstances, would in one or two nights be of greater value than the results of six months' observations made at low altitudes. The orographical character of the border of the moon could be observed and measured. He thought the transit of the ash-gray limb might be observed with fair precision. The phenomenon of a star entering upon the body of the bright limb before disappearing, could be well studied. Photographic pictures of the moon could be made with remarkable effects.

The Sun.—Results of equal value were observed upon the sun. The outline was remarkably sharp, clearly defined, steady, and free from blurring. The spots and faculæ were studied, and the inflowing of a white stream across one of the large spots. The faculæ were traced over the greater part of the sun, and the changes in some of them noted. Around the penumbra of the largest spot there was a mottled appearance, as if an intermediate penumbra existed between the penumbra proper and the brighter body of the sun. The spots, penumbræ, striations in the penumbra, and the faculæ, might all possibly be exhibited in a photograph. He made the same remarks of the relative value of observations of precision under such circumstances, as he had of the moon.

Regular Meeting, September 2d, 1872.

President in the Chair.

The rooms of the Academy were filled to their utmost capacity, by members and friends; the occasion being the presence of Prof. Agassiz, Mrs. Agassiz, Dr. Thomas Hill, Dr. F. Steindachner, Capt. Johnson, and others connected with the Hassler expedition; also Prof. John Torrey, of New York, and Prof. D. C. Gilman, President-elect of the University of California.

The President introduced Professor Agassiz as follows:

Unless objection is made, we will dispense with the ordinary proceedings of our regular meeting, particularly as many of us are here for a special object, which should be gratified as early as possible. With a readiness and a kindness for which his name is a synonym, our illustrious guest promptly accepted the invitation to join us at our meeting this evening. He might well have pleaded the need of rest and repose after such an arduous voyage, and especially after so prolonged a trip through the tropics. But, like a true devotee of science, he accepted the invitation promptly, foregoing all personal considerations of comfort. This Academy extends to him hearty congratulations and its heartfelt good wishes, and is gratified that it is the first to greet him, after a voyage so successful as to place American collections on a par, if not even above, the finest collections of Europe. I have the pleasure of introducing to the Academy, Professor Louis Agassiz.

Prof. Agassiz, who was warmly applauded, addressed the Academy as follows:

Mr. President and Gentlemen:—It gives me very great pleasure to be among you this evening, and I can assure you, that as long as I live I shall be proud to have met such a reception at your hands as has been tendered to me this evening. Twenty years ago, when your Academy was founded, I longed to come across the continent, and perhaps to stimulate and encourage those who were struggling in their efforts to organize a scientific body in a community which was then entirely engaged in gathering gold. My reverence for the Academy of Sciences of California has been growing since I have seen, in your published proceedings, that in a city which is so entirely absorbed by business, you have raised the standard of intellectual culture; and as I have devoted my entire life, without regard to anything else, to the promotion of knowledge, I have felt that you were doing a good thing, not only for the City of San Francisco, not only for the State of California, but for the United States as a great Empire, as a power among nations; for you showed by your zeal, among the difficulties which surrounded you, that you meant, even if you did not succeed to the full extent that you desired, to keep up the spirit which leads forward in intellectual growth. Now, I hold that it is your mission to show to the western part of this continent, that without intellectual growth there is no greatness for a State. It is that which you have to bring to the full understanding of the whole community. You are surrounded with wealth as no State ever was. You have men among you who are richer than kings of the Old World, and yet I see you are still in close quarters. You have not rooms in which to display your acquisitions; you have not the means of making your pursuits inviting to the community at large; and with whom does it rest to foster these interests of intellectual growth? With those who have the means. Let them take the example of the rich men of Massachusetts. I know what they can do. I went single-handed to Cambridge, to teach Natural History, twenty-five years ago. When I delivered my first lecture, there was not in the University a single specimen to illustrate what I had to say. And yet a little band of students, feeling an interest in what they could learn in the lecture-room, and others, thought such a pursuit was worth encouraging, and by-and-by the idea arose that a museum would be of use, and the means were gradually forthcoming, at first sparingly, in small contributions, but gradually more liberally, in larger sums, until at this moment, after fourteen years only, the museum at Cambridge stands, in my estimation, without a parallel in the world.

It may sound like an exaggeration, and yet I will explain how it is possible. The institutions of science in the Old World have grown through centuries. They have been founded upon the ideas which were developed by science in the course of time. They were organized with the means then at the disposal of the investigators of the time, and science has made such progress that now these great institutions are in a measure superannuated, because they cannot be rejuvenated. They are so organized that it is impossible in the halls of the British Museum or in the halls of the Jardin des Plantes, to introduce those appliances which modern research requires. Our little museum was started with the ideas of to-day, and has grown with them in consequence of that. Such materials only were collected as have an immediate bearing upon the questions of the time; and as science advanced, those materials were increased in the direction in which progress was making. And there was a facility for that in the very organization of the whole institution; and that has been so felt by our citizens that they have extended to me every facility which I could wish for. I have had for the last five or six years all the means which I was capable of expending profitably. And yet, you are richer than Boston—a great deal more so. You have a great many more men who could contribute in that liberal way to the organization of an institution which would benefit not only those interested especially in natural science, but which would make observers. This is what the world wants—not books to read, but men to learn what is not yet known. Those men cannot be educated in the school-room. They must be educated in nature, among specimens, by the teachings of that thing which has not been explored now. Knowledge must be obtained, and from where are those materials to be forthcoming? The student has not time to go into the field and gather his materials for work; he must have such aid and must have such stores as would bring the facilities for study closer to his laboratory.

What would you think of the man who would raise his food himself, when he is engaged in the law business or in the medical profession? You would think he was wasting his time. Now I say the scientific man is wasting his time, or is obliged to waste his time, when he is not provided with the appliances with which he can work and by which he is capable of producing. And I hold it is one of the duties of those who have the means, to help those who have only their head, and who go to work with an empty pocket.

So I think that one of your duties, besides fostering and nursing the interest you individually feel for science, is to arouse that general interest in the community which will make every true patriot, every lover of his State, every philanthropist, every man who has the heart to leave a good repute and to leave an honorable memory, desirous of contributing to your progress. Not only have you that before you, your own work and pleasure in the work, but you have also to help one of your institutions, which has already spread the good name of California everywhere where science is cultivated. Your Geological Survey is a model of scientific research. It has been conducted in a spirit and with a success which has cast a shadow over the geological surveys of the Eastern States There is not one—not that of Massachusetts, not that of New York, nor that of the younger States further west, but east of the Rocky Mountains—which can be compared, for beauty of execution, for accuracy of research, for splendid generalization, with those volumes of your Geological Survey which have already seen the light and been given to the world. And if you can secure the continuation of that work to its completion, you will have done for your State and for science a good and an excellent work.

You have, too, to help your University that is growing. There was a time when it was said in Europe, that no American book was worth opening or reading. "Who reads an American book?" We have now books read all the world over. There was a time when we had to send our students abroad in order to complete their education, and when even our colleges gave them, at the best, only elementary culture. Now, our colleges are taking a step forward—are making such progress, our institutions are improving in such a way, that I hope to see the day, old as I am, when European students shall flock to our universities. There is a spirit of freedom which pervades study in America that is wanting in the Old World, where the professor, in order to keep up his head and be able to live and be supported by the Government, has to be the servant of the Minister of Public Education, and do his bidding. Here, we do the bidding of only our own consciences, and do the work as we think it ought to be done. And European students will learn that to add to their knowledge that spirit of freedom, they must flock to our universities. And you are organizing one here which I hope will progress so fast that when we have attracted in the East some of the European students, they will soon be seen crossing the continent and coming to see you, also. And don't be too short in your expectations; do not look too near the present moment, but look forward; and that forward, however distant you may think it now, will be at your feet before many years.

When I saw to-day, for the first time, San Francisco through the Golden Gate, I was amazed. I look upon it as one of the marvels of modern times, that there should be a city standing upon these shores, so grand, so prosperous, so rich—and so young. And what you have achieved in material prosperity, do not despair to achieve in intellectual growth in the same short time. If you will only put the shoulder to the wheel, and have confidence in yourselves that you can do it, you will achieve that, as you achieved the other great result.

President Davidson remarked: I know the Professor needs no thanks from us for his kind words. He must feel such thanks, as he sees them beaming from the countenance of each one here.

I hope our new President of the University of California will favor us with a few words, for we have in him a man come among us with youth, ability and backbone, and these are the kind of men we want in our educational institutions. I introduce to you Professor Gilman, late of Yale College.

REMARKS OF PROFESSOR GILMAN.

I cannot but regard it as a most happy omen, that the first opportunity I have, after coming here to take charge of your educational institution, of meeting with the citizens of this place, is on an evening when you are assembled to pay homage and render greeting to one who brings the best culture of the Old World to bear upon the solution of the great problems which appertain to the New—when you are here to greet so eminent a man as he who has just addressed you. I can echo his words in a faint way, and take up a few of the thoughts he has dropped. He has told you that the Museum at Cambridge is distinguished as the museum of to-day. Should it not be so with the University? Should it not be a university for the wants of to-day? Should we not use it for the great problems which belong to this generation, for the great future that is opening upon us? Should not we all unite to gather up the best of the past experience of every nation, the accumulations of all men before us, and bring them to bear upon our society, and upon, I trust you will allow me to say it, our own State of California? One other thought I should like to re-echo. Professor Agassiz has told you that the great want of science is observers, and the great want of society is men. Now, the object of the University is to turn out men; not narrow specialists, though they may be as eminent as possible in this or that other department which they may pursue, but men of honest and earnest purpose, men of true wisdom, and that is what the University has before it. I will not prolong these remarks, but let me trust that the true utterances you have heard from the distinguished orator who has spoken to you, that you need an institution for to-day, and an institution for the training of men, may sink deep into all our hearts, and inspire us all for the work which is to come.

Professor Torrey, of Columbia College, New York, responded to a call from President Davidson, as follows:

After the distinguished gentlemen who have preceded me, there remains but little for me to say. Those who know me are aware that for many years I have had the greatest desire to explore this great State. I may say, that for many years I have had California on the brain. For a long time I never expected to see it, although I spent many years in investigating the collections of natural history, especially of botany, brought from California, as the various volumes of railroad explorations, etc., will show. Seven years ago I had the pleasure of coming here for the first time, and attending a meeting of this Society. That pleasure is now renewed under peculiar circumstances. So happy am I to meet my excellent friends and the gentlemen who have just addressed you. Now I may say, my joy is no less than it was when I was here before. I have spent all my time without cessation, since I arrived, in examining the botanical productions of California. Although botany has occupied so much of my time, chemistry is my profession, and I regarded botany as an amusement; yet my zeal in either study has not been diminished, notwithstanding I am many years older than my good friend near me, who thinks he is advanced in years. I have been galvanized into making you another visit, and now I propose to remain longer, and then return to work still more upon the flora of this State, hoping to add some material to the large work which is expected when the Geological Survey is completed. I have done already much toward it, and hope to do more before I am taken away.

President Davidson said that in inviting Prof. Agassiz to address the Society, he intimated to him that but a few words would be expected from him. He hoped, however, that before leaving us, Prof. Agassiz would say something on what has been accomplished by the expedition under his charge.

Professor Agassiz said: It may be thought egotistic in me to speak of what has been accomplished under my directions, but I may say that every officer and person connected with the ship, from the Captain to the sailors, contributed to the success of the expedition, rendering such help as made my labor an easy task and the journey a very profitable one. Dr. Steindachner, whose exertions have been so untiring, deserves special mention, as but for him the collection would not have been one-half so large. We had younger men, but none of more unwearied industry. Mr. Blake, Dr. Hill, and in fact all connected with the force, worked diligently and efficiently; while everybody on board contributed to the success. Dr. Hill rendered great service in the collection of specimens of marine plants, although his legitimate duties were of an entirely different nature. Dr. Pitkin had also been of much service, and all had taken as much interest in forwarding the objects of the voyage as the party whose especial duty it was to carry those objects out. During the 269 days of the voyage we packed and sent home 243 boxes and barrels of specimens—nearly a barrel a day—the contents of each one of which would fill a handsome case, such a quantity that the trustees of the college would be obliged to put up additional buildings for their accommodation. It would be tedious to enter into details, but I may mention that the collection of specimens of fishes amounts to over 20,000, and the specimens of various kinds in all over 100,000. They were not preserved in the old-fashioned way, dried and rendered nearly useless, but put in alcohol, over 3,000 gallons being used for the purpose. Thus preserved, the specimens may be dissected and analyzed with facility, and the collection will afford materials for years to come. We shall be able to contribute materially to the resources of scientists elsewhere; in fact, no complete investigation can be made in Europe or elsewhere without the aid of specimens from America; while we are in a position to be independent, and can at last, not only stand on our own legs, but help also to sustain those to whom we have been accustomed to look for support.

At the close of Prof. Agassiz's remarks, the President stated that in order to allow members an opportunity to personally welcome their guests, further proceedings would be dispensed with. He then declared the meeting adjourned, and the members pressed around Prof. Agassiz and the other guests of the Academy, and offered congratulations and friendly greetings.

Regular Meeting, September 16th, 1872.

Vice-President in the Chair.

Twenty-four members present.

W. E. Mayhew and Erastus Dennison were elected resident members.

Donations to the Library: Several fine photographs of Louis Agassiz, by W. H. Rulofson. Notes on the Birds of Prey of Madagascar, by J. H. Gurney; Ibis, Oct., 1869. Notes on Layard's Birds of South America, by J. H. Gurney; Ibis, April and July, 1868. On a new species of Harrier, from New Caledonia, by J. H. Gurney; Proc. Zool. Soc. London, 1865. Trans. of Norfolk and Norwich (England) Naturalist's Society, 1870–71. Remarks on *Aquila Desmursi*, by J. H. Gurney; London, 1862. Report on Observations of Encke's Comet, during its return in 1871, by A. Hall and W. Harkness; Washington, 1872. Memoirs of the New Russian Society of Agriculture, Vol. I, Parts 1, 2 and 3: Odessa, 1872; Proc. Am. Acad. Arts and Sciences, Vol. VIII, pp. 305–408, 1872.

Donations to the Museum: Specimens of Orchilla, from Lower California, by Henry Chapman. Specimens of a medicinal plant, from near Shasta, by Mr. Hastings, said to be a cure for rheumatism.

Prof. Joseph Le Conte gave the result of observations made by him, upon the occurrence of glaciers and glacial action in the Sierras, of which the following is an abstract:

On Some of the Ancient Glaciers of the Sierras.

BY JOSEPH LE CONTE, PROFESSOR OF GEOLOGY, UNIVERSITY OF CALIFORNIA.

The author states, that in his travels amongst the high Sierras, during the past summer, he observed the evidences of many ancient glaciers. Of these, he gives a more particular description of the most remarkable, in the order in which he observed them.

1. *The Merced, or Yosemite Glacier.*— He believes that a glacier once filled Yosemite to its brim. The evidence of this he finds in the ancient moraines and intervening meadows, and in the *glaciated forms* on the north wall. This great glacier received tributaries, which may be very clearly traced, by means of erratics and glaciated surfaces, to Mount Hoffman, to Cathedral Peaks, to Mount Lyell group, and to Mount Clarke group. He states further, that a general view of the surface configuration of the country about Yosemite, reveals a remarkable resemblance to montonnée rocks on a huge scale, and strongly suggests that in early glacial times, not only the cañons, but the whole surface, including every dome and peak, was covered by and moulded beneath an universal ice-sheet.

After a somewhat detailed account of the beautiful glacial signs about Cathedral Peaks, the author passes to

2. *The Tuolumne Glacier.*—This great glacier, as already explained by Whitney, was formed by tributaries from McLane's Pass, Mount Dana, Mono Pass, and especially from Mount Lyell group, which, meeting at Soda Springs, filled the Tuolumne meadows, smoothed and rounded in the most perfect manner the granite hills which lay in its path, overflowed its banks, and sent an icy stream down the Tenaya Cañon to the Yosemite Glacier, while its main flood went down the Tuolumne Cañon into and beyond Hetch-hetchy. It must have been at least forty miles in length.

The author went up the main branch of the Tuolumne river to its source in the top of Mount Lyell, where, he had been told by Mr. Muir, there still existed a *living glacier.*

The peaks of Mount Lyell group together form a vast amphitheatre, closed in on all sides except in the direction of the Tuolumne meadows, by nearly perpendicular walls. In this amphitheatre were formerly gathered the snows from which issued the great Tuolumne glacier. Snow no longer fills the whole amphitheatre, but still lies in vast masses in the more sheltered *coves.* These masses are *still in true glacial motion.* The evidence of this is found in the existence of a perfect *terminal moraine,* semi-circular in form, one mile long, twenty feet high, fifty feet wide at base, bounding the lower margin of the snow. Additional evidence is found in the scattered blocks of stone on the snow, evidently fallen from the cliffs of the amphitheatre, and on their way, in various stages of advance, to join the terminal heaps. Mr. Muir planted a line of stakes across the glacier in order to determine the *rate* of motion by subsequent examination.*

Thus it is evident, that on Mount Lyell we have still a glacier : perhaps not what would at first strike one as a glacier—certainly not a typical glacier, since there is no protrusion of an icy-tongue beyond the limits of the snow-fountain—but still, in all essential respects a glacier, since there is true differential motion and a perfect terminal moraine. As the glacial period waned, the Tuolumne glacier retreated step by step, until it retired within the snow-fields of Mount Lyell and Mount McClure, but there it still exists in a state of feeble vitality. The discovery of this important fact is due to Mr. John Muir. Mr. Muir has found hidden away, amongst the highest peaks of the Sierras, several other snow-masses, which exhibit a similar feeble glacial vitality.

3. *Bloody Cañon Glacier.*—The Sierra, on the west side, slopes for sixty miles, but on the east side very abruptly, so that the plain, four thousand feet to seven thousand feet below, is reached in three or four miles. Long, complicated glaciers, therefore, flowed down the western slope, while on the eastern side, short, simple glaciers flowed in parallel streams down the steep incline and out on the plains for several miles. The moraines of these streams can be well seen from the top of any of the extinct volcanoes on the plains. One of these icy streams flowed down Bloody Cañon. Its track is beautifully scored and polished and rounded. The lateral moraines run out five or six miles on the plain, as parallel ridges of debris, five hundred feet high. In this cañon the two kinds of glacial lakes are finely shown, viz., those which are found in the higher valleys, and are *rock-basins* scooped out by the glacier, and those which are found lower down and are formed by the gathering of water behind terminal moraines. Also, the connection between these latter *lakes* and *marshes* and *meadows* is shown, and the manner in which such lakes are gradually changed into marshes and meadows.

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* The author subsequently learned from Mr. Muir, that after the lapse of forty-six days, he found that the stake nearest the margin, No. 1, had advanced eleven inches ; No. 2, eighteen inches ; No. 3, thirty-four inches, and No. 4 (near the middle), forty-seven inches.

4. *Carson Cañon Glacier.*— Hope Valley, (with its southward continuation as Faith and Charity valleys) and Lake Tahoe Valley lie counter-sunk on the very tops of the Sierras, in the direction of the range, and therefore divide it into *two crests,* one east and one west of these valleys. The author finds abundant evidence of a great glacier, which, taking its rise in a group of snowy peaks to the southward, flowed northward, filling Charity, Faith and Hope valleys as a great *mer de glace,* and then turning at right angles, escaped through Carson Cañon, eastward to the plains of Carson. From Hope Valley *mer de glace* an overflow branch, also, probably ran in the opposite direction into Lake Valley.

5. *Lake Valley Glacier.*—The same group of snowy peaks, already mentioned, gave origin also to another and still grander glacier, which flowed nearly parallel to the last, but extended much farther northward. It filled Lake Valley, the whole of the basin of Lake Tahoe, and escaped through Truckee Cañon, eastward to the plains. Evidences were observed of a former higher and more extended condition of Lake Tahoe.

6. *American River Cañon Glacier.*—Johnson's Pass (the pass over the *western* crest) gives origin to two glaciers; a smaller one running eastward and forming one of the more important tributaries of Lake Valley Glacier, and a much larger one running *westward* through the grand cañon of the South Fork of the American River, for twenty-five or more miles. The cañon at Sugar Loaf, near the junction of granite with the slate, becomes very narrow, deep and precipitous. In this narrow gorge the glaciated forms are very fine.

SOME GENERAL CONSIDERATIONS.

A. Ice-sheet in California.—In the fullness of glacial times, the polar ice-caps, the author thinks, extended along the Sierras probably even to Southern California. The direction of its flow was probably east and west, determined by the slope of this great chain rather than by northern elevation. This general Sierra ice-sheet, from its lower margins, stretched out icy fingers, or separate glaciers, east and west, still lower down the valleys. The evidence of this ice-sheet is seen in domes and dome-like forms, which the author regards as montonnée forms on a huge scale.

The granite about Yosemite is affected with two kinds of structure, viz.: A *concentric structure* on a grand scale, and a *perpendicular cleavage.* The former is well shown in the Royal Arches and in the domes; the latter in the perpendicular cliffs and spires about Yosemite. The domes and dome-like forms so abundant about Yosemite, seem to be the combined result of ice-erosion and concentric structure.

B. Origin of Yosemite.—The perpendicular cliffs of Yosemite are supposed to indicate either fracture or sudden engulfment by earthquake shock. If Yosemite were unique, this theory might be credible; but Yosemite is not unique. The author shows, that many of the great glacial cañons become deep, narrow gorges with precipitous walls, near the junction of the granite with the slate. This is the position of Yosemite, of Hetch-hetchy, and of the gorge of the American River, near Sugar Loaf. These gorges, have all, undoubtedly, been occupied by glaciers, and therefore, probably been cut out by glacial agency. The remarkable verticality of the walls seems to be the result of the perpendicular cleavage of the granite in this part.

C. *General Structure of the Sierras.*—Mountain chains are due to general causes affecting the whole earth; most probably to the shrinkage of the *interior* more than the *exterior.** But all the smaller inequalities—all that constitute scenery—are the result of erosion. Every peak, dome, ridge, cañon, valley, is due to this cause alone, except where recent volcanic action has occurred. Like many other great chains, the Sierras consist of *granite axis* and *stratified flanks;* but the author believes that granite is but the last term of metamorphism of deeply buried sediments subsequently exposed by erosion. That the granite of the Sierra is exposed by erosion, is very clear. The slates originally covered the whole mountain-chain. They still exist on the very crest, because the erosion was less there. On the slopes, ice-erosion has removed the slates and much of the top granite; yet even here a few patches of slate are left, as on Mount Hoffman. But the slates do not appear in force until we reach the limits of the ice-erosion, viz., in the foot-hills, where they form the auriferous belt.

D. *Ice-erosion and Water-erosion compared.*—Eroded forms are determined partly by rock structures and partly by the kind of erosion agent. Forms determined by ice are different from those determined by water. Snow-fountains and ice-rivers—or frost disintegrations and glaciers—tend to produce sharp peaks, spires and combs, and broad valleys occupied by lakes and meadows; while water, on the contrary, tends to produce rounded summits and ridges, and deep V-shaped cañons.

Mr. R. H. Stretch read the following relating to a certain insect pest, exhibited at a previous meeting:

Notes on a Species of Coccus? recently found in California.

BY R. H. STRETCH.

At a former meeting, certain insects forwarded to this Society from Menlo Park, San Mateo county, by Mr. Gordon, were referred to me for examination. I have the honor to report that I found them to belong to the Homopterous family *Coccidæ,* and to be one of that large class of noxious insects popularly known as Scale Bark-lice. As these are among the most troublesome pests with which the orchardist has to contend, I have deemed it desirable to make this report as complete as may be, especially as several species of this family are gaining a foothold in California at the present time; and unless attention is called to them and measures taken for their extinction, they may become as serious drawbacks to our orange growers, as their allies have proved in Florida and the Sandwich Islands.

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* See papers on this subject, *American Journal* for November and December, 1872.

All the specimens referred to were gravid females; many had already deposited their full complement of eggs, and some of the latter were already hatched on July 2d, the date at which they came into my hands. The following is a careful description of the full grown female:

♀.—Body above obovate; no distinct articulation; somewhat striate with deep transverse folds on the disc; while the outer margins are deeply and irregularly rugose, with a thin, whitish, gummy efflorescence arising from the pits. Color deep orange; the lateral margins are regularly fringed with small tufts of short black hairs rising from the thickened folds of the epidermis.

Beneath, the articulated structure is more discernible. The first three segments (?) are deep orange, deeply rugose, with very short, scattered black hair, and each carries a pair of short, slender, black, horny legs. Antennæ, 11-jointed (?) short, black, moniliform, very slightly tapering, the joints being rounded. When the egg-sack is detached the abdomen beneath is seen to be fleshy, pale flesh color, rounded-triangular, and consisting of six segments; height 0.25 inch; breadth 0.15 inch.

The egg sac is very pale yellowish white, from 0.20 to 0.50 inch in length, and 0.25 inch wide; very gibbous; ribbed longitudinally, and somewhat resembling paper in external appearance. It is really a fibrous gummy silky exudation from the sides of the insect, and is only partially closed below. It is the most conspicuous part of the insect, for the true body only appears above as a yellow scale on the depressed anterior portion of the sac.

The eggs are oval, deep flesh or dirty salmon color; they number from 300 to 500, and are bedded in a silky white down. On removing the eggs from a gravid female, I noticed a fine whitish bloom over the entire surface of the abdomen beneath, as though the exudation had been general. A few days later this bloom had increased, and in it were bedded a number of eggs. From this I am led to conclude that the exudation is filamentous and proceeds from numerous pores on the under surface of the abdomen.

Larva.—Length 1-50 inch, deep flesh color inclining to orange. Body ovate, twice as long as broad, with the articulations badly defined; sowewhat depressed, with six whitish, curved and radiating setæ as long as the body. Legs black long slender. Antennæ two-thirds the length of the body, black somewhat clavate, with very long whitish hairs on the terminal joints. These young larvæ are quite active when just hatched; but in a few days attach themselves by means of their proboscis to the bark, become so to speak, fixtures, and rapidly begin to assume the appearance of the adult; the skin wrinkles, and a gummy secretion exudes from the back and sides.

The females from which the above description was drawn moved about slowly from one part of the box in which they were contained to another, but this was probably an unnatural habit caused by the drying up of the twigs to which they were originally attached. This being all the information to be derived from the specimens referred to me, I visited Menlo Park in search of further information, and received a hearty welcome from Mr. Gordon. The supposition is that the insect was imported from Australia some three years ago; at any rate, it seemed to originate on the *Acacia latifolia*. Trees of this species infected eighteen months previously were rapidly dying, though at least fifteen feet in height. The bunches of the insect were very conspicuous from a distance, and were scattered chiefly over wood about two years old, although not by any means confined to those portions of the trees. They had also attacked the orange, currant, peach, plum and other fruit trees, as well as a species of pine, it being thus evident that many trees are liable to suffer from them. Mr. Gordon's gardener had cleared some trees by hand picking, and they seemed to have recovered from the effects. I also found the insect on other trees a mile distant from Mr. Gordon's place, where they were first noticed, but not in such great numbers. This was all the information I could collect in relation to them.

From what I saw I am satisfied that they have been actually disseminated by the very means adopted to get rid of them, and this has resulted from a want of knowledge of their habits. I account for it in this way. The gardener attempted to pick them from certain trees, *at the time the young were first hatching*. The minute larvæ which travelled on to his clothes were unobserved, because they were not suspected, and in the subsequent operations of the day were distributed to other parts of the garden, where they found congenial food and became permanent "squatters." It might be argued that they were scattered by the wind, but they were found in locations which militate strongly against that theory. They could not have been scattered as eggs, because these are firmly attached to the down of the sac, and hatch inside the sac; and though the female has been shown to be capable of locomotion, she is totally unable to perform such journeys as would have been necessary in this instance. From these reasons I am satisfied that the above is the true theory of their dissemination, and it at the same time suggests the remedy. As soon as the insects become conspicuous in the spring by the formation of the white egg-sac, the gardener should provide himself with a suit of old cotton clothes, an old sheet, a stiff brush, and a pan partly filled with strong lye. Let him place the sheet beneath the tree on which he is about to operate, (remembering that at this period there are no active young ones) and then with the wet brush, brush the insects from the twigs into the pan, where they will be killed by the lye, as would also any eggs which might accidentally become detached be destroyed by the lye in the brush. When through, scald the sheet to kill any eggs or insects which may have fallen upon it, and also scald the old clothes for the same reason. The insects are not yet numerous or widely scattered, so far as I have been able to learn, and by this method can certainly be eradicated; but to attack them when the young are hatching will almost surely result in their further spread. Should this happen they will prove most formidable pests, on account of their omnivorous habits, their large size, and their wonderful fecundity.

Owing to the want of works of reference I am unable to give the scientific name of the species which I have provisionally called the Ribbed Scale-Bark Louse. I am informed by C. V. Riley, Esq., the State Entomologist of Missouri, that it is not known in the Eastern States. Generally, it seems to agree better with *Dorthesia* from Australia than with any other form with which I am acquainted. The male is still unknown.

It may not here be out of place to allude to two other species of Bark-lice which have recently come under my observation. The first is a species of *Coccus* closely allied to the *Coccus Ilicis** of Southern Europe. It is found on pine trees in the northern part of the city of San Francisco, but has not yet proved especially destructive. The full grown female, with which alone I am acquainted, is the size of a small pea, globular, smooth, and dark blackish brown in color. It is found in clusters on the outer end of the twigs. The female when opened contained about 200 eggs, lying loosely in the interior of the dry scale, there being no sign of any flocculent matter. The eggs did not hatch till late in July, but the young were found dead on my return from a short absence, and I am unable to do more than call attention to its occurrence.

The second species is abundant on the *Laurestinus* bushes in the city, many of them having been killed by the countless multitudes upon every branch. It is a small brown scale about 1/8 inch long, shaped something like a minute oyster shell, and is very closely allied to the *Aspidiotus conchiformis* of the Eastern States, which has caused such destruction to the apple orchards of those States. I deem it the more important to call attention to this insect, as I found many specimens on apple trees growing alongside of infected *Laurestinus* bushes, and it may yet prove a serious nuisance in California. Closely allied species have become so numerous and destructive to the orange and coffee trees in the Sandwich Islands, as to seriously affect the value of those crops.

Mr. Stretch also presented a paper on the so-called "Flea seeds." He found on examination that they are "Galls" produced by one of the many species of *Cynips* infesting the different oak trees. These insects are allied to the great family of bees, and each species produces a characteristic gall, some of them on the roots, some on the stems, and others on the leaves of the plant attacked. When the insect requires no further nourishment, these galls become detached from the leaf and are only a thin shell, the interior having been eaten out by the enclosed grub. It is the spasmodic contraction and expansion of the grub which produces the jumping of the gall.

A communication on this same subject was prepared for the previous meeting, by Chas. D. Gibbes, but was not read. It will be remembered that a number of the seeds were sent to the Academy from Stockton, and Mr. Gibbes while on a visit to that place took the opportunity to make some observations on them. They were found under an oak at the residence of a Mr. Brown, in the northern part of the city, and contained, as Mr. Stretch remarked, the

* *Le Canium Ilicis*, Burmeister.

larvæ of an insect. They grew on and were all attached to the leaves of the oak tree; and at a certain stage of maturity, or from being shaken by the wind, drop off. Mr. Brown had only noticed them for the last three years, and said they always commenced dropping off early in August. There were other oak trees in the vicinity, but this was the only one on which they were found. Dr. E. S. Holden had also noticed them on a particular oak for the past three years, but had never seen the insect that produced them.

The Vice-President stated that the Trustees had made an arrangement for a special meeting to be held next week, in some hall which would accommodate more people than the Academy rooms, so that all of the members would have an opportunity to hear Prof. Agassiz. The day and the hall would be announced hereafter.

Special Meeting, September 25th, 1872.

President in the Chair.

The rooms of the Academy being of insufficient size for the occasion, this meeting was held at Pacific Hall, to enable the members of the Academy and their friends to hear Professor Agassiz once again, prior to his departure from the State. The hall was well filled. After referring to the voyage of the "Hassler," and the present aims of science, the Professor spoke for about an hour on the "Natural History of the Animal Kingdom." A full report of the lecture was published in the *Overland Monthly*, *Mining and Scientific Press*, and other publications in this city.

Regular Meeting, October 7th, 1872.

President in the Chair.

Twenty-nine members present.

F. Oppenheim, H. L. Breed, William Meyer, Peter Donahue and J. C. Wilmerding were elected life members; and W. P. Prichard, T. J. Edmondson, W. H. Rulofson, L. H. Bonestell and Harry Andrews were elected resident members.

Donations to Library: Collections of the State Historical Society of Wisconsin, 1869–72. Proceedings of Acad. Nat. Sci., of Phila., Jan., Feb., Mar., Apl., 1872. Lecture Notes on Physics, by Alfred Meyer. Eng. and Min. Jour. Am. Chemist, Aug., 1872. Two large framed photographs of Prof. Agassiz, from C. E. Watkins, (with autograph attached).

Donations to the Museum: Specimen of Carbonate of Magnesia, from California, also specimen of Itacolumite from North Carolina, by Mr. Hanks. Specimen of Molybdate of Lead, (Wolfanite) from the Empire Mine, Lucien Mining District, Utah Territory, by Knapp and Stevens. Specimens of raw silk from Japan, by Benjamin Smith. Six specimens of Argentiferous galena from the White Shiloh Mine, Battle Mountain District, Nevada, by John O. Earl. Mr. Dall presented a piece of cocoa-nut shell and husk, picked up on the north side of the Island of Unalashka. Specimens of pestiferous Insects, discovered in Sonoma County, from W. A. Woodward. Specimen of a fossil tooth and vertebræ of *Elephas*, found near Rio Vista, in this State, were exhibited by Dr. Hewston.

John Hewston, Jr., in behalf of W. M. Lent, presented to the Academy, for examination, a number of glass jars containing gravel, earth, iron ore, pebbles, etc., from the so-called diamond fields of Arizona. Upon inspection, small rubies were found in the finer earth.

Dr. Blake exhibited the cast of a large Ammonite, from the foothills near Folsom.

Mr. Hanks submitted, for inspection, the model of a rough diamond, from the Diamond Cutting Works, at Amsterdam.

In reference to the insect pests, presented by Mr. Woodward, Mr. Davidson remarked that they were creating havoc with the fruit in various parts of the State, and were particularly injurious to pears and apples, which were attacked in all stages of growth.

Dr. Gibbons remarked that the species was not new to him, as the orchards of Alameda County had been infested with it for some years past.

Mr. Dall remarked that the cocoa-nut husk, presented by him, was found in winter on the northern shore of Amaknak Island, Unalashka, an interesting fact, and illustrative of the currents in this region. It was one of a number of substances, originating in the tropics, which go to make up the accumulation of driftwood on the islands. This drift contains, among other things, spruce, ginseng and cedar from the Kadiak and the Alexander Archipelago, white spruce and poplar from the Yukon and Kuskoquim Rivers, and various substances, of tropical origin, from the middle or western Pacific. Part of this drift is brought by the south-west current which exists on the east side of Bering Sea, trending with the shores; part by the Alaska current, a branch of the great North Pacific easterly stream, which is deflected to the northward and westward when the main stream strikes the North-West Coast of America, somewhere in the region of Dixon's Entrance; and part by the branch of the Kuro-siwo which pours into Bering Sea, from the south and west, between the Aleutian Islands and Kamchatka. On one occasion, a Sitka spruce was found on Amaknak Island, with green leaves still attached to it. The natives say that cocoa-nuts, more or less perfectly preserved, are often found on the shores, and, no doubt, a careful examination of the drift stuff, accumulated in favorable localities, would develope some interesting facts.

Mr. Davidson corroborated the statements of Mr. Dall, and stated that the natives of the Aleutian Islands had informed him that they always looked for their supply of wood in the drift deposited on the northern shores of their islands.

Prof. Davidson called the attention of the Academy to the earthquake waves that had recently reached our shores, and were recorded by the tide-gauges at this port, Astoria and San Diego. The first disturbance commenced on the 24th of August, and continued for three days. It was indicated earlier at Astoria than at

San Francisco, and earlier here than at San Diego. He had received reports of the same commotion experienced at Honolulu, where the disturbance was noted two and three-quarters hours earlier than at the Golden Gate. He had made careful calculations from the data received, and had determined that the immediate locality of the earthquake disturbance, commencing on the 24th of August, was about midway between the southern point of Kamchatka and the northern shores of the Japanese Islands. On the 16th and 17th of September, the tide-gauge again indicated earthquake disturbance, and, from the character of the waves, it was determined that the location of the shock was not far removed from this Coast.

Dr. Hewston, in behalf of Capt. Scammon, read the following communication:

On a New Species of Balænoptera.*

BY CAPT. C. M. SCAMMON, U. S. R. M.

BALÆNOPTERA, Gray.

Balænoptera, Gray, P. Z. S., 1847, p. 89, B. M. Cat. Cet. 1850, p. 31.

BALÆNOPTERA DAVIDSONI, Scammon, n. sp.

Above, dull black; body, pectoral and caudal fins white below, with a white band across the upper surface of the pectorals near their bases. Gular folds, seventy in number; the interspaces having a pinkish cast, though the more prominent portions are of a milky white. Head pointed; dorsal fin small, falcate, placed two-thirds the length of the body from the end of the beak. Pectorals small, narrow, placed one-third of the animal's length from the anterior extremity. Genitalia opening below and slightly behind the anterior edge of the dorsal fin. Baleen, pure white; laminæ on each side, two hundred and seventy in number; the longest not exceeding ten inches. Total length of animal, twenty-seven feet; pectorals four feet long, thirteen inches wide; spiracles three feet eight inches behind the end of the beak; pectorals, ditto, eight feet six inches; anterior edge of dorsal, ditto, fifteen feet six inches; posterior edge, ditto, eighteen feet. Height of dorsal, ten inches; breadth of flukes, from point to point, seven feet six inches; width of lobes of the same, twenty-five inches. From the fork of the caudal fin to the anus, eight feet four inches; ditto to opening of vagina, nine and a half feet. Anterior end of snout to corner of mouth, four feet eight inches.

Distribution from Mexico to Bering Strait; on the west coast of America.

*Printed in advance, Oct. 4th, 1872.

The specimen from which this description was taken was obtained in Admiralty Inlet, Washington Territory, Oct., 1870. It was a female, and contained a fœtus five feet long; thus correcting the error of the whalers, who commonly regard this small species as the young of the "finback," of the coast. The skull has been deposited in the National Museum at Washington.

This species is evidently congeneric with the *Balænoptera rostrata*, of the B. M. Catalogue of 1850; and, while changes in nomenclature (more recent than those reported in the works of reference now accessible to me), may render it necessary to change the generic appellation at some future day, the one now used seems sufficient for purposes of description. In specific details, also, the present species is nearly allied to the *B. rostrata*, as far as descriptions will admit of instituting a comparison. I have dedicated the species to Prof. GEORGE DAVIDSON, U. S. Coast Survey, and President of the Academy, as a testimony of respect for his scientific attainments, no less than as a personal token of appreciation of his efforts to assist in the advancement of the scientific interests of this coast.

A more detailed account of this animal and its habits, accompanied by illustrations, is reserved for a monograph on the cetaceans of this coast, which I have long contemplated, and which is now on the point of publication.

Mr. Dall exhibited a new species of *Voluta* from the Alaskan Islands, and submitted the following:

Descriptions of New Species of Mollusks from the Northwest Coast of America.*

BY W. H. DALL, U. S. COAST SURVEY.

Voluta (*Scaphella*) *Stearnsii*, Dall. Shell large, slender, spindle-shaped, moderately thick. Color, livid purple, more or less obscured by an ashy-white outer layer, more conspicuous near the sutures and on the callosity of the inner lip. Exterior, smooth (but not polished) except for the strong lines of increase. Sutures appressed; siphonal fasciole strong. Nucleus small, white, mammillated. Aperture more than half as long as the shell, white and livid purple, with a dash of brighter purple at the posterior notch and on the anterior portion of the callus. Edge white, callus reflected, thick and strong, with a chink behind the anterior portion. Canal twisted to the right, moderately deep. Whorls 6–8; long. 4.13 in., lat. 1.62 in., long. apert. 2.59 in.; defl. 40°. Living, from stomach of cod, Shumagin Islands. Dead on beach: Gull rocks Akutan Pass, and west side of Amaknak Island, Captain's Bay, Unalashka. (Plate 1, fig. 1.)

Nacella (?) *rosea*, Dall. Shell small, egg-ovate, of a deep rose color, externally smooth, except for very faint radiating ridges divaricating from the apex, and for lines of growth. Margin entire; apex minute, produced before the an-

* Printed in advance, Oct. 8, 1872.

terior margin. Interior smooth, white, except the margins, which are polished and of the same color as the exterior. Nacre, especially when weathered, silvery. Long. ·35 in., lat. ·27 in., alt. ·12 in. of largest specimen.

Dead on beach, east side of Simeonoff Island, Shumagins. Living, probably on fuci—off shore. (Plate 1, fig. 2).

This, from its appearance, is probably a true *Nacella*, congeneric with the Cape Horn species, and the first described from the northern hemisphere. Its occurrence with that of several other mollusks in the Aleutian fauna is remarkable; and the facts, on further inspection, have developed a considerable resemblance between these antipodal faunæ.

Littorina aleutica, Dall. Shell depressed, whorls four, the nucleus including one and a half. Last whorl much the largest; spire depressed or nearly flattened. Color variable, from dark brown or purple to waxen white, or banded with white on a darker ground. Nucleus polished, dark brown, translucent. Sculpture consisting of rather coarse lines of growth, and about six or eight nodulous revolving ridges more or less strongly elevated in different specimens, the three middle ones being the most prominent, and faint revolving lines being also traceable occasionally between the ridges. Aperture very oblique, smooth, white or purplish within, outer lip sharp, columella broad, straight, generally with a chink behind it. Anterior margin a little produced. Long. ·41 in., lat. ·53 in., of an average specimen. Animal and operculum precisely as in *L. Sitkana*, which was abundant on the same rocks. Hab. Living at Gull rocks Akutan Pass, Aleutian Islands, abundantly.—W. H. Dall.

This is a very remarkable and distinct species, resembling no other on the West American coast. (Plate 1, fig. 3).

Notes.—*Buccinum Kennicottii*, Dall, proves on obtaining specimens containing the soft parts and the operculum, to be a *Chrysodomus*. It was originally described as a *Buccinum*, in deference to the opinion of the late Dr. William Stimpson, who had recently monographed the northern species of that group. Its distribution is from the Shumagins eastward, not as was originally reported from Unalashka.

Buccinum Baeri, Midd. proves to be a very marked race of *B. cyaneum*. *B. Fischerianum*, Dall. which was suspected at the time it was described to be similarly related to *B. cyaneum*, proves to be distinct.

Haliotis, which has long been tabulated as an inhabitant of the Aleutian chain, does not exist in that part of the archipelago east of Unalashka, and probably not in these islands at all.

A partial comparison of the Conchology of portions of the Atlantic and Pacific coasts of North America.

BY ROBERT E. C. STEARNS.

A striking feature in the Conchological fauna of that part of the Pacific coast included in the Californian and Vancouver Zoölogical province when compared with the molluscan fauna of the Atlantic coast from the Arctic seas to Georgia, is the preponderance in the former of those forms of molluscan life which are embraced in the Order of Scutibranchiata.*

The Scutibranchiate Gasteropods, or shield-gilled crawlers, comprise a great number of mollusks, all of which are marine, and which inhabit the sea shore principally the littoral and laminarian zones, subsisting on marine vegetation; thus we find the beautiful group of *Calliostoma* upon the larger algæ as well as the unique *Trochiscus* (*T. Sowerbyi*), and *Chlorostoma* crawling over the sedimentary rocks, upon which grows the green Cladophora or some allied vegetable form upon which it feeds, and which also is the favorite food of several species of limpets.

The Order of Scutibranchiata according to the Adams's, includes the families of *Neritidæ* (none of which are found in the Californian and Oregonian province, though they begin to appear on the coast of Lower California); the *Trochidæ*, which is largely represented by the following genera: *Eutropia* one species; *Leptothyra* three species; *Pachypoma* and *Pomaulax* one species each; *Liotia* one, perhaps two species; *Thalotia* and *Trochiscus* one species each; *Calliostoma*, *Chlorostoma*, *Omphalius*, *Margarita* and *Gibbula* each by several species.

The Family of *Haliotidæ* which is represented by several species all of large size, widely distributed and exceedingly numerous in individuals; *Fissurella* including *Lucapina*, *Glyphis* and *Clypidella*, also *Puncturella* and *Emarginula*.

Dentaliadæ by two or more species; *Tecturidæ* by several species of *Acmæa* also by *Scurra*; *Gadinia* by one and *Nacella* by six or more species.

Chitonidæ by numerous species and great numbers of individuals.

It may be that some of the groups included by the Messrs. Adams in the Order referred to, as our knowledge increases, will require to be separated or removed, but so far as the purposes of comparison as made herein are considered, the result will not be materially impaired.

The total number of marine molluscan species and well marked varieties within the Californian and Oregonian province, so far as known and determined, is not far from 630, of which about 200 are Bivalves; and of the remaining 430, 123 are included within the Scutibranchs; of this latter number about 40 belong to the Chitonidæ and the same number to the Trochidæ.

Of the 247 marine gasteropods enumerated by the late Dr. Stimpson in the Smithsonian Institution Check-list, as found from the Arctic Seas to Georgia, 32 only, or less than one-eighth, come within the Order mentioned; of this comparatively small number seven (7) are *Chitons* and fourteen (14) belong to the *Trochidæ*, while *Haliotis*† is without a representative; the *Trochidæ* within this province are not represented by such marked or unique characters as distinguish their relatives on the West Coast.

*Vide Adams' Genera of Recent Mollusca, Vol. I, p. 376.

†A solitary specimen of *Haliotis*, of small size, was obtained through dredging in the Gulf Stream, four or five years ago, by Count L. F. Pourtales, of the U. S. Coast Survey, but *south* of Georgia.

Some revision may be required hereafter in the number of Scutibranchiate species credited to the West coast province, as forms now catalogued as distinct may in some instances be united; but on the other hand, it is not unlikely that new forms undoubtedly distinct will be detected when the coast is more thoroughly explored.

Prof. Davidson introduced the following paper, with a few remarks upon the great changes that have taken place and are taking place upon the surface of the earth:

Suggestion of a Cosmical cause for the great Climatic changes upon the Earth.

Disliking hypotheses and theories unless supported by facts almost numerous enough to establish a law, I must characterize as a suggestion what I have to state upon this subject:

So far as I am aware, geologists have failed to indicate any reasonable or rational cause for the extensive sub-tropical fossil flora and fauna found within the Arctic circle; and for the great ice sheet—the universal glacier—which doubtless covered nearly the whole land from the poles towards the tropics at a comparatively recent geological period. To mention, is to condemn the extravagant hypothesis of the changing of the direction of the earth's axis, as it involves changes in the motion of the earth necessarily of greater relative amount than the motions of a boy's top. Partial upheavals and great changes of the surface of the earth are insufficient to account for the phenomena, and involve too many contradictions.

The Palæontologist has roughly indicated by his zones of fossil flora, and fossil fauna, that the pole of the earth has not changed its direction; and this is a rough but tangible proof of the deductions of astronomical observations.

My suggestion is that we must look to a cosmical cause for these phenomena of great and even small climatic changes; and that cause is in the combustion of the material or materials upon the surface of the sun.

The telescope and the spectroscope have made known to us the connection between sudden outbursts of storms upon the sun's surface, and the exhibition of magnetic or electrical phenomena on the earth. There has been established a correspondence between the eleven-year period of the solar spots and certain magnetic phenomena; and it appears probable, that the same inter-dependence may be deduced, the sun's spots (as exhibiting solar phenomena) and the winds and precipitation of rain. The spectroscope has revealed to us a sun wherein a sudden outburst of luminous hydrogen has increased the brilliancy of the star from the ninth to the second magnitude, and its comparatively slow return to its apparently former condition.

It appears to me that herein we strike the key-note of the causes at work to solve the problem of short or long periods of varying climate upon the surface of the earth. If the last mentioned phenomenon is possible in one sun, it is possible in every one of the millions of millions of suns around us, and of course in our sun. That such an eruption of burning hydrogen affected the planets revolving around that sun we cannot for one instant doubt. To our instrumental vision it was an exhibition of force lasting but a few months, and its effects we can never know, but that they were wonderful must be admitted, and the effects may extend through ages. Doubtless, all new stars that have suddenly appeared with great brilliancy, were the exhibitions of similar causes.

If such forces are possible for short periods, they are possible and more probable for comparatively long periods. In our sun the forces are apparently evolved in short, moderately regular periods, and also in short and violent outbursts. The former must have an influence upon the general climate of the earth and of the other planets of our system ; in Mercury and Venus the effects will be greatly in excess of similar effects on the earth. Even in this year of exceptional heat over the earth, we have the spectroscope revealing an unusual development of incandescent magnesium over the surface of the sun, and from this great disturbance of the average climate of the earth we may reasonably expect other and different disturbances.

If these forces of the sun's surface exhibit themselves in short and long periods, we can comprehend how periods of almost universal flood ; of earthquakes and volcanic action ; of a climate to develop sub-tropical fauna and flora even within the arctic circle ; of a great ice sheet spreading over the continents from each pole towards and even reaching the equator, may be not only probable, but place the last two phenomena in full accord with the dictum that no violent change of the direction of the earth's axis is admissible.

The spetroscope is the present means of gathering observations to develop the law underlying these climatic changes ; and as we note the exhibitions of the forces upon the surface of the sun, and observe the effects upon the earth, we can also study the changes upon Mars and the other near planets.

But we may not hope to determine the law of connection between the phenomena exhibited on the surface of the sun and those on the other planets, within a short time. Unless some wonderful event should happen in our sun, similar to the sudden outburst of luminous hydrogen in the star in the Northern Crown, to demonstrate to us in an hour, the effect such great cosmical changes have upon the earth and other planets of our system, or unless other instrumental means far beyond the known capacity of the spectroscope, should be devised to detect connections between unknown and unsuspected changes on the sun's surface and limited or irregular periods of earth phenomena, such as years of great heat, cyclonic storms, and earthquake and volcanic activity, perhaps even years of pestilence, a long cycle of years may be required to demonstrate whether and what law lies at the base of my suggestion.

Like the observers who make their measures to determine the gradual elevation or subsidence of continental shores, we way not learn the results, but we can aggregate observations for discussion by the next generation.

Mr. Hastings remarked the fear created in some communities by Plantamour's predicted collision between a comet and the earth.

Dr. Gibbons mentioned the remarkable coolness of the temperature which prevailed here during the month of September last, which had not been equalled in this latitude for twenty-one years.

Regular Meeting, October 21st, 1872.

President in the Chair.

Twenty-six members present.

Rev. Horatio Stebbins, J. H. Weeden, William Doolan, W. J. Miller, John Perry, Jr., J. M. McDonald, W. H. Sears, W. H. Foster, Jr., William Leffingwell, Andrew McF. Davis, E. G. De Crano, B. F. Ellis, Henry P. Bowie, John Curry, Henry M. Fiske, M.D., William Lane Booker, William Calvert, M.D., Jasper M. McDonald, G. S. Johnson, William B. Thornberg, and Louis T. Haggin, were elected resident members.

Edward F. Hall, Jr., and William Burling, were elected life members, and M. W. Saunders and H. J. Stewart, corresponding members.

Donations to the Museum: Head of a white-tailed deer, with antlers abnormally developed, by J. P. Walton. Specimen of a fern, a new species of *Botrychium*, from Emigrant Gap, by Mr. Dunn. Specimen of a fossil from San Pedro (*Beatrice?*), by Geo. Davidson.

In connection with the deer's head presented to the Academy this evening, it is stated in a note accompanying the gift, "that it is the head and horns of a white-tailed deer, killed in the coast range of mountains, fifteen miles west of Tulare Lake; it was shot by Mr. John S. Walton, who says that it is the only specimen of a white-tailed deer that he has seen among a thousand shot by him; it weighed, when dressed, 175 pounds."

Dr. Blake read the following communication:

Remarks on the Topography of the Great Basin.

BY JAMES BLAKE. M. D.

In some remarks I made in May last, on certain points connected with the position and height of the rim of the Great Basin in Humboldt County, Nevada, I stated that the divide between the waters of the Great Basin and the Columbia was situated much farther to the south than the position usually assigned to it on our maps, and that its elevation was much less than is generally stated.

Having recently visited this section of country, I can now furnish more accurate data as to the position and height of divide, across which the waters of the Great Basin escaped into the valley of the Columbia, at least that portion of the divide situated near the 118th meridian. As regards its geographical position, it has been arrived at by computation from the observed latitude and longitude of Fort McDermott. The course from Winnemucca was determined by compass and measured by the roadometer; and the latitude and longitude of the point thus ascertained was arrived at by computation from the latitude and longitude of Fort McDermott, the nearest point at which any accurate astronomical observations have been made for determining these data. The position thus found is 41° 33′ N. latitude, 118° 29′ E. longitude.* The height of the divide is 590 feet above the valley of the Queen's river, at the place where it makes a bend to the southwest, to lose itself in the Black Rock Desert, and 390 feet above the level of the Humboldt valley at Winnemucca, and 450 feet above the head of Puebla valley. It is formed by one of the terminal spurs of the Vicksburg range. The gap in the range extends at about the same level for four miles in a southeasterly direction, the easterly end being rather lower than the westerly. From the north side of the divide two valleys run, one directly opening into the north end of Puebla valley and the other joining the Wyllie Creek valley, but opening into the main Puebla valley a few miles farther north. From the north end of Puebla valley the waters all run north. Opposite the station at Trout Creek, about eighteen miles from the head of the valley, there has been a fall of about fifty feet, and the waters of the creek run north from the station for a distance of six miles before spreading out to form a lake, the first two miles with a fall of thirty feet to the mile, so that the valley, at the sink of Trout Creek, must be one hundred feet lower than at the head. To the north of the sink of Trout Creek a low divide, not more than a few feet in height, and probably formed by drift sand, separates the waters of Trout Creek from the streams coming from the east side of Stein's mountain. These streams form an extensive series of lakes, extending for some miles along the foot of the mountain;

* In these measurements I have calculated the height from a comparison with the height of the barometer at the summit of the Sierra Nevada.

Some four days having been spent at Winnemucca taking observations, the altitude thus obtained was found to differ by about 100 feet from the altitude as measured by the railroad surveys. I shall have some remarks to make on this anomaly at a future meeting.

and although there is no direct outlet into the waters of the Owhyhee, a tributary of the Columbia, yet the waters from these lakes break out in a series of large springs on the east side of a low divide, forming the head of Crooked Creek, which, after a course of about fifteen miles, joins the Owhyhee. There can be no doubt but that the waters from Stein's mountain are drained by these springs, as the waters of the lakes along the foot of the mountains are comparatively sweet and drinkable, which would not be the case were there no drainage for the waters. In fact, it is highly probable that the waters of Trout Creek are drained subterraneously into the waters of Stein's valley, as fish live at the sink of the creek, which they would not do were the whole of the waters removed by evaporation. From these facts it is evident that the divide between the waters of the Great Basin and of the Columbia is the ridge I have pointed out in latitude 41° 33' N., longitude 113° 29' E., and that instead of being 1,800 feet above the level of the Humboldt, it is not more than 400 feet above the valley, in about the same meridian, 1,000 feet above the lowest part of the sink of that river, and 600 feet above the level of the Salt Lake basin. Whether this is the lowest divide between the waters of the Columbia and the Great Basin, further investigations must determine. The largest beach marks, which are so plainly visible in so many places on the sides of mountain ranges, from the Watsatch mountains to the Sierras, are, I believe, found at about this elevation, so that it is probable that at least for a long period the waters of the basin stood at about the height of this divide I have pointed out. I am, however, of opinion that there are other places in which the present edge of the basin will be found low. On each side of the north end of the Santa Rosa range of mountains, at the head of the west fork of Queen's river, to the west, and also at the head of Paradise Valley, to the east, low passes undoubtedly exist. Not having travelled over them, I am unable to speak as to their absolute height: but from their appearance I believe they are higher than that in the Vicksburg range. Leading up to the divide, from the south, is a broad valley, which gradually rises about six hundred feet in a distance of twenty-four miles. To the north of the divide are two broad valleys, separated by a low spur of granite with basaltic axis. The extent of these valleys is such as to preclude the possibility of their having been formed by any drainage from the surrounding hills. Another indication of the existence of strong currents flowing to the north, in this part of the basin, is furnished by a long promontory of gravel stretching out from the north end of the Bottle Creek range of mountains, and which was evidently formed by the meeting of two powerful currents from the east and west side of the range in their course towards the divide. This bank of shingle extends about three miles from the point of the mountain in a northerly direction. It has been cut through by Queen's river, which here makes a bend to the south. The gravel ridge extends about a quarter of a mile beyond the river, its point apparently having been washed away by the waters from Wheeler Creek. As already stated, the height of the divide above the level of Queen's River Valley is about six hundred feet, but I am of opinion that other outlets must exist, which allowed the waters of the Basin to attain a still lower level, before their disappearance solely by evaporation began. There must, however, have been a large body of water left to disappear by evaporation, as the concretionary deposits, to which I last year called the attention of the Academy, are found at an elevation of two hundred feet above the level of the valley, and they could only have been deposited as the water became concentrated by evaporation. I am of opinion that Queen's River Valley, and a large extent of country to the south and west of it, formed part of a secondary basin, in which water to the depth of three or four hundred feet must have disappeared by evaporation. Over the whole of the area of this secondary basin, as far as I have visited it, unmistakeable evidences are seen of the gradual evaporation of a large body of water. Not only are the rocks and boulders surrounded by a thick coating of concretionary matter, but every solid body that was beneath the surface of the water seems to have afforded a nucleus for its deposition. Large numbers of *Anadonta* shells are found on the surface of the ground, entirely encased in this concretionary substance to the thickness of two or three inches. I propose, however, in a subsequent paper, to describe more fully the structure and composition of these deposits. The eastern edge of this secondary basin is formed by the Santa Rosa mountains. On the north is the high land between the Vicksburg and Santa Rosa ranges, and the low divide between Divide and Puebla valleys. Directly south of the Bottle Creek range the basin is separated from the valley of the Humboldt by a low range of hills about fifteen miles north of the latter river. As to its extent farther to the westward, I have no data. It certainly includes the Black Rock Desert, and I think a considerable extent of country still more to the South and West.

Professor Davidson said that having been asked to solve a question in the subdivision of a circular ring into two or more circular rings of equal area with each other, he had found a general formula which governed that and some other problems suggested by it, and which are believed to be new. These he stated in the following order:

I. Given the diameter of a circle, to determine, in terms of that diameter, the consecutive diameters of the interior circles which will divide it into circular rings and a central circle, of equal values with each other.

To divide it into n circular rings and a central circle, call d the given diameter; x, y, etc., the diameters next interior, and $(w-1)$ and w, the last two diameters; then,

$$x^2 = \frac{(n-1)\ d^2}{n} \ ; \quad y^2 = \frac{(n-2)\ d^2}{n} \ ; \text{ etc.}$$

$$(w-1)^2 = \frac{2d^2}{n} \qquad w^2 = \frac{d^2}{n}$$

II. Given the two diameters of a circular ring, to determine, in terms of those diameters, the consecutive diameters of the circles which will subdivide the ring into a given number of circular rings of equal area with each other.

Let d' represent the outer, and d the inner diameters of the given circular ring; n, the number of circular rings, x the first diameter interior to d', y the second, and $(w-1)$ and w the last two; then,

$$x^2 = \frac{d^2 + (n-1)\,d'^2}{n} \quad : \quad y^2 = \frac{2d^2 + (n-2)\,d'^2}{n} \quad : \text{ etc.}$$

$$(w-1)^2 = \frac{(n-2)\ d^2 + 2d'^2}{n} \quad : \quad w^2 = \frac{(n-1)\ d^2 + d'^2}{n}$$

III. Having subdivided the circular ring as in problem II, determine, in terms of the two given diameters, the consecutive diameters of the required circular rings inside the given ring and having equal areas with the prescribed subdivisions.

Let d', d, x, y, etc., represent quantities as before, i', i'', i''', etc., the consecutive diameters of the inner circular rings, and suppose the given circular ring is divided into p circular rings; and there are required n inner circular rings, then,

$$i^2_n = \frac{(n + p)\ d^2 - n\,d'^2}{p}$$

IV. Having subdivided the circular ring as in problem II, determine, in terms of the given diameters, the consecutive diameters of the circular rings outside the given ring, and having equal areas with the prescribed subdivisions.

Let d', d, x, y, etc., represent quantities as before, o', o'', o''', etc., the consecutive diameters of the outer circular rings, and suppose the given circular ring is divided into p circular rings; and there are required n outer circular rings, then,

$$o^2_n = \frac{(n + p)\ d'^2 - n\,d^2}{p}$$

Regular Meeting, November 4th, 1872.

President in the Chair.

Thirty-one members present.

Rev. A. J. Nelson, James G. Steele, Rev. Joseph Wythe, James F. Bowman, Rev. Otis Gibson, John S. Bugbee, and G. D. Wyman, were elected resident members; and Richard S. Floyd, B. Howard Coit, and Peder Sather, were elected life members: Henry Glass, U. S. N., was elected a corresponding member.

Donations to the Museum: Specimens of Reptilia and Crustacea from San Diego, also, *Lingula albida*, and other rare species of mollusks from the same locality, by Henry Hemphill. Crystal of black quartz from Alaska, by William Burling. Specimen of lobster, *Asaphus Oregonense*, Nutt., from the Stockton Slough, by S. R. Throckmorton. Specimens of the Tule potato (a species of artichoke), from the tule lands of the San Joaquin river, and other species of plants; also specimens of two species of *Hyla* (tree frogs), and specimen of nest of Marsh Wren, by C. D. Gibbes.

Dr. Kellogg said he had just returned from under the shadow of the finest evergreens that there *were* in California — true chestnut trees, *Castanea chrysophylla*, from 100 to 200 feet high, 4 to 6 feet in diameter, with a clean trunk of 50 to 75 feet. Similar statements he had made times unnumbered from the Academy's first existence, and are in the Proceedings, but seem to be overlooked by our Eastern friends. He would also state that, on the trip, he had met with the *Rhus aromatica*, a shrub found in Sacramento City, on his first arrival, in 1849, and often brought to his attention since. This also had often been brought to the attention of the Academy. A *Viburnum* is among the Academy's collection from this part of California, (Mendocino County,) recently presented, besides two specimens of huckleberries, if no more.

Mr. C. D. Gibbes remarked upon the variations of the magnetic needle, noticed by him while surveying in the Upper San Joaquin county, and the supposed cause thereof; the subject was discussed by Prof. Davidson and Mr. Gibbes; and the former expressed the belief that if caused by ordinary local attraction, it could be obviated by a sufficient elevation of the compass as practised upon iron ships.

Mr. Gibbes remarked that the plant known to the settlers along the San Joaquin as the "Wild Artichoke," is *Lycopus Europæus*, commonly termed the Water Horehound. The resemblance of the thickened runners to the Jerusalem artichoke, suggested the name Wild Artichoke. The two plants are widely separated botanically —one belonging to the *Labiatæ*, or mint family; the other is the *Helianthus tuberosus* of the natural order Compositæ or Aster family. This last must not be confounded with a composite plant, the flowering heads of which are sold in our markets as artichokes.

Mr. Gibbes also referred to a species of *Sagittaria*, presented by him, which he collected on the tule lands bordering the San Joaquin River, as interesting, inasmuch as it enabled him to determine a plant, the tubers of which he had often seen in the Chinese markets, but never was able to get specimens of the growing plant. He supposed it to be an introduced vegetable from China; it is, however, a plant indigenous to California, and is also found in many parts of the United States. It is, probably, *S. variabilis*, which furnishes a half-dozen varieties. In referring to the literature of this plant, he found no author referring to the tuberous character of the roots, except in one of the reports of the Pacific Railroad surveying parties, where they are said to be eaten by the Indians, who term them "*Wapatoo*."

Prof. E. S. Carr read an abstract from an unpublished paper by John Muir, describing living glaciers, discovered by the latter gentleman in the cañons of Tuolumne county.

Descriptions of Three New Species of Crustacea, Parasitic on the Cetacea of the N. W. Coast of America.*

BY W. H. DALL, U. S. COAST SURVEY.

Genus CYAMUS, Lam.

Cyamus Lam. Syst. An. s. Vert. p. 166. Bate & Westwood, ii, p. 80.

Larunda and *Panope*. Leach.

Cyamus Scammoni, n. sp. ♂ Body moderately depressed, of an egg ovate form; segments slightly separated. Third and fourth segments furnished with a branchia at each side. This, near its base, divides into two cylindrical fila-

* Printed in advance, November 9, 1872.

ments spirally coiled from right to left. At the base of each branchia are two slender accessory filaments not coiled, quite short, and situated, one before, and the other behind, the base of the main branchia. Second pair of hands, kidney-shaped, with the carpal articulation half-way between the distal and proximal ends; and having two pointed tubercles on the inferior edge, before the carpal joint. Third and fourth segments somewhat punctate above, all the others smooth: the sixth and seventh, slightly serrate on the upper anterior edge, and without ventral spines. Color yellowish white. Lon. ·70, lat. ·39 in. of largest specimen.

♀ Similiar to the ♂ in all respects, excepting in being a little more slender, and in wanting the accessory appendages to the branchiæ; the ovigerous sacs are four in number, overlapping each other.

Habitat, on the California Gray Whale, *Rhachianectes glaucus* of Cope, on the coast of California; very numerous. This species is named in honor of Capt. C. M. Scammon, U. S. Rev. Marine, well known by his studies on the cetaceans. The specimens here described were collected and submitted by him for description, and will be figured in his forthcoming monograph of the West Coast whales. I may remark here that these species are all so distinct from those figured by Milne-Edwards, Gosse, Bate and Westwood, that a comparative description has seemed unnecessary; also, that the species obtained on different species of cetaceans have so far been found invariably distinct. The inference is, of course, that each cetacean has its peculiar parasites, a supposition which agrees with our knowledge of the facts in many groups of terrestial animals.

Cyamus suffusus, n. sp. Body flattened, elongate; segments subequal, outer edges widely separated. Branchiæ, single, cylindrical slender, with a very short papilliform appendage before and behind each branchia. Superior antennæ unusually long and stout. First pair of hands quadrant-shaped; second pair slightly punctate, arcuate, emarginate on the inferior edge, with a pointed tubercle on each side of the emargination. Third joint of the posterior legs keeled above, with a prong below. Pleon extremely minute. Segments all smooth. No ventral spines on the posterior segments. Color, yellowish white, suffused with rose-purple, strongest on the antennæ and branchiæ. Length, ·41, breadth (of body) ·25 in. All the specimens which have passed under my observation, some eight or ten in number, were males.

Habitat, on the "hump-back" whale, *Megaptera versabilis*, Cope, Monterey, California.

Cyamus mysticeti, n. sp. Body flattened, subovate, segments adjacent. Branchiæ single, short, stout, pedunculated, a single papilliform appendage behind each. Head short and wide. First pair of legs very small. Hands all simple and smooth, fingers greatly recurved. Carpal articulation in the second pair of hands, half way between the proximal and distal ends of the hand. Pleon very minute. Color dark brownish yellow. Length ·33 in; breadth (of body) ·16 in. Two female specimens.

Habitat, on the northern "bowhead" whale, probably *Balæna mysticetus*, Lin., near Bering Strait.

This is the most compact of the three species, as well as the smallest. I find in comparing large series of *C. Scammoni*, that a considerable variation in form obtains so far as regards comparative length and breadth, even in adult specimens, and these differences are greater than those observed, in the same characters, between the sexes.

Notes on Pre-Historic Remains in the Aleutian Islands.

BY W. H. DALL, U. S. COAST SURVEY.

Captain's Bay, Unalashka.—There are several village sites on this bay which, inhabited during the period subsequent to the Russian occupation of the territory, are now, and long have been deserted. The principal are the Pestriakoff, or Eider village, near Cape Cheerful; one on the south part of Amaknak Island, just south of Expedition Island, on Iliuliuk Harbor, and one in Nateekin Bay; beside the Kalekhta Bay village, more recently evacuated by its inhabitants. The only localities now inhabited are the village of Imagnee on Summer Bay, the village of Iliuliuk, and another of two or three houses, on Uknadok or Hog Island.

In excavating for the erection of a signal, at the northern end of Ulakhta Spit, Amaknak Island, the nature of the materials brought out showed that the locality had once been inhabited. Subsequent inquiries elicited the fact that the oldest inhabitants of Iliuliuk had never heard of any village being situated here, although villages which were deserted in the last century are well known by tradition to the Aleuts of the present day. Hence, it is a reasonable supposition that the village under consideration must at least have ante-dated the Russian invasion of 1760, and may have been older. Hence, the implements, etc., found in this deposit, are in all probability the same as those originally in use among the natives of this region before the introduction of manufactured articles of trade by civilized nations. On this account they are of singular interest. A careful examination of the locality afforded the following observations:

The Ulakhta Spit projects from Amaknak Island, trending nearly in a north and south direction. It is very narrow, being in some places only seven meters wide, and is composed entirely of shingle overlaid by a stratum of vegetable mould, which supports a luxuriant growth of the native grasses. Near the junction of the spit with the main island, it rises, and is continued in a series of low mounds for a quarter of a mile. Between these mounds and the mountainous portion of Amaknak Island, called Ulakhta Head, is a low and narrow strip of ground containing a small pond of brackish water. The highest of these mounds is quite near the north head of the spit, and it was here that my signal was located.

Upon this mound, about twenty feet above high water-mark, by careful scrutiny, I was able to detect at least three depressions of considerable size, which I judged to be the sites of houses of the ancient Aleutian fashion, that is to say, half underground, of sufficient size to accommodate a number of families, each of which had a sort of compartment to itself. The hardy Aleuts had no fires in their houses except for cooking, and this was often done outside. They descended on a notched stick, through an aperture in the middle of the roof, which was also the only window. These depressions appeared to me to be the remains of some of these houses, a supposition afterwards confirmed by our excavations.

In digging the hole for the signal, we got two stone lamps for burning seal oil, about as deep as a saucer, and of an egg-oval shape, exactly similar to some I have seen in use among the present Eskimo of Bering Straits. They were of soft porphyritic rock and still retained traces of the action of fire. When used, they were filled with dried sphagnum soaked in seal oil, which gives out considerable light and heat, as well as smoke. We also obtained a bone arrow-head of the Eskimo pattern from this excavation. The next time that we visited the station, while busy in taking trigonometrical observations, I directed the boat's crew to dig in the northwest corner of what I supposed to be the remains of a house or yourt. This depression was on the crest of the ridge facing east and west, the longer sides about forty feet long and the ends about twenty feet.

The first thing noticed was a sort of wall of rough stones evidently obtained from the neighboring beach, with here and there a whale-rib, in a perpendicular position, which had probably assisted in supporting the roof. Further excavation for a couple of feet revealed a human skeleton in perfect preservation. The body had been doubled up so as to bring the knees up to the chin. It was lying on the right side in a horizontal plane facing the southeast. Two others were afterwards discovered in an exactly similar position. They were about three feet from the surface, but not so far from the inner wall of the house: one was the skeleton of a woman. A few rough flat stones were placed around and under them, but no articles of use or ornament were with the skeletons. It is a matter of record that the ancient Aleuts, when a person died in one of their houses, built up the body in the compartment which had belonged to the person when living, and continued to occupy the remainder of the yourt, as usual. The position in which these skeletons were found, indicates that such was the manner in which they had been interred. It is still a common practice among tribes of the Orarian stock, to tie up the body of a dead person in the manner just described. Further digging showed that a great part of the mound was composed of materials foreign to the locality. These principally consisted of bones of cetaceans, fur seal, (*Callorhinus ursinus*) sea lion, (*Eumetopias Stelleri*) and sea birds, principally ducks and gulls or petrels. There were also large accumulations of the shells of edible mollusks, among the most conspicuous of which were the common mussel (*Mytilus edulis*), *Saxidomus squalidus*, Desh., *Tapes staminea*, Conr. and *Modiola modiolus* L. All the above are still living in these seas, most of which are still found in Captain's Bay, and form a portion of the food of the existing native population. The sea lion and walrus are no longer found in Unalashka, and the fur seal but rarely. That they must have been very abundant at one time is evident from the great accumulation of their bones in this single mound, which was literally half composed of such debris, arranged in layers separated by vegetable mould. From these materials we picked out a number of articles of interest.

These were principally stone lamps like those previously described, of various sizes, differing in some extent in form and nicety of finish. Besides these there were also many large rough stones, either naturally or artificially hollowed out on one side, which had been subjected to the action of fire, and were probably the pavement or hearth upon which fire had been built for culinary purposes. Several rough pieces of cetacean bone were found brought to a sharp square edge at one end, and formerly in use for dressing skins. A few stone knives were found, all of the native pattern, *i. e.*, shaped like a chopping knife. These were of a dark slate-stone, which must have been brought from a locality nearer the mainland of America, as it is not found in Unalashka, or the islands west of it as far as known. Also a large part of a flat spoon of carved bone, with a grooved handle, several awls usually made from the wing bones of birds, bone arrow-heads of Eskimo pattern, fragments of bones variously grooved, cut or carved, and a little ball of bone half perforated. This puzzled me for a long time, until an old Aleut informed me that, in his boyhood, he had seen such things used as buttons, to be placed on the end of a bone lance or arrow, when practising at a mark, in order that the point might not become blunted or injured. None of these articles exhibited any particular skill in carving, or any ornamental patterns except of straight lines. A number of chipped flints which had evidently been used in striking fire, were also found.

Further explorations made during the ensuing winter and spring, revealed the sites of seven villages on Amaknak Island alone, of which but one or two are known even by tradition. Excavations in one or two of these places revealed similar implements to those already described ; others might doubtless have turned up, but my means and time were too limited to permit very extensive excavations. I was able, however, to detect two other modes of burial among these prehistoric natives.

In certain places at the foot of overhanging cliffs, a wall had been built up until the rock above was reached, and outside a bank of earth or turf covered this wall. In the space inside, the debris had then been removed, and in this space, on a layer of small sticks of driftwood, the bodies had been laid, one above the other. In one case I found six skeletons, so placed and separated only by the layers of sticks and a piece of grass matting similar to that still manufactured by the natives of Unalashka. Here again I noted the remarkable absence of any utensils or articles of apparel or ornament. Only one bone arrow-head, with a piece of its shaft, and a fragment of a wooden mask, were found during the examination of some four or five of these caves, crammed with remains of skeletons. The bones were much decayed wherever water, percolating through the rocks, had been able to reach them, but where they were dry, they were well preserved. The bones agreed, in all essential respects, with Eskimo remains of similar character; the only anatomical peculiarity was the great stoutnesss of the long bones and a remarkable thickening of the inner face of the under jaw, which was so extensive, in a majority of cases, as to nearly close the space between the two halves of the jaw, the bone being over an inch in diameter in several cases.

A small cave exists, under an isolated rock, which stands on one of the raised beaches on the middle portion of the island. The entrance is very low, but inside one can stand erect, the cave being about twenty feet in diameter, and of an oval form, the highest point of the dome-shaped roof being about ten feet above the floor. A good deal of water had penetrated through the crevices of the rock, and the bones in this cave were very much decayed. I remarked remains of seven skeletons, arranged around the edges of the cave, that at the extremity of the cave furthest from the entrance being the skeleton of a woman, and close to it the remains of an infant. The floor consisted of about six inches of black mould, covering the usual shingle of the beaches. A number of angular fragments of rock had fallen from above. No remains of animals were found here, and if there had been any wooden articles they had all rotted away.

Near one of the skeletons was found, heaped together, a number of stone knives, a bone awl, and two fragments, one of pumice and the other of fine sandstone, with their edges and surfaces smoothed and squared evidently for the purpose of dressing down the asperities of skins to be used for clothing. The most interesting collection was found near the skeleton of the woman, and consisted of two bone labrets* shaped like those now in use among the Thlinkets and Botocudos. These are doubtless very ancient, as all traces of the usage have long since passed away. There were besides, a lot of needles made of the wing bones of birds, a needle case made of the humerus of some large bird, closed at each end by a wooden stopper, bone awls, stone knives, a whetstone of fine grained sand rock, and a little case of birch bark containing plumbago. Neither the birch, the sandstone, nor the black slate, of which the knives were made, nor the plumbago, exist on the island of Unalashka.

As proved by other researches on the islands of Kadiak and Unga, the early Aleuts were accustomed to preserve the remains of their more eminent dead by removing the viscera, stuffing the body with dry grass and drying it. This was placed in some dry cave, dressed as in life, ornamented with gay apparel, and covered with wooden carvings, the most remarkable of which were masks of large size, painted of different colors and ornamented with feathers, tufts of hair and bristles from the deer. A very great variety of other carvings were also placed in these caves,† and sometimes the bodies, placed in natural attitudes, were covered entirely with carved wooden armor, or placed in a miniature canoe or bidarka, armed as if hunting, or holding a paddle. Women were represented as if sewing, dressing skins or nursing their infants; old men as if beating their drums, as they do during the winter-dances in Eskimo villages to this day.

But few of these remains exist in a well preserved condition, yet the extent of the practice may be understood from the fact that over thirty different masks, all more or less mutilated, were found in one cave at Unga. Any notes in regard to them possess a certain interest, and may be worthy of preserva-

* Pl. II, figs. 1-2.

† Pl. II, figs. 3-5.

tion, as before many years have gone by, even the traces of these by-gone customs will have entirely disappeared.

Shelikoff reported on the first census in 1795 a population of ten thousand Aleuts, including thirty-six hundred natives of Kadiak. In 1867 the total Aleutian population in the islands amounted to about 1930, according to the report of Prof. Geo. Davidson, U. S. Coast Survey. The census for 1871, as reported to me by the priest of Unalashka, was 2574 in all; of the inhabitants of the islands only, there were in 1870, 1901, with 97 births and 104 deaths; in 1871, 1913 souls, with 44 births and 57 deaths; the increase of 12 being due to immigration from Sitka and the mainland. The death rate is slightly the largest and a gradual decrease in population is resulting, pointing toward the final extinction of the race.

The Horse Disease and its Treatment.

BY A. B. STOUT, M. D.

The probability that the "Horse Disease," now prevailing in the Eastern and Western States, may reach California, renders it a subject worthy of earnest study. It is probable, or at least greatly to be hoped, that the elevated and cold barrier of the Sierras may interrupt and prevent its passage across the Rocky Mountains. Even if it should, the original germ-elements of its existence may as well be generated primarily, if climatic influences favor their production, on this as on that side of the mountains.

It may then prove a public benefit to throw what light we can on this malady, as far in advance as possible of its invasion. Being thus armed in advance with information, every horse-owner in the State may be prepared to act as his own veterinary surgeon.

We may premise by saying that the usual appliances of veterinary surgeons will not succeed. The nature of the malady is that of an intermittent fever disposed to assume a typhoid type. The nasal catarrh, the throat disease, and the congestion of the lungs, which appear with more or less acuteness, are only secondary affections, and abate so soon as the primary fever and brain disorder are controlled. Hence it is that purgatives, drenches, sweats, blisters and clysters, if relied upon alone, assist the malady by promoting debility. Whatever debilitates the animal will favor the disease; because the disease itself is one of debility, caused by the poisoning of the blood through malarious influence. This poison prostrates the power of the brain and corrupts the blood; nervous fever results, and the animal requires support rather than debilitating agents.

THE SYMPTOMS OF THE DISEASE,

As yet obtained, are very vaguely described; but the one symptom, that of the coldness of the legs and ears, is almost sufficient to define the malady. No journals have as yet given a clear account of the general symptoms. When the air containing the germ-poison which the horse breathes comes in contact with the lining membrane of the nose, mouth and throat, it is quite natural that enough of those poison-particles should attach themselves to these membranes, on the way to the lungs, and excite inflammation, with discharge of matter, firstly thin and clear and afterwards thick and yellow. If they have activity enough so to excite a local inflammation, how much more serious must be their energy when absorbed through the lungs into the blood, and thence transmitted to the brain.

While, then, it may be very well to make some local applications to the nose and throat to soothe that irritation, and empty the digestive organs of the horse by mild purgation, the object of the cure can only be effected by counteracting the influence of the poison on the blood and brain. This fairly attained, the local catarrh will rapidly abate. The fatality of the disease will depend upon the degree of intoxication, (empoisonment) and the celerity with which remedies are applied in its earliest appearance.

THE FATALITY OF THE THROAT AFFECTION

Is less to be feared, for it depends upon the neglect to relieve the primary malady. The inflammation in the narrow passage to the lungs becomes dangerous by superseding the primary in acuteness; and then kills by direct suffocation or strangulation, rather than by the malarious influence on the blood and brain.

The rational and

NATURAL TREATMENT

To be derived from these views is to apply the same remedies to the horse as would be resorted to for the human being. Due allowance being made for the comparative differences between man and the horse, the same treatment which is known to counteract malarious disease in the former, will also cure the latter. It is not asserted that all climatic germ-poisons are identical, but that they are so nearly allied in their action on living beings, that modifications of the same general treatment will suffice to control them all. The same accuracy of dosage cannot be obtained for the horse as may be attained for man, because the animal cannot define his sensations, and the prescribers, horse-owners and farmers, are novices in the art of medication; they cannot estimate the differences dependent upon age, strength, sex, and the degree of acuteness of the malady. On such discriminations the animal must take his chance.

Being satisfied of the identity of the disease with that of the human subject—and the similarity of treatment, the next question would be the dosage or the comparative quantity of the remedy. If this were estimated by the ratio of bulk and weight, the relative dose would be from five to eight times greater for the horse than the man. But the organ to be acted upon is the brain, which in the horse bears no such proportion to that of man. Again, the simplicity and uniformity of food and habits of the horse, would render his nervous system much more impressionable to active therapeutic agents. The same would be true of the other functional organs of the animal. A safe inference would be the same, or at the utmost double doses, would amply suffice.

HORSE DISEASE IN CALIFORNIA.

Horse disease is no new thing in California. It has existed with more or less intensity for years. The chicken disease may be mentioned in the same category, and, doubtless, is referable to the same climatic conditions. How often have we heard of four or five horses dying within a few days in the same stable, and suspicions been excited that the water had been poisoned or some foul play been practiced. Sometimes two or three horses, where there was no imputation of overdriving or abuse, have died in a night—especially where the horses have been kept in basement stalls, and where the access of pure air was defective. These horses were, in truth, the victims of malarious infection, but unfortunately this truth was not recognized.

The Rinder-pest of Germany is another illustration of a similar infection, only its intensity was felt by the horned cattle. If, then, the horse disease appear as a general epidemic in California, some cautious reserve may well be exercised before the disease is pronounced to be an importation from the Eastern States, for it is certain that it may exist from local climatic cause, and not necessarily be the result of propagation by contagion or by the diffusion of an onward march from State to State.

THE CURE.

The sheet-anchor of treatment is Quinine. To it all other remedies are only auxiliaries. This should be at once administered without waiting for other preliminary treatment. The best moment to give the Sulph. Quinine, if the prescriber is capable to judge, is in the cold stage of the fever, or when it is at its lowest temperature, as indicated by the coldness of the legs and ears. Fifteen to thirty grains at the dose, every three hours—continued for twenty-four or forty-eight hours—according to the severity of the attack. During this time a mild purgative of Jalap, Guaiac and Glauber salt may be of service. Let the animal be well blanketed to promote perspiration, and fed with warm mash.

The catarrh will be relieved by a local application of infusion of Golden Seal (Hydratus) in which a few drops of Carbolic Acid, dissolved in a teaspoonful of spirit of wine or whisky, have been mixed. This remedy should be injected into the nostrils with a syringe having a long beak. In this way it will not only bathe the nasal membrane, but will reach the throat. Some of it will also be swallowed, which will serve a good purpose in cleansing the stomach. In this mixture the quinine may be dissolved and be poured from a bottle down the horse's throat, serving thereby at the same time, the purpose of a throat wash. A wine-glass full of the infusion of Golden Seal will suffice for each nostril. If the fever is high the shoes should be taken off, and warm poultices of flax-seed meal be applied to the feet and fetlocks.

THE HYGIENE OF THE STABLE

Is a subject of the utmost importance. A bad and dirty stable is of itself enough to engender the disease. So that any false economy in this respect may lead to very expensive results.

All sick horses should be forthwith removed from basement stalls. Free ventilation to free the stable from ammoniacal and urinary odors is indispensable. Probably the best disinfectant, because not poisonous and very efficient, is the Bromo-chlor. alum, which should be frequently sprinkled from a watering pot through the stalls and passages, a pint to a bucket full of water suffices. The addition of Carbolic acid, $\frac{1}{4}$ oz. to the same measure, may be advantageously added. The Bromo-chlor. alum may be obtained, as well as the Golden Seal infusion, at any drug store.

This disinfectant freely sprinkled into the manure pit will not injure the fertilizing properties of that substance. But here Chloride of Lime may also enter. But if Chloride of Lime is too freely used in the stable, the chlorine set at liberty will make the horses cough, and increase the nasal catarrh.

Before closing we venture the enquiry, may not the glanders (farcin) be closely allied to the malarious contagious; and, although the glanders is always considered an incurable, fatal disease, might not this same treatment prove that this disease may likewise be cured?

Prof. Davidson said he had a series of problems in mensuration similar to those offered on a previous evening; of these, he presented the following:

V. Given, the side of a square, to determine, in terms of that side, the consecutive sides of the interior squares which will divide it into a series of hollow squares and a central square, of equal values with each other.

To divide it into n hollow squares and a central square, call l the given side, x, y, etc., the sides next interior, $(w-1)$ and w the last two; then,

$$x^2 = \frac{(n-1)\ l^2}{n} \quad : \quad y^2 = \frac{(n-2)\ l^2}{n} \quad : \quad \text{etc.}$$

$$(w-1)^2 = \frac{2\,l^2}{n} \quad : \quad w = \frac{l^2}{n}$$

VI. Given the sides of a hollow square, to determine, in terms of those sides, the consecutive sides of the squares which will subdivide the hollow square into a given number of hollow squares of equal areas with each other.

Let l' represent the outer, and l the inner sides of the given hollow square; n the number of hollow squares, x the first side interior to l', y the second, $(w-1)$ and w the last two; then,

$$n^2 = \frac{(n-1)\ l^2 + l'^2}{n} \quad : \quad y^2 = \frac{(n-2)\ l^2 + l'^2}{n} \quad \text{etc.}$$

$$(w-1)^2 = \frac{2l^2 + (n-2)\,l'^2}{n} \quad : \quad w = \frac{l^2 + (n-1)\ l'^2}{n}$$

VII. Having subdivided the hollow square as in problem VI, to determine, in terms of the two given sides, the consecutive sides of the hollow squares inside the given hollow square, and having equal areas with the prescribed subdivisions.

Let l', l, x, y, etc., represent quantities as before, i', i'', i''', etc., the consecutive sides of the inner hollow squares, and suppose the given hollow square is divided into p hollow squares; and there are required n inner hollow squares, then,

$$i_n^2 = \frac{(n+p)\ l^2 - n\,l'^2}{p}$$

VIII. Having subdivided the hollow square as in problem VI, to determine, in terms of the two given sides, the consecutive sides of the hollow squares outside the given hollow square, and having equal areas with the previous subdivisions.

Let l', l, x. y, etc., represent quantities as before, o', o'', o''', etc., the consecutive sides of the outer hollow squares, and suppose the given hollow square is divided into p hollow squares; and there are required n outer hollow squares, then,

$$o_n^2 = \frac{(n+p)\ l'^2 - n\,l^2}{p}$$

Regular Meeting, November 18th, 1872.

President in the Chair.

Twenty-nine members present.

H. F. Teschmacher, Ezra S. Carr, and J. A. Hoffman were elected resident members.

Donations to Library: Am. Naturalist, Oct. and Nov., 1872. Overland Monthly. Am. Jour. Science and Arts, Oct. and Nov., 1872. Fifth Ann. Rep. Peabody Acad. Sci. White Coffee-Leaf Miner, Pamph. Report of Geological Survey of N. H. Memoirs of Boston Society Nat. History. Proc. Phil. Acad. Nat. Sci. Proc. Boston Society Nat. His. On the Transit of Venus in 1874, Pamph. 4to. Observations Encke's Comet in 1871, Pamph. 4to.

Sequoia and its History, by A. Gray, Pamph. 8vo. Am. Chemist, Sept., 1872.

Donations to the Museum: Tusk and lower jaw of *Elephas primigenius*; also, one side of lower jaw with teeth of some extinct ruminant, from Elephant Point, Eschscholtz Bay, Kotzebue Sound, from the Alaska Commercial Company — (the tusk weighs 155 pounds). Specimen of *Chimæra collei*, by J. P. Dameron.

Description of a new Species of Hibiscus.

BY A. KELLOGG, M. D.

Hibiscus Californicus, Kellogg.—Stem 5 to 7 feet high, branching above and stooling abundantly from a perennial crown, velvety stellate pubescent throughout. Leaves cordate (rarely sub-3-lobed) acute, or somewhat acuminate, serrate, 5 to 7 nerved, petiole about $\frac{2}{3}$ the length of the blade (lamina 4 to 5 inches in length, and 3 to 4 in width). Peduncles axillary, 3 to 4 inches long, articulated an inch or more below the flower, lower half confluent. Involucels about 12, sub-equal, persistent; calyx strongly nerved. Flowers light lemon yellow, with purple centre and reddish nerves, about the size of common *Hollyhock*. Capsule large, seeds many, minutely pappillose-warty, chalaza loosely appressed, dorsal line wanting.

The above was collected by Mr. C. D. Gibbes, at Webb's Landing, on an island in the San Joaquin River.

The President introduced Prof. Bradley and Dr. Curtis, who were attached to the Yellowstone Expedition, under Prof. Hayden. Prof. Bradley had charge of the Snake River party, which investigated that region, almost a *terra incognita*. The objective point was the three Tetons, the trip to which was full of interest in the discovery of limestone and Trilobites, of the Quebec group, at Fort Hall. At the edge of the Snake River Valley, the basalt commences; in this region were found extinct craters, the lava from which contained numerous crystals of quartzite. To the north of this are some domes of singular appearance, called the Sand Hill Mountains. In the Teton basin is some fine agricultural land, adapted for wheat, etc., though the area is not large. Two of the party ascended the Big Teton, 13,400 feet, by aneroid barometer, to summit. The formation of the country indicates that the valley was once a lake. The limestones are of the Quebec group, the ferruginous quartzite represents the Potsdam; the mass of the Teton group is of metamorphic character. On one of these ridges were found the remains of what appeared to have been a fortification. Near Henry's Lake, we found immense masses of obsidian sandstone. In this vicinity, we observed a crater of two miles in length by one-half a mile wide, called Sawtelle's Peak. To the north of Henry's Lake is Reynolds' Pass; to the west of the lake is Red-rock Pass, one hundred feet above the basin. There are many geysers throwing columns eight to ten feet high, and innumerable smaller geysers; the "Old Faithful" 120 feet high, and two to three feet in diameter; the Grand Geyser is said to reach a height of 300 feet—we saw it of a height of 200 feet, it shook the ground severely; at first, a loud pumping noise is heard, and after some three to seven pulsations, the flow commences. We found a lake, to which we gave the name of Lewis' Lake, in memory of the great explorer whose name should be attached to Snake River; the general elevation of this lake region is from six to seven thousand feet. At this elevation were found beds of river gravel, showing that a river system formerly existed far above the present level. The cañon at the outlet of Lewis' Lake fully equals the cañon of the Yellowstone, but without the picturesque coloring; here were evidences of external glacial action.

Dr. Curtis remarked the occurrence of springs of a temperature of 180° to 198° Fahrenheit. Animal life was found in water of 186°. In August, we had to break the ice to obtain water for washing. The number of geysers must be 10,000. "Old Faithful" spouted every sixty-five minutes, and continued for seven minutes. Three practical passes were found breaking through the mountains, so low that a railroad could easily be built.

Mr. Dall stated that the tusk and the accompanying bones, presented to the Academy this evening, were collected in the celebrated deposit on Elephant Point, Kotzebue Sound, by Capt. E. E. Smith, of the Alaska Commercial Company's schooner *Eustace*.

Previous to the Captain's visit, Mr. Dall had described the deposit to him, and urged the importance of examining the exact circumstances under which the bones occur, and the features of the "ice-cliffs" of the locality, about which some conflicting testimony had been given by the officers of Kotzebue's Expedition, of Capt. Beechey's party, and the officers of the *Herald's* voyage. The locality, according to Captain Smith's account, is well represented in the plate prefixed to Seemann's Botany of the *Herald's* voyage. Captain Smith's examination showed beyond question, that the ice-stratum of thirty or forty feet in thickness occurs in a depression amongst some very low and rolling hills, and is composed of solid and nearly pure ice. It is surmounted by a stratum of blue clay about four feet in thickness, covered with a thin layer of vegetable matter, in which moss, willows and *Vaccinium* bushes were growing. There are no rocks in the immediate vicinity from which the clay might have been derived by decomposition, and the very low and rolling character of the land in the vicinity, chiefly composed of basaltic rocks covered with soil, precluded the idea of a glacier having existed in the vicinity, and rendered it improbable that the locality could have been the estuary of any considerable stream.

In the stratum of clay the fossils are found, and here only, except where by the wearing away of the bank they have fallen upon the beach. The ice is therefore older than the latest tertiary in which these remains occur.

The formation of these strata remains a mystery. Mr. Dall, in his work on Alaska, had suggested a hypothesis which might have accounted for it; but in the light of these later investigations he felt compelled to withdraw it as untenable.

Mr. Bradley suggested that the region might have been below the level of the sea, and the remains have been washed into it by the action of some river in the vicinity, which, at the same time, covered the pre-existing ice with clay; but Mr. Dall thought that the topography of the vicinity, and the fact that no marine fossils were found associated with the other remains, rendered this improbable.

Regular Meeting, December 2nd, 1872.

President in the Chair.

Thirty members present.

Henry F. Williams, J. D. Pierson, John M. Willey, M. D., Barrington Gethen, Richard Gird and Richard L. Ogden were elected resident members.

Donations to Library: Map of the Pioche Mining District, Nevada, by E. Durand.

Donations to the Museum: Specimens of Californian and Alaskan Woods, from W. G. W. Harford. A collection of Insects from the Sierras, by George Davidson. Specimen of precipitated Copper, from a mine at Copperopolis, by William Burling.

The specimen of precipitated copper, donated to the Academy, was taken from a copper mine at Copperopolis, which had partially filled with water; the copper had precipitated upon a pick-iron, and the iron subsequently dissolved, leaving the copper as a matrix or external cast.

Mr. Goodyear presented the results of his observations during a recent trip to the North, of which the following is an abstract:

Notes on the Geology of the Coast of Oregon.

BY W. A. GOODYEAR.

On his trip to Koos Bay, by the stage route, little was noted beyond what is described in the geological report, except the fact that the cañon of the upper Sacramento River had long existed prior to the flow of basaltic lava which once ran for fifteen or twenty miles along its channel; the deepening of the cañon since that epoch having been comparatively small, amounting to an estimated depth of 200 to 400 feet below the lava flow.

Between the Rogue and Umpquah Rivers, the country is very mountainous and heavily timbered: but nothing of volcanic character was seen in Southern Oregon, except two or three flat-topped hills near Jacksonville, and locally known as the "Table Rocks," of which the capping is probably basaltic lava; hence to the lower Willamette Valley no other volcanic matter was seen.

From Roseburg to Koos Bay, distant sixty-three miles, the road passes over the Coast range of mountains, attaining an elevation of about 4,000 feet. From Roseburg for 25 miles to the eastern flank of the mountains there are comparatively low hills and small fertile valleys; the former covered, but not heavily, with oak, which gives place to a dense growth of coniferous trees as the altitude is increased and the coast approached. The oak-timbered hills are metamorphic rock with some semi-serpentine, but the exposures are rare along the road travelled. The higher mountains and the whole country to the westward consist of heavy-bedded sandstones, with little shale, and entirely unaltered.

The peculiar feature of the country adjacent to Koos Bay is the numerous tide water sloughs which stretch ten to thirty miles inland; the same general features are exhibited at the lower reaches of the Coquille and Umpquah Rivers. The region traversed by these sloughs appears to have been a table land whose present height is from 200 to 800 feet above the sea, with evidence of oscillation in some cases of even more recent date than the excavation of the sloughs.

There is yet known only one workable bed of coal in the Koos Bay coal region; that on the north of the Bay is undoubtedly the same as the Eastport and Newport mines to the South. A thin stratum of coal was reported as pierced about seventy-five feet above the main bed. Nevertheless, the coal field about Koos Bay is extensive, reaching from the coast ten or twelve mines inland; south to the Coquille River and probably fifteen or twenty miles inland; and northward probably to the Umpquah, coal of good quality being reported on the North Umpquah east of the coast range. From the nature of the country, however, the part of this broad area covered with coal of good quality and workable thickness is comparatively small. From the small depth of water on the bars of the rivers and harbors, only vessels drawing ten or twelve feet can be employed as colliers, and this combined with other causes lead us to the conclusion that for many years it will not be profitable to work coal not in proximity to the shores of Koos Bay. This workable coal bed consists of two strata, each from two to two and a half feet in thickness and separated by a stratum of clay rock from six to twelve inches thick: above the upper layer of coal is another stratum of rather hard clay rock from twelve to eighteen inches thick; and over this another stratum of coal of nearly equal thickness; but this is not worked, although good, because the clay rock forms the better roof for the mine.

The quality of the Koos Bay coal is better than that of the Diablo mines for some purposes, and for others is inferior. For domestic purposes it burns freer. For steam purposes it is not quite equal to the Diablo coal, apparently owing to its larger percentage of water. But recent government experiments exhibit no difference in the steam-producing qualities of the two coals.

The texture of the wood from which the Koos Bay coal was formed is often more beautifully preserved than in the Diablo coal, and this with other facts point to its more recent formation.

Mr. Goodyear made an examination of the auriferous sand and gravel hills that border the sea north of the Coquille. For a mile inland these low rolling hills are covered with a scanty growth of grass and scattering trees, and front the sea in a continuous line of bluff ranging from 50 to 100 feet in elevation. These sands from four or five miles north of the Coquille were formerly extensively worked for gold, and are reported to have been very rich; the working was chiefly with the shovel and long-tom. The gold was uniformly fine, no nuggets or even large grains having been found, and much gold was lost, so that the sands were successfully worked over six or seven times. Certain parts of the beach were reported fabulously rich, the productive stratum was a layer of "black sand," magnetic oxide of iron, from one to two feet in thickness, and the gold was found as far out as the sea would permit of exploration. The "color" was found throughout the sand hills.

Mr. Goodyear noted evidences of the oscillation of the elevation of the coast line; at one place in the sands of the beach the stump of a tree six to seven feet in diameter, evidently rooted where it grew, the wood partially carbonized, fibre brown and soft, though still rather tough and exactly resembling in character the woody fibre in a bed of incipient lignite two or three feet thick, which crops out horizontally in the face of the bluff a few feet only above the level of the beach, and buried beneath thirty to fifty of half consolidated sand and fine gravel forming the upper part of the bluff. Eighteen or twenty years since this stump was half covered up by the foot of the bluff, which is now fully twenty feet from the stump. At this point, when the tide is very low, the tops of other stumps may be seen standing upright, about a hundred yards outside the present low water line. Another indication of oscillation is shown in the existence of a remunerative bed of similar auriferous black sand, two or three miles inland, and about one hundred and ninety feet above the sea. In opening a tail-race from this deposit to the sea, the cut exhibits a section from twenty-five to forty feet deep, marked by horizontal alternating layers of sand, fine gravel and a few thin layers of soil; sticks and logs are not uncommon in the mass, and some trees were unearthed still standing where they grew; he examined two or three stumps of trees yet upright and forty feet below the present surface. These stumps had the same carbonized appearance as the stump on the beach. Part of the forces required to effect these changes was doubtless wind, and other indications pointed to running water as an agent.

From the mouth of the small creek five miles north of the Coquille, a bluish gray, rather soft sandstone makes its appearance, underlying, and probably unconformably, the more recent bed he has described. As it stretches northward it increased in elevation, and forms several rocky islets off the shore line.

At the "black sand" deposit, existing two or three miles inland, the stratum is from two to nine feet thick and overlaid by thirty to fifty feet of reddish sand. In a second mine in the same vicinity the "black sand" averages five or six feet thick. With the gold is found some platinum, mingled with more or less iridosmine, and occasionally pellets of native copper, bright and malleable, are found. The difficulty of saving all the gold in this deposit consists in its extreme fineness, and also in its being watered with a film which protects it from the action of mercury. It is not clear what this film is, but by washing the black sand for several hours and then working it in an arastra, two or three times more gold is recovered than without washing. Plattner's process by chlorination was to be tried at one of the mines.

From Roseburg to the head of the Willamette Valley, Mr. Goodyear noticed much unaltered rock, shells and sandstones, in the railroad cuts. At Albany, he first noticed volcanic pebbles in the gravel used in ballasting the road. Twenty-five miles before reaching Portland, the basaltic bluffs were met on the right bank of the Willamette, and thence continued throughout the region he traversed as far as the Dalles of the Columbia river. He called attention to a striking contrast between the character of the volcanic matter of this region and that of the western slope of the Sierra Nevada, in California. The Cascade Mountains, where the Columbia cuts through them, appear to be made up entirely of a series of superimposed sheets of lava, which, when it flowed, ran not in narrow streams, but spread far and wide over the then smooth and gently sloping lands. They therefore consist of terraces of solid, compact rock from base to summit, and the quantity of breccias is very small. On the contrary, the western slope of the Sierra Nevada shows its volcanic matter almost exclusively in fragmentary forms. Beds of ashes, breccias, and volcanic gravels and conglomerates abound; but lava flows are few and far between. This is especially true of the central part of the State. Throughout the central and eastern part of the Sierra Nevada, there is but one great lava flow, that of the Tuolumne Table Mountain. Great as is the total quantity of volcanic material in the mining counties of the Sierra Nevada, it is insignificant compared with the vast accumulations that have built up the Cascade Range.

Upon completion of this paper, Mr. Davidson named the various localities on the coast where the " black sand "and auriferous gravel deposits cropped out upon the shore, and stated that in 1851 he had discovered the " color " in the small deposits of black sand under Cape Disappointment.

Dr. Blake referred to certain barometric anomalies observed by him in the Great Basin, not sufficient in number, however, to predicate any law pertaining thereto.

Dr. Kellogg exhibited a young plant of the *Leptosyne gigantea*, which had been raised in this city from specimens collected on the Santa Barbara Islands, and called the attention of the Academy to the many beauties displayed by this plant.

The President stated that the Trustees had corresponded with Prof. Tyndall, in the hope to induce him to visit California, and had received a reply from him to the effect that he could not visit the Coast this winter, but hoped to do so at some future time.

Regular Meeting, December 16th, 1872.

President in the Chair.

Twenty-five members present.

E. F. Northam, Prof. D. C. Gilman, and A. DeTavel, were elected resident members.

Donations to the Library: Reports of the U. S. Coast Survey on the Solar Eclipse of 1869.

Donations to the Museum: Specimens of ribs and vertebra of Humpbacked Whale. Fin-bone and Baleen of same; also specimens of Barnacles (*Coronula*), off of same species, by Capt. C. M.

Scammon. Specimen of Cryptomorphite, from the Borate Mining Company. Several species of Shells, from Henry Hemphill.

Dr. A. W. Saxe made some remarks on the periodicity of the California flood seasons, and their probable dependence upon the exhibition of the spots on the sun's surface.

On the Parasites of the Cetaceans of the N. W. Coast of America, with Descriptions of New Forms.*

BY W. H. DALL, U. S. COAST SURVEY.

Among the parasites most widely known as infesting the cetacea, two classes may be recognized, viz: those which are true parasites deriving their subsistence from the animal upon which they are found, such as the Pycnogonoids and Cyami; and those which are merely sessile upon the animal, and derive no nourishment or other benefit from it which might not equally well be furnished by an inanimate object, such as the various cirripedes.

No Pycnogonoids have yet been reported from the cetacea of this coast. Brief descriptions of the species of *Cyamus* found upon the California Gray, the Humpback and the Arctic Bowhead whales, were submitted by me to the Academy at a recent meeting. I may here add to those descriptions a few facts since obtained, and bearing upon the species described. I have, through the courtesy of Capt. Scammon, been able to examine a large number of *Cyami* obtained at Monterey, Cal., from the Humpback, (*M. versabilis.* Cope). They are all of the same species as that (*C. suffusus*) described by me as parasitic upon that whale; a fact which tends to confirm the hypothesis that each species of whale has its own peculiar parasites, and that there is rarely more than one species of *Cyamus* found upon one animal. The females, which were unknown at the date of my description, now prove to resemble the male in every respect, except in regard to the sexual organs, and in being a trifle more slender in form.

Among the cirripedes, *Tubicinella* has not been reported from these waters, (though it may be found in the Ochotsk sea, generally situated in the so-called "bonnet" of the baleen whales) nor is the *Chelonobia* known to have been obtained from any of the whales of this coast. The genera known from the north Pacific waters are *Coronula*, an allied form which I believe to be uncharacterized, and *Otion* or a closely allied form.

SESSILIA.

CORONULA, Lam.

Coronula. Lam. An. s. vert. v. p. 387.

Coronula balænaris, Lin. sp. Lam. Ann. du Mus. I p. 468, pl. 30, figs. 2—4. This species, or one very closely allied to it, was obtained by the late Mr.

* Published in advance, Dec. 18, 1872.

Bridges, probably from the coast of Central America; but the identification of the exact locality and the species of cetacean from which it was obtained, was prevented by the premature and lamented decease of that energetic field naturalist. This species was obtained from the Humpback by Capt. Scammon at Monterey, Cal.

Coronula diadema? Lam.

It is quite possible that the species here indicated under the above name, may be distinct from the true Atlantic *diadema*, but materials for exact comparison are wanting, and the figures given by Reeve and others very closely resemble the form before me. The radiating ridges are six in each group, often slightly bifurcated at their bases, and strongly sculptured with transverse, fluctuating, slightly elevated beaded lines. The interspaces are sharply transversely grooved. The superior membranous surface is brown, the pallium or hood surrounding the cirri is slightly purplish. The scuta are subtriangulate, with the posterior prolongation longest, slightly keeled above, with sharply pointed adjacent umbones at the anterior angle of the occludent margin. No vestiges of the terga are present. Adult specimens are over two inches in diameter at the base In such a specimen the dimensions of the scuta are as follows: lon. occludent margin, .215 in.; posterior margin slightly arcuated, .28 in.; anterior margin, .175 in.; color of scuta, white; concave below, stout, solid. This species has been obtained from the Humpback whale (*M. versabilis*) from Behring Strait to the Gulf of California, and may also be found on other species. It is especially abundant on the flippers and on the under lip of these animals.

CRYPTOLEPAS, n. g.

Scuta and terga both present, minute; valves six; externally produced below the surface of the whale's skin in thin radiating laminæ, with their planes perpendicular to the vertical axis of the animal, and bifurcating and enlarged toward their distal edges. Parasitic on *Cetacea*.

CRYPTOLEPAS RACHIANECTI, Dall.

Valves, subequal, rostrum radiate, not elate. Lateral valves anteriorly alate, posteriorly radiate; carina alate, not radiate. Each valve internally transversely deeply grooved, and furnished externally with six radiating laminæ vertically sharply grooved; the adjacent terminal laminæ of each two valves. coalescing to form one lamina of extra thickness; all the laminæ bifurcated and thickened toward their outer edges, with two or more short spurs on each side, irregularly placed between the shell wall and the bifurcation. Superior terminations of the valves (bluntly pointed?) usually abraded, transversely striate. Scuta subquadrate, adjacent anteriorly, very slightly beaked in the middle of the occludent margin; terga subquadrate, small, separated from the scuta by intervening membrane; both very small in proportion to the orifice. Membranes very thin and delicate, raised into a small lamællæ between the opercular valves. All the calcareous matter pulverulent, and showing a strong tendency to split up into laminæ. Antero-posterior diameter of large specimen 1.62 in.; do. of orifice, .63 in.; transverse diameter of orifice, .58 in.; lon. scuta, .17 in.; lat. do. .08 in.;

lon. terga .07 in.; lat. do. .07 in. Color of membranes, when living, sulphur yellow; hood extremely protrusile.

This species is found sessile on the California Gray whale (*Rhachianectes glaucus*, Cope). I have observed them on specimens of that species hauled up on the beach at Monterey for cutting off the blubber, in the bay whaling off that locality. The superior surface of the lateral laminæ being covered by the black skin of the whale, are not visible; and the animal removed from its native element—protruding its bright yellow hood in every direction, to a surprising distance, as if gasping for breath—presented a truly singular appearance.

PEDUNCULATA.

Otion, Leach.

Otion, Leach. Ency. Brittanica, suppl. vol. iii, p. 170.

Otion Stimpsoni, Dall.

Scuta only present, beaked, with the umbones on the occludent margins; anterior prolongation the longer, pointed, rather slender; posterior prolongation rounded, wider; external margin concave; color, (in spirits) light orange with a dark purple streak on the rostral surface and on each side of the peduncle; while the lateral surfaces of the body case and lobes are mottled with dark purple. The lower lip of the orifice is transversely striated and translucent, the upper margins, slightly reflexed internally, white; in some specimens with two prolongations or small lobes above, which are wanting in other specimens. The tubular prolongations, very irregular and variable in size and form, usually unsymmetrical; one sometimes nearly abortive. Length of peduncle, 2.8 in.; of body, 2.16 in.; of lobes, 2.0 in.; of orifice, 1.18 in.; of scuta, .55 in.; width of scuta, .16 in.

Habitat: on the "Humpback" (M. *versabilis*) sessile on the *Coronulæ* which infest that species, but never, so far as I have observed, on the surface of the whale itself.

Dr. Leach describes five calcareous pieces, namely, the scuta, terga and rostrum in the typical species, (*O. Cuvieri*, Leach) and they are figured by Reeve; but this species has certainly only the scuta. Whether this difference is of more than specific value I am not able to decide, owing to the great paucity of works of reference here. I should be unwilling to describe the species, were it not that it was submitted to the late lamented Dr. Stimpson for examination, and was pronounced by him to be new.

A variety, or perhaps another form, was observed by me in Bering Strait, in 1865, which was blotched all over with rose pink, and had the scuta narrower and more slender; it was also smaller than the specimens before me; but as it is not at hand, I am unable to decide with certainty.

I am indebted to Capt. C. M. Scammon and R. E. C. Stearns, Esq., for specimens and facilities furnished in the preparation of this paper. Most of the specimens were collected by the former gentleman, and will be figured in his forthcoming monograph of the cetaceans of the N. W. Coast.

Descriptions of New Species of Mollusca from the Northwest Coast of America.*

BY W. H. DALL, U. S. COAST SURVEY.

Magasella Aleutica, Dall, n. s. (Pl. I, fig. 6).

Shell small, nearly smooth, salmon colored, brighter on the lines of growth, and pale on the umbones; form subquadrate, anterior edge of hæmal valve very slightly excavated, and that of the neural valve correspondingly produced. Loop excessively slender, except the lateral arms of the reflexed portion, which are very broad, but connected behind by a very slender thread of shelly matter, the reflexed portion forming a sort of funnel, opening above, and almost incomplete behind. Septum thin, rather broad from behind forward, not produced above the reflexed portion of the loop. Cardinal process and hinge teeth small and inconspicuous, foramen incomplete and horse-shoe shaped, with no vestige of a deltidium. Lat. ·35 in., alt. ·2 in., lon. of neural valve ·37 in., of hæmal valve ·33 in.

Habitat, in the Aleutian Ids, from Akutan Pass, to the Shumagins, attached to the under surface of rocks at extremest low water of spring tides; Dall.

This pretty species resembles in miniature *Laqueus rubella* of Sowerby. but is proportionately shorter and broader. The animal is rather sluggish, and living specimens kept in sea water for several days exhibited no further signs of life, than the slight opening of the valves. The soft parts are of a darker reddish color, and show through the shell to some extent, as in *Waldheimia venosa*. There is some variation in form, some specimens being much broader than others. It was not uncommon, and a number of living specimens were obtained but the details of the anatomy are reserved for another paper to be prepared at a time when I may be able to devote more leisure to the subject.

Acmæa (*Collisella*) *peramabilis*, Dall, n. s.

Shell thin, delicate, ovate; externally of a uniform dark rose color, with a few scattered irregular blotches of light or dark brown, nucleus pale. Within polished, bluish white, with a chestnut brown spectrum with sharply defined edges, outside of which for a short distance the white is unsullied, but further toward the margin in adult specimens, radiating brown blotches may be observed forming a more or less interrupted band around the shell, which is wanting in the young. The margin is of the same deep rose as the exterior. Shell moderately elevated, with the apex well marked subacute and situated in the central third. Nucleus smooth, pale, sharply decurved with a chink beneath it, in front. Sculpture of fine sharp elevated threads which extend from the vertex to the margin without bifurcating. These are crossed by very fine sharp lines of growth slightly elevated. Lon. 1·03 in., lat. 0·8 in., alt. 0·33 in. Posterior slope slightly arched.

Habitat, Shumagin group of islands, Alaska Territory, on rocks near low water mark. Dall.

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* Printed in advance, December 17, 1872.

This lovely species has no relations with *A. sybaritica*, Dall, and *rosacea*, Cpr, except those of color. The two latter are much smaller and the rose color is much lighter and differently disposed. Its nearest allies are some varieties of *A. patina*, in none of which have I observed any approach to the color of this species, and which have a different nucleus, and the sculpture in slender rounded riblets instead of sharp threads. The shell of *patina* is also in general much more solid and thick. The animal partakes of the rosy hue of the shell except the margin of the mantle which is furnished with brown dots. It belongs to the subgenus *Collisella*. It is worthy of note that when there is a brown marking on the exterior, in the region of the submarginal internal mottled band, the latter is interrupted by a white space corresponding in size and width to the external marking. In spite of the very great variations in the species of this genus, I feel sufficiently confident in regard to the distinctness of this form to describe it as a well marked species, excelled in beauty by none.

Argonauta expansa, Dall, n. s.

Shell of moderate size, of nearly two involute whorls. Aperture widely expanded near the spire, rather narrow in front. Carinæ rather blunt, furnished with about thirty alternate projections, those behind the posterior edge of the aperture above and below, being tipped with very dark brown. The prominence of the projections decreases in the middle of the back, and they become larger and more prominent toward the anterior edge of the aperture. The prominence of the lateral radiating folds varies in like manner. Of these about twenty-three start from the axis of the shell, which is drawn out behind the lateral expansions of the aperture and supports them. There are about twenty-six intercalary folds. The spire behind the posterior edge of the aperture is more or less tinged with brown, and there is a livid brownish purple coloration on the lateral extensions of the axis and that part of the shell adjacent to them. The interior of the shell is smoothly polished, the exterior, especially on the protuberances of the carinæ, is covered with a multitude of exceedingly minute rough pustules, which give a very rough, harsh feel to the shell, and under a lens appear hemispherical. Laying the shell upon its aperture, with the apex posterior, we have the following measurements. Total length 3.25 in. Width of dorsal area posteriorly 0·32 in., do. anteriorly 0·7. Height of shell 2·0 inches. Total extension of axis from end to end. 4 inches. Total length of aperture 2·25 inches, length from the anterior edge of the spire to the anterior edge of the aperture 1·9 inches.

Habitat, in the Gulf of California.

This pretty and peculiar argonaut possesses an assemblage of characters not common to any described species, though there are several which have a somewhat similar lateral extension of the axis. The dry ova still adhere to the inner side of the spire, and the shell is evidently fresh. I have seen one other specimen smaller than the one described, and collected at the same time. The only other species known from the same locality, (*A. Pacifica*, Dall,) is much compressed, has not the lateral extensions and has a different sculpture, beside growing much larger. Colls. Stearns, Dall, Fisher and Harford.

INDEX OF AUTHORS.—1868-1872.

GENERAL INDEX.

CORRECTIONS.

On page 139, for "Thomas London" read "Thomas Condon."

On page 185, seventh line, for "egg-case" read "larva-case."

On page 186, fifth line in first paragraph, for "therein" read "been."

On page 193, for "C. T. Yale" read "C. G. Yale."

On page 205, second line from bottom, to "C. N. Ellinwood" add "M. D."

On page 214, sixth and seventh lines of fourth sentence, for "between" read "in."

On page 215, eighth line from top, for "obtained" read "discovered"; same page, tenth line, for "obtained" read "secured"; same page, twelfth line, for "obtained" read "procured."

On page 250, third line from bottom, for "inconstant" read "infrequent."

On page 274, first line, third paragraph, for "spetroscope" read "spectroscope."

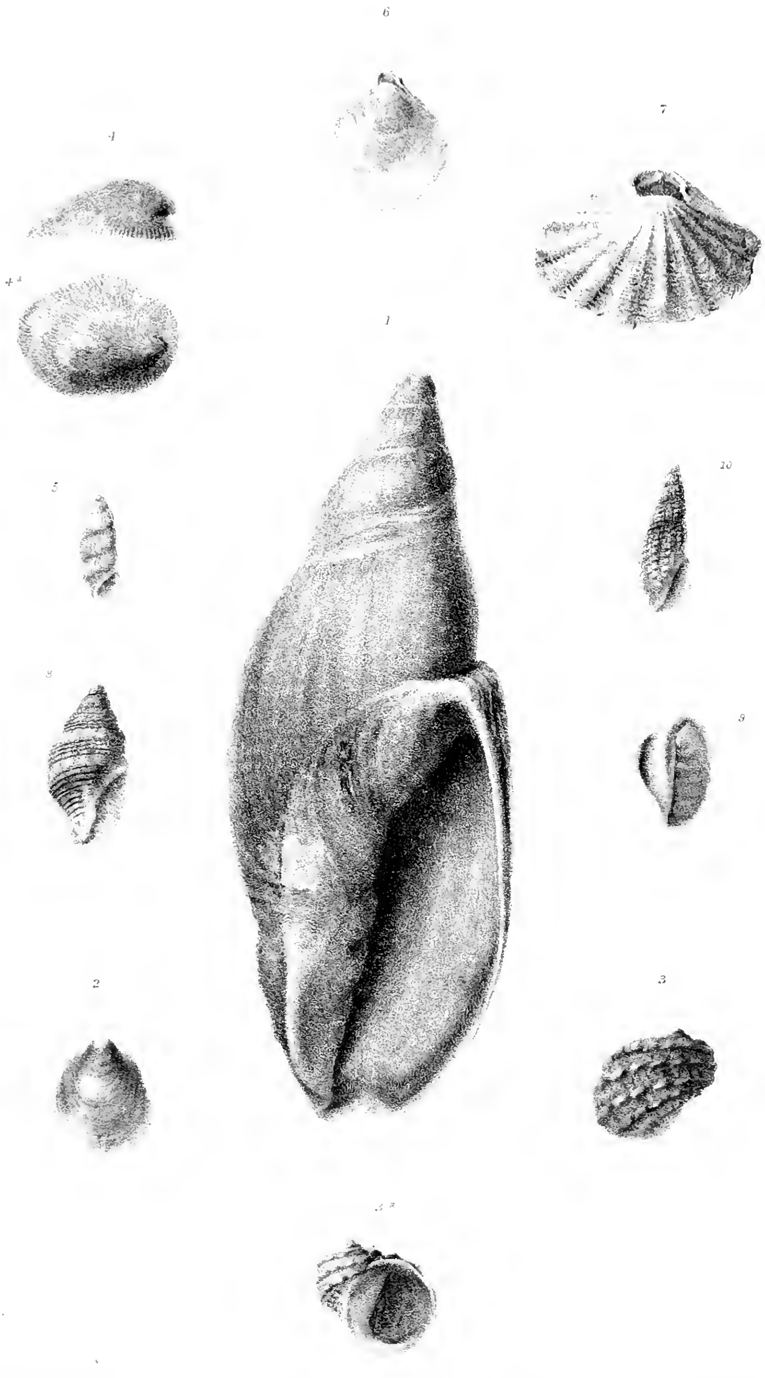
On page 275, ninth line from bottom, for "*Beatrice?*" read "*Beatricia?*"

INDEX TO PLATES, VOL. IV.

PLATE I.

* *Pedicularia Californica*, described by Dr. W. Newcomb, on page 121 of Volume III of this Academy's Proceedings, (now figured from a specimen in my collection,) has again been detected on Corals, in deep water near the Farallones; also by G. W. Dunn and the late Dr. C. A. Canfield, at Monterey.—R. E. C. Stearns.

PLATE II.



..atkins plot

NEW SHELLS OF THE WEST COAST OF N. AMERICA

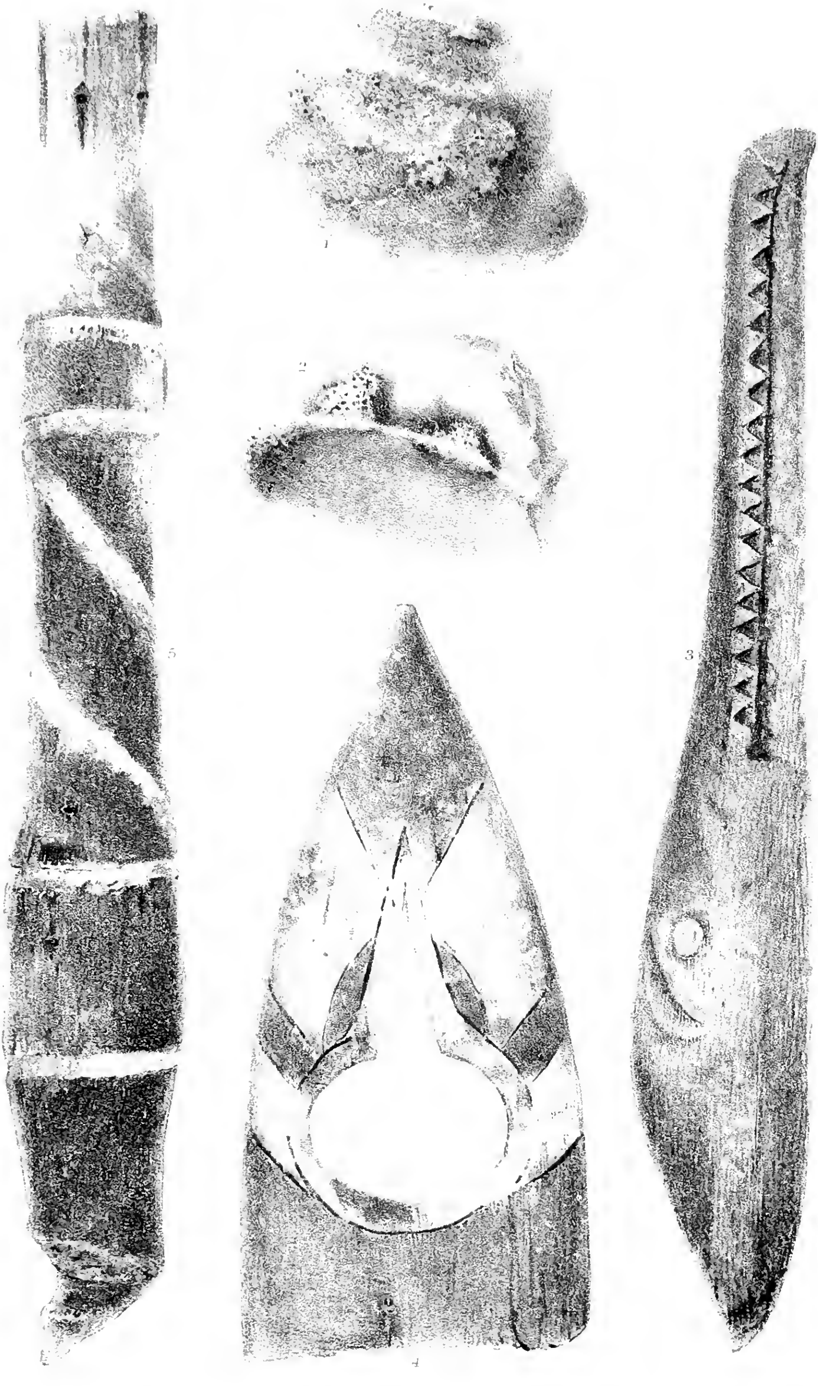


Fig. 1-2 BONE [illegible] FROM THE AMAKNAK [illegible]AVE.
Fig. 3-5 WOODEN CARVINGS FROM THE CAVE AT DELAROFF HARBOR.

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