PROCEEDINGS

OF THE

CALIFORNIA ACADEMY OF NATURAL SCIENCES.

VOL. 1.—PART 2D. SAN FRANCISCO. 1856.

SAN FRANCISCO, Jan. 7, 1856.

Col. L. Ransom in the Chair.

The reports of the Curators, Librarian and Treasurer were accepted, and placed on file.

Donations to the Cabinet.

From Capt. J. W. Russell, specimens of Mollusca and Echinodermata, from Nootka Sound. Articles of Indian manufacture, from the Makaar tribe, at Cape Flattery, were deposited.

From Dr. Behr, two specimens of *Wenona isabella*, from Contra Costa.

From Col. Ransom, a species of Cytheraea.

The following officers were elected for the year 1856:

Col. L. Ransom,	President,	
Dr. A. Kellogg,	1st Vice President,	Trustees.
Dr. J. N. Eckel,	2d " "	
Edward Bosqui,	Treasurer,	
Dr. W. O. Ayres,	Cor. Secretary,	
M. George Read	Rec. "	
T. J. Nevins,	Librarian,	
Dr. J. B. Trask,	Curator of Geology and Mineralogy,	
H. G. Bloomer,	Curator of Botany,	
L. W. Sloat,	Curator of Conchology,	
Dr. L. Lanszweert,	Curator of Zoology	

The following amendments to the Constitution were adopted:

Section 4th of article 2d so as to read as follows—

SEC. 4. The membership fee to be paid by an applicant for resident membership shall be ten dollars, and every such member shall also pay one dollar monthly in advance. The payment or donation of one hundred dollars shall constitute the contributor, or the person on whose behalf such contribution shall be made, a member for life, on being duly elected by the Academy; and such member for life shall possess all the rights and immunities of a resident member, and shall be exempt from the payment of monthly dues.

To section 1st of article 2d, add the following:

Provided, that no person thus elected shall be regarded or recognized as such member until he shall have signified his acceptance, and complied with the prescribed conditions.

SAN FRANCISCO, Jan. 14, 1856.

President in the Chair.

Donations to the Cabinet.

From J. T. Hall, Esq., a group of Eocene fossils in sandstone, from near Negro Bar, American River.

The thanks of the Academy were voted for the donation.

From Dr. J. B. Trask, two specimens of Goosander, from the plains of the Sacramento.

From Dr. R. K. Reid, of Stockton, a very valuable collection of Californian birds, comprising fourteen species.

Donations to the Library.

From the Smithsonian Institution, seven volumes of the Smithsonian Contributions to Knowledge.

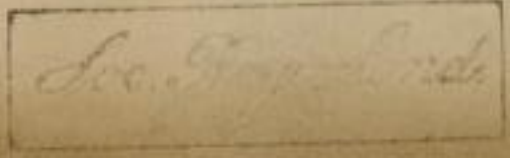
From the Societé Royale of Stockholm, Sweden, two volumes, 1853 and 1854, Kongl. Vetenskaps—Academiens Handlingar.

From Dr. J. N. Eckel, six French and German works on Botany, Entomology, &c.

From the Lyceum of Nat. History, Williams College, Mass., an address delivered before them, 1856, by Prof. W. B. Rogers.

Elections were made, viz.:

W. O. Ayres, M. D., T. J. Nevins, L. Ransom,	Publication Committee.
T. J. Nevins, J. N. Eckel, M. D., J. B. Trask, M. D.	Library Committee.
T. J. Nevins, A. Kellogg, M. D., W. Hedley.	Finance Committee.



The following paper on earthquakes in California, from 1812to 1855, was presented by J. B. Trask :

In preparing this paper I have endeavored to obtain, as far as possible, the most correct information of the history of these phenomena in former years, and to correct some of the misapprehensions and statements which have appeared from time to time relating to the severity of earthquake shocks in this country during the earlier periods of its history.

From careful inquiry of the older residents, I can learn of but one shock that has proved in the slightest degree serious, causing the destruction of either life or property to any extent. This was the earthquake of September, 1812, which destroyed the Missions San Juan Capistrano, in Los Angeles county, and that of Viejo, in the valley of San Inez, in the county of Santa Barbara.

The following is the history of that event as I have obtained it from the native inhabitants, and older foreign residents on this coast:

The day was clear and uncommonly warm; it being Sunday the people had assembled at San Juan Capistrano for evening service. About half an hour after the opening of service, an unusual loud, but distant rushing sound was heard in the atmosphere to the east and over the water, which resembled the sound of strong wind, but as the sound approached no perceptible breeze accompanied it. *The sea was smooth and the air calm.* So distant and loud was this atmospheric sound that several left the building attracted by its noise.

Immediately following the sound, the first and heaviest shock of the earthquake occurred, which was sufficiently severe to prostrate the Mission church almost in a body, burying in its ruins the most of those who remained behind, when the first indication of its approach was heard.

The shock was very sudden and almost without warning, save from the rushing sound above noted, and to its occurrence at that moment is to be attributed the loss of life that followed.

The number reported to have been killed outright, is variously estimated from thirty to forty-five, (the largest number of persons agree on the smallest number of deaths given), but in the absence of records such statements should be received with many grains of allowance, where memory alone is the only means left, and the term of forty-three years has elapsed to the period at which this account was placed on paper. A considerable number are reported to have been badly injured.

There is a universal agreement on this point, viz: *that the first shock threw down the entire building, and that a large number of persons were in it at that moment*, and under the circumstances it would be most singular if no deaths were caused by such an event.

The motion of the earth is described as having *lifted vertically*, attended by a *vortical* movement. No *undulatory* motion is described by any one. Dizziness and *naseau* seized almost every person in the vicinity.

A heavy, loud, deep rumbling, accompanied the successive shocks that followed, and which were five in number, all having the motion above described, though comparatively light in their effects to the first. The sounds attending the phenomena came apparently from the South and East.

In the valley of San Inez, to the south and west of Santa Barbara, the ruins now known as the "Mission Viejo," was also completely destroyed; the distance between Capistrano and San Inez being about 170 miles. The shock which destroyed this building occurred about one hour after the former, and the inhabitants had left the building but a few minutes before it fell, service having closed. The first shock felt here prostrated the building, as in the preceding case.

A Spanish ship which lay at anchor off San Buenaventura, 38 miles from Santa Barbara, was much injured by the shock, and leaked to that extent, that it became necessary to beach her, and remove the most of her cargo.

It is an interesting fact, and at the same time somewhat remarkable, that the time which elapsed between the advent of the shocks at Capistrano and San Inez is widely variant from what we should look for, when the distance apart and velocity of motion in earthquakes are taken into consideration.

The effect of this earthquake on the sea, in the bay of Santa Barbara, is described as follows: "The sea was observed to recede from the shore during the continuance of the shocks, and left the latter dry for a considerable distance, when it returned in five or six heavy rollers, which overflowed the plain on which Santa Barbara is built. The inhabitants saw the recession of the sea, and being aware of the danger on its return, fled to the adjoining hills near the town to escape the probable deluge.

The sea on its return flowed inland little more than half a mile, and reached the lower part of the town, doing but trifling damage, destroying three small adobe buildings.

Very little damage was done to the houses in town from the effects of the shocks, while the Mission at the San Inez was prostrated almost instantly. There is no evidence that I can find, that this earthquake was felt in San Luis Obispo, though such has been the report.

Prior to 1812 I have not been able to learn of the occurrence of this phenomena, that appear to have been particularly severe or destructive, and that they have not been so, is evidenced in the fact that from the foundation of the first Mission at San Diego in 1769, a period of eighty-six years has passed, during which time, but one, and that the above, finds a place either in their history or the memory of those now living, traditionary or otherwise.

From the date of the above to the year 1850, we have no record of the occurrence of these phenomena other than the fact that light and repeated shocks were common in the country.

During 1850 the following shocks were recorded, but it is probable that several were not noted, as we find their frequency bears no relation to those which have occurred during subsequent years.

1850.

March 12.—A light shock was felt in San Jose.

May 13.—A light shock in San Francisco. An eruption of Manua Loa, S. I., and shock same day.

June 28.—A light shock in San Francisco

August 4.—A smart shock was felt in Stockton and Sacramento.

Sept. 14.—Smart shock at San Francisco and San Jose. Total number recorded in 1850, five.

1851.

May 15.—Three severe shocks in San Francisco During this earthquake windows were broken and buildings severely shaken. A large amount of merchandize was thrown down in a store on California street. The shipping in the harbor rolled heavily.—An eruption of Manua Loa and shock in the S. I. same day.

May 17.—A light shock in San Francisco.

May 28.—A light shock on the Salinas.

June 13.—A smart shock in San Francisco, which was felt at San Louis Obispo and San Fernando.

Dec. 2.—A shock at Downieville.

Dec. 31.—A smart shock at Downieville. Total number recorded in 1851 is six.

1852.

From the beginning of this year, until past its third quarter, no disturbances were noted, until the month of November.

Nov. 26.—The number of shocks noticed on this day at San Simeon was *eleven*, and at Los Angeles and San Gabriel the same number. The same number, or nearly so, was observed by parties having in charge a government train in transit from Camp Yuma to San Diego. This earthquake was felt over the entire country east and south of San Luis Obispo, to San Diego and the Colorado river, covering a line of about 300 miles square. Subsequent accounts prove that it affected the country south of the Colorado as far Guyamas in the province of Sonora.

For the term of six days subsequent to the 26th, the entire south part of the State was convulsed, with slight intermissions. During their continuance a *mud volcano* broke out upon the Colorado Desert, and another south of the Colorado, one of which was visited by a portion of the U. S. command under Maj Heintzleman.

Dec. 17.—Two smart shocks occurred in San Luis Obispo, which fractured the walls of two adobe buildings, and threw down part of the wall of the house belonging to, and occupied by Don Jesus Pico and family.

During the month of December the southern and middle portions of California were much disturbed, and the effects were felt as far north as the 37th parallel.

The shocks continued into the month of January, and were noticed until the 5th of this month on the San Joaquin.

The period of time inclusive between the 16th November (the date of the sad earthquake of Banda Neira, in the Molluccas) and the 26th January, 1853, cannot but be regarded as one of the most remarkable periods of modern date. During this period a greater proportion of the earth's surface was convulsed by subteranean forces, than has been known for many years, in the same length of time.

The area most severely affected by these phenomena is included in the parallels of 40° south and 37° north latitude inclusive, making 76 degrees of latitude, and extending from 120° east to 45° west longitude, making 210 degrees of longitude, or nearly equal to three fifths of the equatorial circumference of the earth.

At this time the coast of eastern Asia, the Islands of the South Indian Ocean, Singapore, the Molluccas, the east coast of China, the north, east, and south of Australia, the coast of California, Mexico, and South America, with portions of the Atlantic coast, south of the 34th parallel shared in the general disturbance that prevailed upon our own shores during the period above named.

With the 26th of January ceased the vibrations on this coast at that time, (that were perceptible without the use of instruments), but it appears that they continued much later on the east coast of China and Australia, extending into the month of February.

1853.

Jan. 2.—A smart shock felt in Mariposa, and at the same time in San Francisco, Shasta City, and Bodega.

Jan. 5.—A shock at Corte Maderia.

Feb. 14.—A light shock at San Luis Obispo.

March 1.—A Smart shock at San Francisco, felt at San Luis Obispo and Santa Barbara.

April 24.—A light shock at Humboldt Bay.

April 26.—Three shocks at Weaverville.

June 2.—Two smart shocks on the plains of the San Joaquin.

July 12.—A light shock in Yreka, Siskiyou Co.

Sept. 3.—Four shocks on the San Joaquin and Salinas Plains.

Oct. 23.—Three heavy shocks at Humboldt Bay.

Oct. 25.—A light shock at Humboldt Bay.

Nov. 16.—A light shock at San Jose.

Nov. 21.—A shock at San Francisco.

Dec. 11.—A light shock at San Francisco and Mission Dolores.

Dec. 23.—A light shock at Shasta City.

Total number recorded in 1853 is 15

1854.

Jan. 3.—Two smart shocks in Mariposa, and felt at the same time in Shasta.

March 2.—A light shock in San Francisco.

March 20.—A shock in Stockton.

April 29.—A light shock at Santa Barbara.

May 23.—A shock at Crescent City.

May 31.—An earthquake at Santa Barbara, at 10 minutes before 5 o'clock in the morning. There were three vibrations, the first of which was accompanied with a deep rumbling; the second was preceded by a loud rushing sound, like the approach of a strong wind. About four or five seconds elapsed between each shock. The sea was much disturbed, and a heavy surf swell came in soon after the second shock was felt, which passed some thirty feet beyond the old wreck near the embarcadero. The inhabitants left their beds in their night attire, and sought the street. But little damage was done.

June 26.—Two light shocks in Placer county.

July 10.—One shock at Georgetown.

July 14.—One shock at Georgetown.

Sept. 14.—A light shock at Nevada.

Oct. 21.—A light shock at Monterey

Oct. 26.—A smart shock at San Francisco, felt also at Benicia. Vessels lying at the wharves worked heavily on their hawsers.

Total number of earthquakes in 1854 is 12.

EARTHQUAKES DURING THE YEAR 1855.

The following is the record of the number of earthquakes that have occurred during 1855 in the State of California, with the date and hour of the day at which they were observed.

Jan. 13, 6½ P. M.—A smart shock occurred at San Benito and San Miguel, and was felt also, though light, at San Luis Obispo.

Jan. 24, 10 P. M.—A heavy shock of an earthquake was felt at Downieville, continuing seven or eight seconds. This shock was felt severely at Gibsonville on the north, at Forest City, Minesota, Orleans Flat, Eureka, Georgetown, and Nashville, on the Cosumnes, south, and at the Keystone Ranch (Yuba Co.) on the west. The entire distance in a north and south direction affected, was ninety-four miles, and in a westerly line thirty miles. It was preceded by a profound rumbling, accompanied by a rushing sound like the approach of a strong wind in the distance. This shock shook buildings severely. A large pinnacle of rock, about 100 feet in height, was precipitated from the top of the Downieville Butte down to the south fork of the Yuba at its base.

Feb. 5, 10 A. M.—A light shock was felt at Wolf

Creek and the northeast part of Nevada county.

April 7, 6 P. M.—A light shock was felt at Gibb's Ferry, Trinity county, and was experienced as far north as Callahan's Ranch, at the head of Scott's Valley, Siskiyou county.

June 25, 2 P. M.—A smart shock was felt at Santa Barbara, and extended northward as far as the valley of Santa Maria. This shock was cotemporaneous with one that occurred in Switzerland.

July 10, 9½ A. M.—A light shock was felt in Georgetown, El Dorado county, which lasted about four seconds. On the same day a very severe shock was felt in the city of Los Angeles, which done considerable damage. There were four distinct shocks during the earthquake, with a period of about two or three seconds, elapsing between each vibration.—During their continuance, the ground opened in several places, in fissures of one or two inches, the marks of which remained for several days afterwards.—There were some twenty-six buildings in the city more or less injured, which I personally examined, and among them the church, the west wall of which was split from top to bottom in two places, the fissures being from one to two and a half inches in breadth, running entirely through. The east wall split at a slight angle from the perpendicular, and had but one fissure. The walls of the Star Hotel were split in several places, and on the west side there appears to have been a decided horizontal motion, as the wall was displaced on that side horizontally to the depth of about one inch, and some eight or nine feet in length. The amount of displacement decreased from the west end of the building towards the centre. It is a fact worthy of note, that none of the *thin* adobe walls of the buildings suffered injury, while most of the *thick* walled buildings were injured to a grtater or less extent.

During the earthquake, many articles were thrown down, those that were standing on shelves against the east end of the buildings were thrown westward on to the floor, and those on the opposite end of the buildings were thrown back in an inclined position against the walls. These features were noticed in the drug stores of Doctors Winston and Hope, situated on the main street, and a short distance west of the church.

The meteorological condition of the atmosphere was rather unusual, and is described as follows:—The day was unusually warm and sultry, attended with little thunder and some rain, (the latter very unusual) and a very sudden change of temperature to unpleasant coldness. At Point San Juan there was observed considerable commotion in the water, attended with a strong rushing sound, and two unusually heavy surf swells immediately *following the last shock*.

This shock was felt distinctly at the saw-mill some eight miles east of San Bernardino, about seventy miles east of Los Angeles, and at Santa Barbara, about one hundred miles in a westerly direction. At Los Angeles the shock occurred at fifteen minutes after eight in the evening.

Aug. 12, 9¼ A. M.—A light shock of an earthquake was felt at Georgetown, which lasted about three seconds. The vibration apparently came from the north. Between this date and the 10th July there were four other light shocks, the dates of which are not recorded.

Oct. 21, 7¼ P. M.—A smart shock of an earthquake was felt in San Francisco. The buildings situated over the water were violently shaken. There was much commotion in the water of the harbor a few minutes preceding the shock, which caused several vessels to heave heavily at their hawsers and cables.

Oct. 27, 3 P. M.—A light shock was felt in the valley of Clear Lake. On the same day a shock was felt in Downieville, which lasted about five seconds. At Goodyear's Bar it was more severe than at the preceding locality.

Dec. 5, 11.20 A. M.—The shock of an earthquake was felt at Humboldt Bay, which lasted about three seconds. There were two vibrations, the last being the most severe.

Dec. 11, 4 A. M.—A shock was felt in San Francisco and at the Mission Dolores; at the latter place it is represented as having been quite severe.

Jan. 2d, 1856, 10 A. M.—A light shock in San Francisco, which lasted about three seconds. The shock came from the north and was undulatory.

The whole number of which I have a record for 1855, amounts to twelve only; but there may be others which have escaped my notice on account of absence from the city.

The following table will show the number of shocks for each year, and each month of the year, for six years from 1850 to 1855 inclusive:

	1850	1851	1852	1853	1854	1855	No. for each month in six years.
January,				2	1	2	5
February,				1		1	2
March,	1			1	2		4
April,				2	1	1	4
May,	1	3			2		6
June,	1	1		1	1	1	5
July,				1	2	1	3
August,	1					1	2
September,	1			1	1		3
October,				2	2	2	6
November,			11	2			13
December,		2	1	2		2	8
Total each year....	5	6	12	14	12	11—59	59

From the above it will be seen that of the total number of shocks in six years in this state, forty-eight have occurred during the spring, summer and autumn months, and eleven during the winter months.

Of the total number noted, twenty-seven have occured from San Luis Obispo south, and of the thirty-two remaining, nine have been felt in San Francisco at the same time they were observed at San Luis Obispo, while the remaining twenty-three were felt at San Francisco and north of that point.

Notwithstanding we have had, what may, perhaps, be considered a frequency in the recurrence of these phenomena, still there are but a *very few* of the total number that would merit a moment's consideration south of the twenty fifth parallel of north latitude, for there they would be regarded a minor affairs entirely.

From all the facts in our possession relating to the phenomena on our coast, it appears that the greatest preponderance in action, and severity of effects, is exerted for the most part, south of Point Conception, for, from this place, east, south and north, to near the Colorado, the most conclusive evidences exist of very recent volcanic action having been exerted on rather an extensive scale, and is also still persistent in several localities within the area named, though in a minor degree.

It would be interesting to examine the changes of level that have evidently taken place in this State within the last five years; but, as more extended observations would greatly assist us in forming conclusions on this subject, I will defer that portion until a future day.

San Francisco, Jan. 21, 1856.

President in the Chair.

Donations to the Cabinet.

From C. D. Gibbs, specimens, of Clay containing impressions of leaves, from Table Mountain; also a specimen of Lignite, with Sulphuret of Iron.

From Col. Ransom, silicified wood, from Kern River.

From S. W. Higgins, a fossil multilocular shell, apparently of new generic form, from Coose Bay.

From W B. Little, a calcareous concretion, from Thompson's ranch, Santa Clara Co.

From Dr. J. B. Trask, specimens of Arbor Vitæ, in blossom; they were referred for investigation to Dr. Behr and Dr. Kellogg.

From M. G. Read, Sulphuret of Iron, from Mexico; also a Roman coin, from Herculaneum,

From Capt. J. W. Russell, specimens of shells, &c., from the island of San Miguel, Cal.

Deposited for the Cabinet.

By Dr. A. B. Stout, an Indian Mummy, from Shoalwater Bay, showing the result of their method of preserving their dead.

By Capt. J. W. Russell, a blanket made by the Indians at Cape Flattery, from the hair of a peculiar race of dogs.

Donations to the Library.

Proceedings of the Boston Society of Natural History, vol. 5, pp. 241—256, from the Society.

Report of the Coast Survey for 1854, from R. D. Cutts, Esq., from Washington, D. C.

Plants of Cincinnati and Vicinity, by Thomas G. Lea, from Jacob Resor, Esq.

San Francisco, Jan. 26, 1856.

President in the Chair.

S. W. Higgins and F. Rohrer were elected Corresponding Members.

Donations to the Cabinet.

From Mr. W. T. Rumble, of Columbia, a series of specimens collected chiefly in Utah Territory.—Among them was a pebble of Jasper cut so as to constitute a seal; this was found amid fragments of ancient pottery.

From Mr. C. K. Lambert, of Columbia, specimens from Table Mountain and vicinity.

From Henry Hancock, U. S. Deputy Sorveyor, specimens of shrubs, and the wood and leaves of Palmetto, found N. E. of Los Angeles.

From B. M. Henry, U. S. Deputy Surveyor, a specimen of Tertiary Coal, from the Coast Range, fifteen miles southwest of Stockton.

From Dr. C. H. Raymond, a specimen of paper manufactured from wood shavings.

The thanks of the Academy were voted for the above donations.

From Dr. Lanszweert, a Capsule from Central America. Referred to Dr. Kellogg and Mr. Bloomer.

From Mr. S. W. Higgins, Tertiary fossils from Coose Bay, O. T.

San Francisco, Feb. 4, 1856.

Dr. A. Kellogg in the Chair.

Donations to the Cabinet.

From Mrs. Herrick, a specimen of *Acrostichum alcicorne*, or Elk Horn Fern.

From Mrs. Miller, a specimen of *Fucus* from the Gulf Stream.

The thanks of the Academy were voted for the above donations.

From Dr. Eckel, a part of the jaw of a Mastodon, from Columbia, Tuolumne Co.; the same species as the teeth previously received from Murphy's, Calaveras Co.

From Dr. Lanszweert, Iron from Santa Clara, made from ore found in that county, containing forty per cent.

From Capt. Russell, shells and Indian relics from San Miguel, with others from Cape Flattery.

From Dr. Randall, specimens of Tertiary Fossils from Chico Creek, Butte Co., containing a small Ammonite, and a Baculnite. Dr. Randall also presented a specimen of *Planorbis* from the same county, with Indian relics from Marin county.

From Dr. R. Reid, of Stockton, plants collected near the Cosumnes and Mokelumne rivers.

Donations to the Library.

From Jacob Resor, of Cincinnati, a Catalogue of the Flowering Plants and Ferns observed in the vicinity of Cincinnati, by Joseph Clark.

From Dr. Eckel, Liebig's complete works on Chemistry.

From subscription of the members, the Botany of Capt. Beechey's Voyage, and Part 1 of the Botany of the Voyage of H. M. Ship Herald.

Dr. Kellogg exhibited drawings of ten species of Conifers, four species of the Silver Fir, and four species of Spruce Fir; two of the latter are rare, and may prove to be new. Also two species of Pines, one of which is evidently new. The Society are under obligations to Dr. J. C. Newberry, of Col. Richardson's Survey, for the use of the specimens from which the sketches were made. A full description will appear in his report. As the Society have no specimens of many of these species, our friends would greatly oblige us by sending any specimens from their respective vicinities.

Feb. 11, 1856.

President in the Chair.

Mr. J. C. Palmer was elected a Life Member of the Academy.

Donations to the Cabinet.

From Capt. Kentzel, a living specimen of the Whistler, *Aryctomys pruinosus*, Penn., from Cook's Inlet, Russian Possessions. This donation is of more than ordinary interest, as the species is represented

in but very few collections. Its Indian name is stated to be *Gighan*.

From Mr. W. E. Cormack, a specimen of *Planorbis* from Australia; one of Kauri (a resinous product, from which a varnish often substituted for Copal is made in England) from New Zealand; and one of Protoxide of Iron from Staffordshire, England.

From Mr. Boch, Lava from Mauna Loa.

From Mr. E. A. Rowe, of Weaverville, specimens of Iridium.

From Mr. Camman, geological specimens from near Randolph City, Coose Bay.

The thanks of the Academy were voted for the above donations.

From Col. L. Ransom, a fragment of a fossil tree twelve inches in diameter, found about fifty miles north-east of Los Angeles.

From Dr. J. B. Trask, specimens of fishes and reptiles from Sacramento.

From Dr. A. Randall, specimens of *Astacus*, from Alviso.

Donations to the Library.

From Mr. W. E. Cormack, the Botanical and the Ichthyological Appendix to Franklin's Voyage, by John Richardson, for which the thanks of the Academy were tendered.

San Francisco, Feb. 18, 1856.

President in the Chair.

P. M. Randall, and S. Pinkham were elected Resident Members of the Academy. Capt. Kentrel was elected a Corresponding Member. Charles H. Cook was elected a Life Member.

Donations to the Cabinet.

From Col. L. Ransom, Lignite from Table Mountain, Butte Co; Copper Ore, Hornblende Granite, and Iron Ore, from near Lake Elizabeth, and a specimen of Mygale.

From Mr. McCormick, limestone and Spar from Bone Cave, Bristol England; *Astacus Bartoni*, from Miramichi River, Nova Scotia; a parasitic plant from the Stanislaus River; and a "vegetable caterpillar" from New Zealand.

From Mr. G. W. Lelhi, a specimen of Dendritic Gold, from Wall's Diggings, Sacramento Co.

From Mr. W. H. Hill, Fossilized Wood from Monte Christo.

From Mr. J. Brittan, a specimen of *Solecurtus*, from Monte Diabolo.

Donations to the Library.

From the Essex Institute, Salem, Mass., a Descriptive Catalogue, with a list of its officers and members.

The thanks of the Academy were voted for the above donations.

From Dr. J. B. Trask, American Journal of Science, Nos. 58 to 61.

San Francisco, Feb. 25th, 1856.

President in the Chair.

Donations to the Cabinet.

From Mr. E. J. Loomis, of Alameda, a Sparrow Hawk (*Tinnunculus Sparverius*). The thanks of the Academy were voted for the donation

From Dr. R. K. Reid, of Stockton, a specimen of *Planorbis* from Tulare Lake.

From Col. L. Ranson, Granite, and Translucent Quartz and Sand, from Folsom, Sacramento Co.

From Dr. A. Randall, Red Coral, and a Chiton covered with Corallines, from Monterey; two specimens of *Helix*, from Cypress Point; specimens, also, of *Cuphressus Macrocarpa* from Cypress Point.

From Dr. Veatch, of Red Bluffs, minerals and fossils from Lick Springs, Shasta Co.; also, a specimen of *Tritillaria* from the same locality.

Donations to the Library.

From the Boston Society of Natural History, one number of their proceedings, pp. 257 to 272, December, 1855.

From Mr. W. Heffley, Kane's Chemistry, by Draper.

Mr. T. J. Nevins presented an account of a very beautiful Lunar Rainbow, seen by him, at Alameda, Feb. 20, at 7 P. M. It was accompanied by a secondary bow, the arch being distinct and complete in both.

March 3, 1856.

President in the Chair.

Dr. B. F. Shumard, State Geologist of Missouri, was elected a Corresponding member.

Donations to the Cabinet.

From Mr. Lewis, a specimen of *Octopus*. The thanks of the Academy were voted for the donation.

From Col. Ranson, specimens of Cannel Coal, from England; also, an Indian pipe from San Bernardino.

Donations to the Library.

From W. P. Blake, Descriptions of Fossils and Shells, collected in California.

From Dr. Eckel, Foot-Prints of the Creator, by Hugh Miller.

March 10, 1856.

President in the Chair.

J. M. Alden, of the U. S. Coast Survey, was elected a Corresponding Member.

A. H. Jones and C. D. Shuepel, were elected Resident Members.

Donations to the Cabinet.

From N. A. Covarrubias, specimens of California Pearls.

From Mr. Peabody, seeds of Calacanthus, from the Geysers.

The thanks of the Academy were voted for the above donations.

From Mr. Tallant, specimens of *Ambystoma*, insects, and the ovum of a Shark.

From Col. Ransom, specimens of Sand-stone, Serpentine, and Chromic Iron.

A unanimous vote of thanks was tendered to Mr. Frank Baker, for a donation of carpets for the rooms of the Academy.

San Francisco, March 17, 1856.

President in the chair.

Donations to the Cabinet.

From Mrs. T. J. Nevins, specimens of flowers from Alameda.

From Mr. G. S. Morgan, Fossil Shells from Shoal-water Bay. The thanks of the Academy were ordered for the above donations.

From Mr. Tallant, specimens of *Nassa*, *Asteorcanthion*, *Grapsus*, &c., from North Beach.

From Dr. Lanszweert, specimens of *Notophithalmus tarodus*, Esch., from Mission Dolores.

Donations to the Library.

From Prof. J. D. Dana, "Science and the Bible—a Review of Prof. Lewis' 'Six Days of the Creation.'"

From the Boston Society Natural History, their Proceedings, pp. 283 to 278.

A communication was received from Mr. T. J. Nevius, giving an account of a thunder shower observed at Alameda.

Description of a new species of Ammonite and Baculite, from the Tertiary rocks of Chico Creek. By Dr. John B. Trask.

It is not without some hesitency that the announcement, of these genera is made at this time, as occuring in a more recent group than that assigned them by paleontologists of the present day. This is done, knowing well that the period at which they became extinct, is *placed* far below that of the lowest of the Tertiary groups. Still, it appears to me impossible to place the rocks containing these fossils, in any other than the period here given them, and as late at least as the superior portions of the upper Eocene. The associated fossils are for the most part of the present existing genera and species upon the coast, and if the per centage of existing genera is admitted as a rule to fix the relative age of rocks of this character, then it will be necessary to carry these beds into the Miocene periods.

The rocks are composed of about twenty genera, not more than two of which, do not exist upon the coast at the present time, and it may be doubted that those will yet be found. Eleven of those most easily made out, and which belong to the cabinet specimens, are figured in outline on the plate, (see plate 11,) together with accurate drawings of the fossils of this paper, numbered 1 and 1. A, 2 and 2. A. plate 11; and will serve to convey a correct idea of the fossils of the group.

The figures in outline consist of cardium, tellina, mactra, natica, buccinnum, fusus, purpura, cerithium, turritella, &c. The bivalves not figured, consist of veneres, cytherea, lutraria, and several other genera. Had there been but a single specimen of the baculite and ammonite, their appearance in these rocks might have been considered purely an accidental circumstance, and occuring as a transported fragment from the districts to the north, and one hundred miles distant, where those genera abound. But as they are not found in the rocks of the same character or age, they cannot be attributed to that cause.

When we consider their number, and the relation they hold numerically to the associated fossils of the group, and promiscuous distribution, we cannot do otherwise than assign to them an age cotemporaneous throughout, and that they lived and died in those beds in which theirremains are now found.

My attention was called to these fossils by Dr. A. Randall, by whom they were found on Chico Creek during the past winter, and by him placed in the cabinet of the Academy. I have seen but one ammonite from this locality, but he has knowledge of three or more from the same place.

After examining the Baculite presented by him, I became convinced that the small cylindrical fossils, so frequent in those rocks belonged to this genus, and on inspecting the specimens in the cabinet, not less than nine different specimens were counted. Prior to this time, I had regarded those shells as dentalia, for which they would easily be mistaken, from their small size and the character of the fossils with which they are associated.

If an erroneous diagnosis has not been made in relation to the age of these rocks, (and of this fact I entertain no fear) they become a matter of much scientific interest, as they prove that the period at which these animals existed, descends to a later day than that now by general consent assigned them, and these rocks will demonstrate that fact most incontestibly.

The only question that can arise in this case is, whether we shall conform to the strict scholastic rule laid down, for the clasification of geological periods, and carry so extensive a group of decidedly tertiary deposits down to the cretaceous, with their present existing genera with them; or carry two genera higher up in those periods, and give them what they most unmistakably tell us, viz., a later animate existence than before known.

If the former case be applied, then it will become necessary to modify our opinions relating to tertiary rocks, particularly in this State, for most certain it is that the fossiliferous beds of Chico Creek are *more* recent than those of Ocoya (Pose Creek) Creek of Tulare county, the fossils of which have recently been examined by Mr. Conrad of Philadelphia, and by him pronounced to be of miocene date.

Ammonite (Lam) Chicoensis. Trask.

Plate II. *Fig.* 1 and 1. A.

Shell small; with two and one-half whorls; twenty-three tertuous angulate costae, each second or third rib terminating at the ventral edge of the outer whorl, the others pass beyond; two rows of small tubercles on the last whorl, the outer row and largest, situated on the dorsal edge, the inner row situated about one-fourth of the depth of the whorl from the dorsal edge, and becoming obsolete at the eighteenth rib; tubercles on the outer edge correspond to the number of costae on the whorl, siphuncle visible the entire length of the dorsum. Length, eleven-twentieths; depth, nine-twentieths; width, four-twentieths of an inch. Locality, Chico Creek, Cal.

Baculite (Lam) Chicoensis. Trask.

Plate II. *Fig.* 2 and 2. A.

Shells small; thin; compressed; smooth; latero-

dorsally sub compressed, latero-ventrally somewhat obtusely rounded. Section of the shell obovate. The above figures of natural size. Locality, Chico Creek, Cal.

Description of three new species of the Genus Plagiostoma, from the Cretaceous rocks of Los Angeles. By Dr. John B. Trask.

Up to the present time, no mention has been made of the occurrence of the Cretaceous rocks in this State. The researches of F. Roemer, in Western Texas and New Mexico, demonstrated their existence to the middle and southern portions of this territory, at which point he left them.

A late traveller, Julius Froebel, extended his observations over the ground of Roemer in part, and continued the same into California. In a conversation with the former gentleman, in 1854, upon the fossils of New Mexico and westward of that country, he intimated the probable existence of the Cretaceous rocks west of the Colorado. The fossils collected by him west of that point, were not sufficiently well defined, however, to base a positive conclusion upon, and place the matter beyond a doubt. I feel satisfied at the present time that most of those fossils are referable to that period, and that the opinion he then advanced was well grounded.

Since that time I have been fortunate enough to discover fossils, of as much antiquity at least as those of Western Texas, and probably still lower in the series, the rocks containing them forming the coast of the Pacific Ocean in this State. There can be no doubt therefore at present, that the Cretaceous rocks extend from the Atlantic to the Pacific.

The rocks in which these fossils are found, occur at San Pedro, in the county of Los Angeles, immediately upon the coast, and underlying the superficial tertiary beds (lately denominated recent formations by Mr. T. Conrad) of this locality. I have some hesitancy in placing these rocks so high up in the geological series, as the position here assigned them, but as the associated fossils are as yet somewhat obscure and ill defined, it is thought best to place them here for the present, or until farther examination of their fossils shall classify them otherwise.

The tertiary deposits at this place are about thirty feet in depth, and have a low northerly dip; about twenty feet of this deposit is made up of beds of fossil diatomacea, the upper stratum of which is white, and similar in appearance to that found at Monterey, but much less dense, the forms differ but little from hat deposit.

Beneath the tertiary beds, a dark, soft, marly deposit crops out but a few feet above tide water, having a northerly dip of about fifty degrees, and extending along the beach for three-fourths of a mile.—They contain the fossils described and figured below, associated with small crustaceans and coralines, the latter too fragile to admit of demonstration. Conformable to these beds, along the shore to the west and north, are beds of a yellowish and buff-colored limestone, resembling a coarse variety of lithographic stone, containing fossil crustaceans of small size, none of which have yet been found sufficiently perfect to admit of a description.

The fossils here described and figured, are all from very perfect casts; the fine striae and small fold upon the auricles, are as perfect as they possibly could have been upon the shell originally.

The fossils I have refered to the genus Plagiostoma of Sowerby, but having the figures of but two species of that genus, and no description whatever, I am compelled to omit reference to those heretofore described, that may simulate these in form or otherwise.

PLAGIOSTOMA (SOW) PEDRONA. Trask.

Plate III. *Fig.* 1.

Shell compressed; sub-triangular, with eight or nine flatly rounded concentric annulations, which are nearly as distinctly marked on the interior of the valve for about half the height from the ventral margin; (see fig. 1. A.) beaks acute at the apex, and as high as the line of the auricles; anterior auricle rounded in front, and has a small, thin fold extending from the umbone to the centre of its anterior margin, and is covered with about thirteen small, rounded, radiating striae, which converge at the beak; beaks at the anterior third; sub-acute; anterior margin rounded, and somewhat produced; ventral margin smoothly arched; posterior margin rounded, becoming slightly arcuate toward the dorsam of the shell; posterior auricle angulate, and obtusely truncate posteriorly. Length one and eight-twentieths of an inch; height one and four-twentieths of an inch. Locality, San Pedro, Cal.

P. ANNULATUS. Trask.

Plate III. *Fig.* 2.

Shell compressed; obliquely rounded; five to seven broad concentric annulations; anterior margin obtusely rounded; ventral margin rounded; posterior margin somewhat produced; ventrally, and becoming slightly arched toward the dorsum; beak at the anterior half, and slightly raised above the line of the auricles; anterior auricle angular, with about twelve fine striae divergent from the umbones; posterior auricle subangulate, and truncate posteriorly. Length, one and five-twentieths of an inch; height, one and three-twentieths of an inch. Locality, San Pedro, Cal. Found with the preceding. There were three specimens of this species found—the left valve was used for the figure from its being the most perfect.

P. TRUNCATA. Trask.

Plate III. *Fig* 3.

Shell compressed; rotund-quadrate; about eight flattened, slightly rounded, concentric annulations; anterior margin rounded, and somewhat obtuse below the middle; ventral margin orbicular; posterior margin bluntly rounded; posterior dorsal margin subangulate; beaks acute above the line of the auricles; anterior auricle rounded in front, striate, and has a small fold extending from the umbones to its anterior margin above its middle, posterior auricle angulate and obtuse posteriorly; beaks anterior to the middle. Length, one and one-tenth inches;—height, one inch. Locality, San Pedro, Cal. Found with the preceding species.

SAN FRANCISCO, March 24, 1856.

President in the chair.

Donations to the Cabinet.

From Dr. J. A. Veatch, plants from the vicinity of Lick Springs, Shasta county.

From Mr. J. P. Haven, a large collection of marine shells, from the Islands of the South Pacific; the skull of a Barbaroussa; specimens of Corals; a Flying Fish, and articles manufactured by the natives of the Pacific Islands; also, a large Mahogany Bookcase.

From Capt. Maltby, specimens of gold-bearing quartz from Kern River.

From Mr. D. S. Marvin, specimens of *Scolopendra*, from Forest City.

From Mr. J. P. Buckley, a collection of Insects. The thanks of the Academy were voted for the above donations; also, to the Pacific Express Co. for the gratuitous carriage of specimens.

Donations to the Library.

From the Linnean Society, of London, the second volume of their Proceedings.

San Francisco, March 31, 1856.

President in the Chair.

Donations to the Cabinet.

From the Arizona Mining Company, Red Oxide of Copper, containing eighty per cent. of the metal; Grey Sulphuret of Copper; Malachite, and Black Oxide of Copper from Arizona.

From Mr. George Black, specimens from the cretaceous rocks of Vancouver's Island, consisting of Inoceramus, Ammonites, Baculites, &c. The thanks of the Academy were voted for the above donations.

From Dr. Eckel, a specimen of *Gordius*, from Grass Valley.

From Dr. Lanszweert, two larvae of *Dyticus* and three specimens of *Coltambites*. Dr. L. mentioned that the *Saturnia Californica*, our native Silk Worm, had made its appearance at the same time as the blossoming of the Ceanothus.

Dr. Kellogg exhibited a drawing of the *Balsamorhiza deltoidea*, or Balsam Root Sunflower. The roots are baked in the earth and eaten by the Indians. This specimen was brought from Red Bluffs, Shasta county, by Dr. J. A. Veatch; a specimen from Placerville, has no serratures at the base of the leaf (?) like the present one.

Donations to the Library.

From Mr. W. P. Blake, a pamphlet containing papers read by him at the meeting of the Association for the Advancement of Science, at Providence, R. I.

The American Journal of Science and Arts, Vol. 21 No. 62, was received.

San Francisco, April 7, 1856.

Dr. Trask in the chair.

Donations to the Cabinet.

From Dr. Lanszweert, a species of Planorbis, believed to be new.

From Dr. Trask, a specimen of Graphite from Mt. Washington Mine, Shasta Co., from a bed seventeen feet thick; also, two specimens of fine Limestone from near Vaca Valley, Solano Co.—it receives a high polish and would answer for ornamental purposes—it is abundant; also, three specimens of *Lutraria* from Tomales Bay.

San Francisco, April 14, 1856.

Mr. F. Marriot and Mr. Thos. Rollandson were elected Resident Members. Dr. Henry Wheatland, of Salem, Mass., was elected a Corresponding Member.

Donations to the Cabinet.

From Mr. J. C. Brown, three specimens of Sulphur, one of Alum, one of Selenite, four of Copper, one of Scoria, one of Efflorescent Sulphur, one of Limestone and one Cactus, from Tres Virgenes.

From Mr. Bloomer was received a donation of Plates of Numbers for Cases.

San Francisco, April 21, 1856.

Dr. Kellogg in the chair.

From Dr. Lanszwert, were received specimens of Coleopterous and Dipterous insects.

From the Boston Society of Natural History was received a copy of their Proceedings, Vol. 5, pp. 289, 304.

Dr. Kellogg's Paper.

Dr. Kellogg exhibited a drawing and specimen of an *Ephedra* or Joint Fir:—

A low shrub, known among southern miners, as Tea Twigs, from its general use as tea. Many prefer it to the China tea, but we think nothing known is likely to equal, much less supercede, the latter; although, from actual experience, we feel confident our species must prove one of the very best substitutes—it is scarcely to be compared with many herbs we hear so often extolled in this respect. The tea is a tonic astringent, with the odor of cinchona, and evidently a restorative stomachic. It leaves a rich, mellow, persistent, somewhat aromatic flavor upon the palate, similar to the best black tea; and we think must prove salutary in relaxations, chronic diarrhœas, etc.; in fact, one species of this family, found in Asia, was formerly kept in the shops and used by physicians.

Capt. Maltby, of Kern River, has the thanks of the Academy for these specimens. We are greatly in want of the fruit and flowers, and hope soon to receive them. This is probably the *E. Americana*. It differs from the species found at Salt Lake. The green branches are clustered and opposite, without leaves, in place of which are two opposite, very minute membranous-like scales, of a brown madder color, without points, the twigs striated, somewhat seven sided, jointed like an Equisetum or Scouring Rush—they readily separate and fall apart at these joints, hence the origin of the common name *Joint Firs*.

San Francisco, April 28, 1856.

President in the Chair.

M. A. Le Plongeon was elected a Resident Member.

From Mr. Tallant were received numerous specimens of Algæ, Sertulariæ, &c.

The following paper, "On some Californian Crustacea," was received from Mr. Wm. Stimpson, Zoologist to the U. S. Expedition to the North Pacific.

The Californian coast is apparently not as rich in marine invertebrata, especially of the lower orders, as the generality of coasts in the same latitude; which may be owing to the want of variety in station, and the paucity of inlets, bays, and islands, which afford shelter to such animals. The Crustacea, however, although they cannot be said to be numerous, can scarcely be included in this remark, as a respec-

table number of all orders, and even a considerable one of Macroura, are now known to exist on these shores. Scarce any of these were described by the earlier authors, and I am not aware that any species is mentioned as inhabiting Upper California by Herbst, Latreille, Lamarck, or even by Milne Edwards. Most of those already known have been brought into notice since 1840, and have been described, or remarked upon, by Owen, (*Zool. of Beechey's Voy., Crust.,*) Randall, (*Jour. Acad. Nat. Sci.*, Philad., vol. viii.,) Gibbes, (*Proc. Am. Assoc.*, Charleston, 1850, vol. iii.,) and Dana, (*Crustacea of the U. S. Exploring Expedition*).

The following paper contains notes on such species as were collected during a short stay in California during the winter of 1855–6.

Cancer magister, Dana, (*Proc. Am. Acad. Nat. Sci.*, May, 1851, p. 73), the common large crab, is very abundant about the wharves of San Francisco. It is of a light reddish brown color, darkest anteriorly; often light orange below; the inner sides of the anterior feet crimson.

Cancer antennarius, *St., n. s.* Carapax convex, much undulated, minutely granulated, its width to its length as 38 to 25. External antennæ very large, hairy, of a length equalling two-fifths that of the carapax. Antero-lateral margins with nine sharp teeth; the posterior are most prominent in young individuals, but drawn considerably inward, and belonging rather to the postero-lateral margin. In the angles between the teeth the edges are strongly denticulated. Third article of external maxillipeds with long hairs on the terminal edge. Carpus and hand in the adult smoothly rounded, and minutely granulated; in the young partially covered above with small spiniform tubercles, and the outer surface of the hand costate. The posterior four pairs of feet, and the margin of parts generally on the inferior surface very hairy. Tarsi with thick brushes. Color dark purplish-brown. Width of a large specimen four inches. Found on rocky bottoms in two or three fathoms, about the mouth of the bay of San Francisco.

Cancer gracilis, Dana. (*l. c.*, May, 1851, p. 73.) This species is said to occur in San Francisco Bay by its original describer. It must, however, be exceedingly rare here, as I have never met with it after repeated search. It would seem to be more common further down the coast, towards San Diego, from which locality I have received a specimen from Dr. Ayres.

Another large crab is common in the bay, which may prove, upon comparison, to be the *Platycarcinus productus* of Randall, (*Jour. Acad. Nat. Sci.*, Philad., viii., 115.) I would apply to it, provisionally, the name of Cancer perlatus. Carapax of great width in proportion to its length, *i. e.*, as 5 to 3; rather broadly concave near the margins, convex about the middle and posteriorly; its surface but little undulated, smooth and ungranulated; antero-lateral margins with nine teeth, blunt and not very prominent; the anterior are least projecting, and of greatest width; frontal margin between the exterior antennæ trilobate, lobes not prominent; superior edge of postero-lateral margins granulated. External maxillipeds smooth in the male, the third article slightly pubescent on the edges in the female; in both this article is deeply sinuated for the insertion of the fourth, its interior apex being considerably produced. Hand and carpus somewhat irregularly nodulose above, the nodules forming two irregular rows along the superior edge of the hand, which is obsoletely 4-costate on the outer surface. Posterior feet rather compressed, second articles hairy along the superior crest; penultimate article of second pair with a tuft near its extremity inferiorly; tarsi with three longitudinal brushes of short thick hair along the angles, the superior and anterior one of which is obsolete in the fifth pair of feet, and the superior and posterior one almost wanting in the others. This species is of a dark red or madder-color above, feet mottled; below dirty white. Length of carapax three and three-fifth inches; width six inches. Found in company with *C. magister*, and commonly seen with it in the markets.

Pseudograpsus Oregonensis, Dana, (*l. c.*, 1851, p. 248,) is found in the coves of San Francisco Bay, living generally among pebbles and boulders on muddy shores, from half-tide to low water mark. It is bluish-gray above, darkened anteriorly with clouds of dark-red dots; the feet, with the exception of the light-colored anterior pair, are sparsely dotted with red.

Pseudograpsus nudus, Dana, (*l. c.*, 1851, p. 249,) is found among the rocks, in the clearer water, near the open sea. It is of a dark olive, sometimes of a dark mahogany color; and is easily distinguished from the preceding species by the glossy smoothness of its posterior feet.

Echidnocerus setimanus. *Ctenorhinus setimanus*, Gibbons. (*Proc. Cal. Nat. Sci.*, I. 48.) This fine species is perhaps identical with that of Oregon, (*E. cibarius*, White). It differs from the Sitka species only in the shorter and blunter spines of the antero-lateral margins and of the feet. The genus *Echidnocerus* will probably be found synonymous with some one of the subdivisions of the *Lithodina* recently established by Brandt (*vid. Bulletin, Scient. de l'Acad. imp. de St. Petersb., cl. phys. mathem.*, T. vii., p. 174, 175.)

The "lobster" of the San Francisco market is probably the *Palinurus interruptus* of Randall. It belongs to the genus *Panulirus* of Gray. It is brought from the coast to the southward, and Dr. Trask informs me that it is very common on a rocky ledge in ten or twelve fathoms off Santa Barbara.

Callianassa occidentalis, St. Eyes subtriangular, closely approximated at their bases, but diverging and curving a little upward at their pointed tips. Length of the external antennæ two-thirds that of the body. The larger of the anterior feet smooth and glossy on the sides; the second article denticulated along the inferior edge. Hand scarcely longer, and perceptibly of less height than the carpus; slightly ciliate on the edges, and especially toward the extremities. A considerable hiatus intervenes between the fingers when closed, and between their bases arises a small but prominent tooth, which curves upward. Moveable finger nearly half as long as the hand, rather slender, with hooked extremity; its tooth little projecting, formed by a swelling out of the inferior edge, which is minutely denticulated. Thumb regularly but very slightly curved. Color a delicate orange; anterior feet rose-colored. Length four inches. This species lives in the holes which are seen in such numbers at low water on the smooth sandy beaches near the entrance of San Francisco Bay. In *C. gigas*, as described by Dana, the carpus is proportionally very much shorter than in this species.

Gebia Californica, St. Stomachal region of carapax hirsute only on the anterior two-thirds, and marked with three longitudinal furrows, the median of which is much shorter than the two lateral

or marginal ones. Anterior feet very hairy on the edges; carpus with two or three sharp spines at the inner angle; fingers both toothed near their inner bases; the lower or immovable one rather slender and curved. Terminal segment of abdomen large, transverse, and projecting a little beyond the margin of the lateral plates. Length 1¼ inches. From the coast near Monterey. *G. Pugettensis* differs from this species in that its carapax is covered with pubesence anteriorly as far as the transverse dorsal suture; and in wanting teeth on the fingers.

Crangon Franciscorum, St. More slender and less depressed than is usual in the genus. Rostrum small, subtriangular, rounded in front. Spines of thorax nearly as in *C. vulgaris*. Palm of hand very oblique, inclining to longitudinal, occupying nearly one-third of the length of its inner side; the thumb-like process long and spiniform. Sternal spine long, and followed by two or three sharp tubercles on the succeeding segments. A small sharp spine on each side of the abdomen at the supero-lateral angle of the antepenultimate segment. Terminal segment very long, slender, and pointed, smoothly rounded above. Color light and dark yellowish-gray, mottled. Eyes salmon colored in life. Length three inches. This is the common market shrimp of San Francisco, and is found abundantly in the sandy coves around the bay.

Crangon nigricauda, St. This species resembles very closely the common shrimp of Europe and of the Northern United States, and is probably the species mentioned by Owen as occurring at Monterey, which he considers identical with *C. vulgaris*. (*vid. Zool. of Beechey's Voy.*, p. 87.) It may, however, be distinguished from that species by its smaller and comparatively shorter hand, and by the narrower and more pointed terminal abdominal segment which has also a shallow longitudinal furrow on the upper surface. The flagella of the internal antennæ are unequal in length, the longest but little surpassing the extremities of the lamellæ of the external antennæ. Rostrum very small, nearly oblong, with its extremity rounded. Sternal spine single, directed obliquely forward. Color blackish above, darkest at the tail. Hands of a lilac tint. Length 2½ inches. Found in deeper water than the preceding species, from which this is easily distinguished by its shorter, broader, and more depressed form, and by its darker color.

Hippolyte palpator, Owen. (*l. c.*, Pl. xxviii. f. 3.) Color pale yellowish, with transverse streaks of crimson at the articulations of the segments and on the legs. It is not uncommon on the sandy bottom of the bay in from five to ten fathoms.

Hippolyte Brevirostris, Dana. (*l. c.*, Tau., 1852, p. 24.) Of a uniform pale lake-color. A larger species than the preceding. Taken in the Bay of San Francisco.

Idotea consolidata, St. Body convex, broadest at the fourth thoracic segment; first four segments of thorax larger in every dimension than the last three, convex, and with an umbo near the lateral margins, which are turned up a little. No distinct epimera. Abdomen convex, formed of a single piece, with a slight transverse depressed line indicating the partial separation of an anterior segment; narrowed toward the posterior extremity, which is terminated by a little concavity. Eyes strongly convex. Exterior antennæ half as long as the body; flagella with nine elongated articles. Internal antennæ superior, without flagella, and reaching to the fourth article of the external ones. Feet with long terminal articles or fingers. Color reddish or brownish, mottled.—Length, 0.4 inch; breadth, 0.18 in. Taken in ten fathoms sand, near the entrance of the Bay of San Francisco.

Philoscia tuberculata, St. Body somewhat loosely articulated anteriorly, covered above with granulations, or more properly minute tubercles, which are somewhat variable in size, but generally as large anteriorly as posteriorly, and show a tendency to arrangement in transverse rows; two or three to each segment. Antennæ inserted in the cavities between the middle and the side lobes of the head, which are very prominent; they are composed of seven articles, the last two forming the flagellum.—Caudal segment small, narrow, with a rounded obtuse point. Terminal article of external ramus of caudal appendage styliform, tapering to an obtuse point, and reaching beyond the extremity of the abdomen to a distance equalling half its length. Color dark gray, almost black; below greenish white.—Length 0.33 inch. Found under dead leaves, sticks, etc., in damp places, and along the margins of brooks.

Caprella Californica, St. Antennæ exceedingly variable in their proportions; flagella of superior ones 10—15-articulate; inferior ones sub-pediform. A more or less developed spine, which curves forward, and is sometimes of considerable length, is placed upon the back at the anterior extremity of the first thoracic segment. Hand of second pair of feet generally three-toothed, teeth (in full-grown specimens) about equal in size, and placed mostly toward the outer extremity of the hand. Two or three sharp tubercles along the sides of the branchiferous segment; and a short dorsal spine on each of the posterior segments. Hands of posterior feet slender. Color variable. Length one inch. Found on seaweeds, etc., below low water mark in San Francisco Bay.

Corophium spinicorne, St. Inferior antennæ half as long as the body, without flagella, and with a large, curved, sharp-pointed spine at the inferior extremity of the very thick third article. Superior antennæ nearly as long as the inferior ones. Feet with plumose hairs; those of the first pair with minute subcheliform hands, palm transverse, third and fourth articles with long setæ along the inferior edge. Feet of the second pair simple, but with the third and fourth articles conjoined laterally, as if forming a hand; the fourth article being placed inferiorly and fringed with long hairs. Caudal stylets as in *C. longicorne*, except that the external ramus in the second pair is not cultriform. Color brownish, darkest at the head, with transverse bands of light yellow corresponding to the articulations.—Antennæ brownish. Length 0.4 inch. Found among confervæ, etc., in the salt marshes on the shores of San Francisco Bay.

Erichthonius rapax, St. Small epimera on the first thoracic segment, larger ones on the second, both narrow, not touching each other. Antennæ subequal, one-third as long as the body; superior ones with 6-articulate flagella; inferior ones strongly toothed at the inferior angle of their basal segment, and with 10-articulate flagella. Mandibular palpi reaching beyond the middle of basal article of the superior antennæ. Eyes on lobes which protrude forward between the bases of the antennæ. Hands of the first pair small, subcheliform; those of the second pair of great size, with a bi-articulate finger, and a thumb one-third as long as the finger, with a strong tooth at the middle of its inner side. Color brown-

ish. Length one-fourth of an inch. Dredged in two fathoms sand, in San Francisco Bay.

Orchestia Traskiana, St. *Male*, with the flagella of the inferior antennæ forming more than half their length, and consisting of fourteen articles; superior antennæ reaching to the extremity of the second article of the inferior ones; feet of the first pair with a small, somewhat trilobate hand and minute finger, as in *O. littorea*, *pollicifera*, etc.; feet of the second pair with an ovate hand, with no teeth on the oblique, convex, spinous palm (which terminates posteriorly in a slight notch) nor on the finger, which is less than half as long as the hand. In the *female* the first pair of hands resembles those of the male, except in being smaller, having less produced lobes and a comparatively longer finger; those of the second pair with a small elongated hand, with a rounded extremity and a rudimentary finger applied at about the middle of one edge, somewhat as in *O. insculpta*, Dana. In *both* the feet of the sixth and seventh pairs are of about equal length. Eyes rounded, black. Color light-grey, sometimes greenish or brownish, always very pale. Length three-fifths inch. Very common among the rejectimenta along high-water mark on the shores of San Francisco Bay.

Allorchestes seminuda, St. Body compressed; eye broad, suboval, the posterior side straight, the anterior slightly concave; superior antennæ with 13-articulate flagella, and three-fifths as long as the inferior ones, which are one-third as long as the body, and have 14-articulate flagella. Setæ on both pairs of antennæ few, very short and almost obsolete. Hand of 1st pair of feet short, palm oblique, finger of moderate size; carpus with a rather long projection of its antero-inferior angle; hand of the 2nd pair short, ovate, deeply excavated below for the reception of the point of the finger, which article is more than half as long as the hand. Color pale green; antennæ red. Length half an inch. Found on sea-weed, and among barnacles, on piles, stones, etc., at half tide in San Francisco harbor.

Mara Confervicola, St. Fourth, fifth, and sixth articles of abdomen angular and setose on the dorsal surface. Eye broad, subreniform. Superior antennæ less than half as long as the body, with a thickened basal article, a very slender 24-articulate flagellum twice as long as its peduncle, and a 5-articulate appendiculum. Inferior antennæ as long as the superior ones, with a 12-articulate flagellum of about equal length with its peduncle. Hands four, rather small, of similar size and shape, truncate, palm slightly concave, with blunt spinules; finger short, stout, curved, with an almost obsolete tooth at the middle of its inner side. Feet of the fifth pair scarcely more than half as long as those of the sixth and seventh, which are about equal in length.—Rami of the posterior pair of caudal stylets unequal; external ones long, considerably flattened, setose along their jagged edges; inner rami very small.—Color dark brownish, rarely blackish. Length 0.4 inch. Found among confervæ, etc., in salt marshes on the shores of San Francisco Bay.

Phoxus grandis, St. Large; body thick, robust, broad; rostrum lamelliform, expanded over the bases of the superior antennæ, with broadly rounded extremity. Superior antennæ bi-flagellate, the inner flagella very little smaller than the outer ones; both 12-articulate; penultimate article of peduncle entirely concealed beneath the rostrum. Inferior antennæ a little longer than the superior ones; terminal article of peduncle broad at its extremity, where its outer angle is rounded and a little produced;—its inner angle bearing the 15-articulate flagellum. Eye transversely oblong. Feet covered with simple hairs. Those of the first and second pairs with small subcheliform hands; those of the third and fourth pairs with the third and fourth articles dilated, the fifth slender and the sixth minute. Feet of the posterior three pairs very much expanded, those of the sixth pair longest. Caudal stylets of the first and second pairs with short, styliform rami, the inner ones being a little shorter than the outer ones; those of the third pair with long, flattened, equal rami, the outer ones spinulose along the outer edges, both fringed with long hair on the inner edges. Terminal spines of considerable length.—Color yellowish-white. Length, 0.5 inch. Dredged in ten fathoms, on a sandy bottom, in the channel near the entrance of San Francisco Bay.

San Francisco, May 5, 1856.

President in the chair.

Donations to the Cabinet.

From Mr. Thomas Marston, two specimens of Ligalte, from Douglass Flat.

From Rev. Mr. Blakeslee, specimens of Tufa, Tremolite, Sulphuret of Iron and Iron Ochre, from Iowa Hill.

From Mr. James L. Hawks, a root used by the inhabitants of Western Mexico as a cure for the bite of venomous reptiles; its native name is Huaco. The thanks of the Academy were voted for the above donations.

From Dr. Trask, a valuable series of specimens from the gold mines of California, together with specimens of volcanic rocks from Sonoma and Placer counties.

From Capt. C. J. W. Russell, a specimen of Octopus, from San Francisco Bay; also, a Scorpion from Sinaloa, Mexico.

From Mr. Sloat, a Tarantula from the Warm Springs, near San Jose.

San Francisco, May 12, 1856.

President in the chair.

Sir Wm. J. Hooker, Director of the Royal Gardens at Kew, was elected an Honorary Member of the Academy.

Mr. Andrew Garrett, of Hilo, Hawaii, was elected a Corresponding Member.

Donations to the Cabinet.

From Mr. G. B. Williams, a Mastodon Tooth from Kincaid's Flat.

From Mr. Smith, a specimen of Selenite from La Paz, Mexico.

From Dr. Trask, two specimens of *Callianassa occidentalis*, Stimpson, from the Bay of San Francisco; also, numerous specimens of minerals, shells, etc.

From Col. Ransom, a specimen of Ostraea, from the mountains sixty miles east of San Louis Obispo; it is 13¼ inches in length, and 7½ inches in depth, and weighs 18 pounds.

From Capt. Russell, four packages of seeds from Mexico.

From Dr. Eckel, specimens of Copper; also, of petrified wood, from Arizona.

San Francisco, May 19, 1856.

President in the chair.

Donations to the Cabinet.

From Dr. Stillman, specimens of Bulimus, from Los Moras, Texas.

From Mr. Sherman Day, specimens of Trachyte and Volcanic Tufa, from near Carson's Pass.

Several specimens of Geodes, from near Volcano, Amador county, were deposited by Mr. H. Camp.

A very large Patella, from La Paz, was deposited by Capt Russell.

San Francisco, May 26, 1856.

President in the chair.

Donations to the Cabinet.

From Mr. S. W. Levy, specimens of Phrynosoma, from Knight's Ferry.

From Mr. E. Mangan, a specimen of Chromic Iron from the foot hills west of Tulare Lake.

From Mr Joseph Briton, specimens of fossils from Monte Diabolo. The thanks of the Academy were voted for the above donations.

San Francisco, June 2, 1856.

President in the chair.

Donations to the Cabinet,

From Mr. A. Frieck, specimens of fruits, lava, etc., from the Sandwich Islands.

From Mr. Joshua E. Clayton, specimens of ores, etc., from Mariposa county.

From Mrs. T. J. Nevins, a collection of flowers from Alameda. The thanks of the Academy were voted for the above donations.

From the Boston Society of Natural History, was received a copy of their proceedings, Vol. 5, pp. 305, 320.

San Francisco, June 16, 1856.

President in the chair.

Mr. Moss was elected a Resident Member of the Academy.

Donations to the Cabinet.

From Capt. T. D. Johns, fossil cetaceau vertebral, from Coose Bay.

From Mr. Jerome Brown, Shaw's Flat, Tuolumne county, Mastodon teeth, from Stone Gulch.

The thanks of the Academy were voted for the above donations.

From Dr. Trask, 126 species of Achatinella, from the Hawaiian Islands.

Donations to the Library

From Mr. Nevins, Patent Office Report for 1853, and the Ninth Annual Report of the Smithsonian Institution.

San Francisco, July 7, 1856.

President in the chair.

Donations to the Cabinet.

From Mr. F. Bonard, specimens of Lava from Mauna Loa

From Mr. McMullen, specimens of birds, from the Cosumnes river.

The thanks of the Academy were voted for the above donations.

From Col. Ransom, a specimen of foliated Graphite, found fifty miles east of San Bernardino.

Donations to the Library.

From Dr. Eckel, Bibliotheca Historico-Geographica, 2 vols., and Bibliotheca Historico-Naturalis, 2 vols.

Proceedings of the Elliott Society of Natural History, Charleston, S. C., from the Society.

Reports of explorations for a Pacific Railroad.

San Francisco, July 21, 1856.

President in the chair.

Donations to the Cabinet.

From Dr. Stillman, Crustacea and Echinodermata from Panama Bay.

From Mr. T. J. Barnes, silicified wood from Arkansas Diggings, Amador county.

From Miss K. Palmer, the nest of a humming bird, from Alameda

From Mr. Hough, of Oakland, the fruit of *Ribes aureum* and a specimen of *Sarcodes sanguinea*.

The thanks of the Academy were voted for the above donations.

From Dr. Trask, specimens of coal with fossil Equisetaceae, from Scotland; also, several specimens of *Eutainia*.

From Mr. Isaac Lee, was received a pamphlet, containing several papers published by him.

Letters were read from the Royal Society of London, Prof J. Henry and Lieut. M. F. Maury.

San Francisco, July 28, 1856.

President in the Chair.

The following amendments to the By-Laws were unanimously adopted:

"From and after this date, no matters for exhibition presented by any resident member, shall be entered on the minutes of the association."

"The publication of any paper in the departments of Zoology and Botany, must be accompanied by the specimens described or drawings of the same, in fit condition for preservation, which shall become the property of the association."

Mr. A. F. Beardslee deposited for the Library, Michaux & Nuttall's North American Sylva; also a pamphlet containing descriptions of new coniferous trees of California.

B. B. Redding & Co. presented one volume of the *Democratic State Journal*.

August 25, 1856.

Vice-President in the Chair.

Mr. A. F. Beardslee was elected a Corresponding member.

Donations to the Cabinet.

From Mr. D. E. Hough—a specimen of *Salmo rivularis*, Ayres, from Temascal Creek.

From Mr. Bloomer—a specimen of Limestone from Suisun Valley.

From Dr. Lanszwert—specimens of *Eutainia dorsalis*, *Pituophis catenifer* and *Apodichthys flavidus*.

From Dr. Eckel—two specimens of *Tænia solium*.

Donations to the Library.

From Prof. J. D. Dana—"Science and the Bible," part 2d.

From Mr. Schmolz—"Atomycwichts tablen zur berechnung, von R. Weber."

American Journal of Science, vol. 22, No. 64, was received.

October 20, 1856.

President in the Chair.

Donations to the Cabinet.

From Mr. Charles Earl—specimens of insects and reptiles, from Chihuahua, Mexico.

From Dr. Holman—specimens of *Platichthys* from the Rio Grande, near Panama.

From Dr. Veatch—specimens of Sulphur, Travertine, Gelatinous Silex, and Chalcedony, from the Geysers; also a specimen of Limonite from near McDonald's Ranch, Berryessa Valley.

From Mr. J. M. Alden—a specimen of *Scomber Diego*, from the Santa Barbara Channel.

From Col. Ransom—specimens of minerals from the Great Basin, consisting of Obsidian, Pumice, Travertine, and Copper ore; also a package of bulbous roots called by the Indians of the Basin, "Taboos," much used by them as food.

From Dr. Stillman—specimens of *Asteracanthion*, *Cidaris*, *Hemiramphus* and *Chaetodon*, from Panama.

Dr. W. O. Ayres presented the following description of a new species of mackerel:

Scomber Diego, Ayres.

Body elongated, compressed, the thickness being contained nearly twice in the length. (The specimens described were taken while the fish were not in full condition, still the *Scomber Diego* is at all times doubtless less rounded than *Scomber scomber* or *Scomber vernalis*.) Length of the head contained four times in the entire length; depth of the body equalling three fourths the length of the head.

Eyes large, rounded, separated from each other by a space equal to their own diameter, which is contained four times in the length of the head. Muzzle pointed, jaws equal; gape of the mouth moderate, a line vertical to the tip of the maxillary crossing the anterior part of the eye. Maxillary entirely and intermaxillary in large part received under a sheath formed by the anterior suborbital.

Teeth numerous, very fine and even, in both jaws, and on the palatines, and a few on the vomer.—Pharyngeals densely crowded. Anterior nostril the smaller, circular.

Scales numerous, rather small, soft, covering the body, the bases of the second dorsal, and caudal, and the upper portion of the operculum and preoperculum; remainder of the head naked, very smooth.

Lateral line very nearly straight. The first dorsal fin, which is thin and delicate, arising at about one third of the distance from the tip of the snout to the extremity of the tail, is triangular in form, the second ray equalling nearly the length of the fin or half the length of the head. The fin when depressed is entirely received in a groove.

The distance between the two dorsals is equal to the length of the first. The second is low, highest in front, tapering posteriorly, its greatest height being less than half the height of the first dorsal, and its length equal to twice its height. The space between the second dorsal and the caudal is occupied by five finlets at about equal distances, the last having nearly twice the height of the others.

The anal fin, arising a little further back than the second dorsal, is entirely similar to that fin in form and size. Between it and the caudal are five finlets, corresponding to those of the back.

Pectoral fins somewhat pointed, their length contained a little more than twice in their height, which latter is not quite equal to that of the first dorsal.

Ventrals a little posterior to the pectorals, which they scarcely equal in height.

Caudal fin very deeply forked, the height of the central rays being only one fourth of that of the longest, which latter equal one-seventh of the length of the fish. Depth of the body at the origin of the caudal fin only one-half of the diameter of the eye.

D. 9 12; A. 1 12; P. 19; V. 1 5; C. 8 1 6 5 1 7.

Color, dark bluish green, with darker waving lines above; head greenish brown above; cheeks, sides and abdomen bright silvery. Tongue and membrane of the mouth and throat clouded, sometimes almost black. Fins agreeing in color with the part of the body to which they are attached.

No specimens have yet been seen measuring more than eleven inches in length, though it is stated that they sometimes exceed that size by two or three inches.

This fish is the only Mackerel known to inhabit the coast of California. It occurs from Monterey to San Diego, and probably extends its range much further in both directions. We hear, in fact, of Mackerel along our northern shores, but have seen no specimens, and of course cannot decide upon the species. None were contained in the collections made in Washington and Oregon by Dr. Cooper and Lieut. Trowbridge.

S. Diego is allied very closely indeed to *S. vernalis*, the mackerel of our New England coast. It differs however in the form and proportions of the head, in the contour of the body, in the eyes, the lateral line and the fins.

We are not sufficiently acquainted with its history to speak with confidence in regard to its migrations. Most of the specimens received have been taken in the Santa Barbara Channel, in the months of August and September. It is quite abundant, though never coming in such great numbers as the Atlantic species. No attempts have yet been made to render its capture a source of profit.

San Francisco, Jan. 12, 1857.

President in the Chair.

Dr. Trask read the following paper:

At the close of 1855, I presented to the Association a statement of the occurrence of earthquakes in this State for that year and a term of years preceding.

During the year just passed, I have kept a careful record of these phenomena, that have been noticed in this city, and other parts of the State, and which will be found below, with their date, and the hour of the day on which they took place, and they comprise all that have occurred, with perhaps two exceptions, the date for which were so obscure as to render it impossible to determine with accuracy the precise period of their occurrence. So far as I am informed, those shocks which have taken place in this State during the past year have not been marked with more severity than has been usual in years preceding, frequently amounting to a slight tremor, and at other times to more distinct movements; three only have possessed sufficient intensity as to command general attention during the busy hours of day.

Very few have been noticed by persons who were standing upon the earth at the period of their occurrence. By far the greater proportion were observed in high situations from the ground, and in the more retired parts of the city, or on the alluvial covering of the country to the west and south.

The total number for the past year is sixteen, and of this number thirteen were observed between sunset and sunsise, a fact sufficient in itself to show the lightness of their character; for, did they possess that severity so often attributed to them, the attention of the populace would much more often be directed to their observance. Yet we find such is not the fact, their first knowledge of such an occurrence being usually its announcement by the daily press.

By reference to the statistics below, it will be seen that even in the mountain districts, where during the day there is much less of turmoil and noise arising from business than in the populous city, that of all those noticed, none have been of sufficient intensity to attract the attention of the inhabitants during the hours of daylight. These facts, though few in themselves, are of importance, to disabuse the public mind in relation to the danger to be apprehended from the occurrence of these phenomena. The character which we sustain both at home and abroad, as being in constant danger of being swallowed up by these occurrences, and that our country is but a bed of latent volcanoes ready to burst forth at any moment, spreading devastation over the land, is one of the greatest fallacies that ever obtained possession of the human brain. Our State is as primitive as Massachusetts or New Hampshire, and the dangers that attend us from the sources above spoken of, are equally great as in the States just named.

We should remember that when speaking of California as a State, that we include a line of territory equalling that of the seaboard lying between Cape Hatteras on the south and the British Possessions on the north, and including eleven of the seaboard States of the Union; and when we place our comparative estimates on this basis in matters of this character, it will become at once evident that the danger of annihilation from the causes under consideration, are not of that magnitude that at first sight would appear.

Along the coast of Mexico and Central America, to the south of California from all the records that are obtainable here, there appears to have been a much greater exemption from those phenomena than has been usual in former years; this seems to have been the fact, also, throughout the Pacific, Oceanic and most of the Continental islands along the coast of China, while to the north and north-west, beyond the fifty-fifth parallel, both volcanic and earthquake phenomena appear to have been greater than usual. This has been observable, for the most part, in the neighborhood of the Aleutian Archipelago, along the north east coast of Japan, and in the British and Russian Possessions of North America on the Pacific, and islands of the Ochotsk Sea.

It would be interesting to know more of the predominance of these phenomena in those regions, and such information could be easily obtained from the commanders of the whaling fleet, if the proper measures were adopted to secure it.

Below will be found some interesting matter upon this subject, which took place during the past year near the Straits of Ourinach. The earthquakes which have occurred in this State during 1856, and the period of their occurrence, is as follows:

Jan. 2d.—At a quarter before ten this morning, a smart shock of an earthquake was felt in San Francisco. The motion of the earth was undulatory, and came apparently from the northward. A pendulum indicated a motion of about five and a half inches.

Jan. 28th.—At the town of Petaluma, Sonoma county, a shock of an earthquake occurred at a few minutes past three o'clock in the morning.—It was sufficiently heavy to awake persons from their sleep.

Jan. 29th.—At a quarter before one o'clock this morning, a slight shock was felt in San Francisco.—It was observed also at the Mission Dolores. There were three distinct tremors, with short intervals elapsing between. The motion was apparently from the westward.

Jan. 21st.—Quite a smart shock occurred at four o'clock this evening; it was quite sharp in the south-west part of the city.

Feb. 15th.—At five o'clock twenty-five minutes a severe shock of an earthquake was felt in San Francisco, the duration of which was about eight seconds. Persons sleeping were aroused, and many persons left their beds and sought the street. There were two distinct shocks, the second very light and scarcely perceptible. The motion was *undulatory* and *vertical*, and at the end of the first shock a very strong, profound jar, with which it ceased.

The upper part of a building on Battery street, for seventy feet in length, was thrown down, the whole of which was above the cornice very thin, and the mortar with which it was constructed had not become hardened, being easily removed by the fingers—it more re-embled wet sand than a firm mortar.—

There appears but little difference in the sensations of persons situated either in upper or basement stories.

It was preceeded by a deep, heavy rumbling, and the motion apparently came from the northwest. A distinct shock was felt at eight minutes past two o'clock the same morning, by persons who were awake and up at the time.

The vortical movement was shown in the fact that small square bottles and boxes that stood upon a line, were moved from their position horizontally, describing an arc of thirty degrees and upwards, as shown by the dust upon the shelves on which they stood.

The first wave came with a force sufficient to project small articles three or four feet on the floor, from shelves on which they were placed; they were apparently all thrown in the same direction. Seve-

ral clocks were stopped at precisely 5 hours 25 minutes.

All the cracks in walls and ceilings had a direction nearly northwest and southeast, and most of them had the appearance of having been produced at the moment of elevation.

The earthquake was felt heavily at Monterey, at 5 hours 20 minutes; it was also felt at Bodega, but no time is given,

The vessels on the coast, and ranging from San Pedro on the south to Southern Oregon, and at distances varying from eight to one hundred miles from land, did not experience any shock. They were 22 in number.

Up to the present date the most northern point of which we have any record of its having been felt, is at Santa Rosa, which is 53 miles north of San Francisco, and at Monterey, 90 miles south of the latter place; to the east of this city we have no record beyond Stockton. This would give for its length 143 miles, and its breadth 66 miles.

Inquiry was made through the State line Telegraph at El Dorado, Nevada, Downieville, Placerville, Marysville, Sacramento Stockton, and San Jose; it was not felt in any of the localities named, excepting the two last, and at Stockton it was quite light.

If the time as given at Monterey was the same as at this city, (San Francisco) the velocity of the earthwave must have been much slower than that of the great earthquake at Simoda.

March 24.—A slight shock was felt at Canal Gulch, Siskiyou county, also at Yreka at twenty minutes before 10 o'clock, P. M. The motion is described as being horizontal.

March 31.—A light shock was felt in San Francisco at twenty five minutes past 1 o'clock, A. M. It consisted of three light but distinct tremors.

April 6.—11½ P. M. A smart shock was felt at Los Angeles and the Monte. People were aroused from their beds.

May 10.—A light shock was felt in San Francisco at 10 minutes after 9 o'clock, P. M. The shock was accompanied by a loud report, like the discharge of a cannon; people mistook it for the signal gun of the mail steamer. This was felt at Monterey, Contra Costa county.

May 2.—A severe shock was felt at Los Angeles a few minutes past 12 o'clock, P. M. It caused much trembling among the buildings, and considerable alarm among the people, many leaving their beds The shock was preceded by two loud reports like the blasting of rock; it apparently came from the northwest; no damage was done.

August 2.—A light shock was felt in San Francisco at 20 minutes after 5 o'clock, A. M It was sufficiently strong to awaken persons in bed; it was evidently more severe in Stockton.

August 27.—An earthquake was felt at Mission San Juan, Monterey county, at 15 minutes before 9 o'clock, P. M. There were two distinct shocks with short intervals elapsing, the second being the heaviest. The motion is described as undulatory and coming from the west. It was felt at Monterey and at Santa Cruz.

Sept. 6.—A smart shock felt at Santa Cruz, at 3 o'clock, A. M. It created considerable consternation and many persons left their beds.

Sept 20.—A very severe shock was felt in different parts of San Diego county, and at that town at 11½ o'clock, P. M. At Santa Isabel the ceilings of the dwellings was shaken down; the cattle stampeded and ran bellowing in all directions, and the Indians seemed equally terrified. The walls of the adobe buildings were many of them cracked. The motion is described as oscillatory. A light shock occurred on the following Monday evening.

Nov. 12.—A smart shock occurred at Humboldt Bay at 4 o'clock, A. M. Another shock was reported but no date given.

From the records before us it will be seen that fourteen being the total number of earthquakes recorded during 1856, seven have been felt in San Francisco in common with other parts of the State; seven have occurred south of this locality that were not observed here, and four north of it. Of the seven shocks noticed here five only were not observed in any adjacent district, and may be considered as strictly local. The periods of the year at which the shocks have occurred, is as follows: During the winter months, five; during the autumn, three; during the spring and summer, six. Nine have taken place between the vernal and autumnal equinoxes.

We have records of considerable and violent volcanic phenomena throughout the northern seas, and islands both to the east and west of Alaska. The Russian frigate *Dwina*, while lying at Shnam Shu, brings intelligence of the outburst of a volcano in that vicinity about the 22nd of June, and on the 25th of the same month passed through fields of floating pumice; the latitude by observation being 50° 53' and longitude 158° 32' east per chronometer.

An interesting account of a submarine volcano was reported by the Captain of the bark *Alice Frazer*, in latitude 54° 36'— longitude 135° west, which is as follows: A portion of the whaling fleet, four in number, were running through the Straits of Ourinack, on the 26th of July last; while passing the straits a submarine volcano burst out, sending a column of water several hundred feet upward; immediately following this, immense masses of lava were projected into the air, and the sea for miles and for days afterward, was covered with floating fragments of pumice. The ships *Scotland* and *Enterprise* were nearer the volcano than the ships *Frazer* and *Wm. Thomson*; on the decks of the two former considerable pumice, lava, and ashes fell. There were seven vessels in the straits at the time of the occurrence, three of which the names I could not learn.

The outburst was accompanied with violent shocks of earthquake. It is the opinion of Captain Newell, of the *Alice Frazer*, that considerable shoaling has been the result of this submarine action.

Annual meeting by adjournment.

The Reports of the Treasurer, Curators, and Corresponding Secretary were received and placed on file.

The following officers were elected for the ensuing year:

President—Leander Ransom.

1st Vice-President—Theodore Moss.

2d Vice-President—J. A. Eckel, M. D

Recording Secretary—M. G. Read

Corresponding Secretary—W. O. Ayres, M. D.

Treasurer—F. Bosqui.

Curator of Zoology—L. Lanszweert, M. D.

Curator of Geology and Mineralogy—Dr. J. B. Trask.

Librarian—W. Heffley.

(Cal. Acad. Nat. Sci.)

On motion, it was voted that the election of Standing Committees be deferred to a future meeting.

From Dr. Stillman, of the steamer "John L. Stephens," were received specimens of marine shells, Radiata, &c., from the Bay of Panama.

From the Curator of Geology, by exchange, tooth of a species of *Elephas*, from Oregon.

From the Boston Society of Natural History was received a sheet of their Proceedings, Vol. 6. pp. 1—32.

(Omitted Proceedings.)

SEPTEMBER 29, 1856.

President in the Chair.

Dr. Joseph Birnstill was elected a Corresponding member.

Donations to the Cabinet.

From Mr. J. Galloway—specimens of Solar Salt and Sulphate of Lime, from San Quentin, Lower California.

From Mr. Pollock—a specimen of *Asteracanthion*, from San Francisco Bay. The thanks of the Academy were voted for the above donations.

From Capt. Russell—a specimen of *Pituophis* and the skin of a fox, from San Clemente Island.

From Mr. Beardslee—specimens of cones and pines from Shasta and vicinity.

Letters were read from Mr. Binney, of Germantown, Pa., Dr. B. F. Shumard, of Saint Louis, Boston Society of Natural History, and Western Academy of Natural Sciences.

Donations to the Library.

From Dr. B. F. Shumard—a paper on a new fossil genus, belonging to the family Blastoidea.

From the Boston Society of Natural History—Proceedings of the Society, pp. 353—368.

SAN FRANCISCO, Nov. 17, 1856.

President in the chair.

Donations to the Cabinet.

From Mr. Horace Davis—specimens of Limestone and Lignite, from Shaw's Flat.

From Mr. J. T. Cunningham—bones of Mastodon, from Shaw's Flat.

From Dr. Skinner, of Stockton—pharyngeal bones of *Mylopharadon robustus*.

From Mr. J. E. Clayton—cones of *Sequoia gigantea*, and bulbs of the Mountain Lily, from the Upper San Joaquin. The thanks of the Academy were voted for the donations above recorded.

From Col. Ransom—scapula of a Whale.

From Mr. Beardsley—specimens of Peroxide of Manganese, from near Oakland, and cones of Silver Fir. (*Abies nobilis*) from Scott Mountain.

From Dr. J. A. Veatch—skulls of *Ursus ferox* and *Canis ochropus* (?) Echo.

SAN FRANCISCO, Dec. 16, 1856.

Dr. Kellogg, Vice President, in the Chair.

Dr. Haggin, of San Francisco, was elected a Resident member.

Donations to the Cabinet.

From Mr. F. Rais—fossils of the marine Tertiary, from Monterey County, with minerals and recent shells.

From Dr. Badorous—specimens of silicified wood, from Mokelumne Hill.

From Captain J. D. Brown—specimens of Coleoptera, Coral and Sponges, from the Gulf of California.

From Mr. Bridges—specimens of *Sequoia gigantea*, *Sequoia sempervirens*, *Pinus Lambertiana* and *Pinus insignis*.

From Dr. J. A. Veatch—specimens of Travertine, Sulphur, Obsidian and silicified roots of the Tule, from near Clear Lake.

Donations to the Library.

Proceedings of the Boston Society of Natural History, vol. 5, pp. 375—416, from the Society.

From Messrs. Vincent & Payot—Memories de la Societe des Sciences Naturelles, 1835, 1842, 1849.—The thanks of the Academy were voted for these donations.

SAN FRANCISCO, Jan. 25, 1857.

President in the chair.

Mr. Thomas G. Cary was elected a resident member.

Donations to the Cabinet.

From Dr. Stillman, specimens of Shells, &c., from the Bay of Panama.

From Dr. Trask, a fossil *Elephas* tooth, from Oregon.

From Mr. Theodore Moss, a specimen of *Diomedea exulans*, from near Cape Horn; also a specimen of Mineral Resin in Coal, from the Island of Borneo.

From Dr. Lanszweert, specimens of Malachite from Australia, and of Sulphuret of Copper from Nevada.

By purchase from the estate of Dr. A. Randall, an extensive collection of plants of California, wood of forest trees, Mosses of New Mexico and the Gila, Shells and Minerals.

Donations to the Library.

Proceedings of the Boston Society of Natural History, Vol. 6, No. 1, from the Society.

From Mr. Geo. Frauenfeld, Verhandlungen der Zoologisch—Botanischen, 1852, 1853, 1854 and 1855; also, Bericht uber die oster—Literatur der Zoologie, Botanick, Paleontologie, aus den jarhen 1850—51—'52—'53—55. Also, Aufzahlung der Algen der Dalmatineschen Kusten; von Geo. Frauenfeld; also Metamorphism of Insects, by Geo. Frauenfeld; also Jahrbuch der Kaiserlich Koniglichen Geologischen Reichenstalt, 1850—1855.

From the Smithsonian Institution, the eighth vol. of the Smithsonian Contributions to Knowledge.

The thanks of the Academy were voted for the above donations.

From Mr. Wm. Stimpson, a copy of his work on the Testaceous Mollusks of New England.

From Dr. Lanszweert, a Catalogue of the Shells of Connecticut; also Conchology from the Encyclopædia Britannica, with plates of American Conchology.

The Committee on Publication were appointed a committee to draft a memorial to Congress in favor of the publication of the Scientific Reports of the U. S. Exploring Expedition under Commanders Ringold and Rogers.

Mr. Moss presented a prospectus of the Literary and Scientific Association of Valparaiso.

Mr. T. J. Nevins was elected a Life Member of the Academy.

Dr. Kellogg exhibited a drawing of a new species of Oak, to which was given the provisional name of

Quercus Vaccinifolia—Kellogg—or Huckleberry-leaf Oak—Leaves annual, coriaceous, small, oblong-ovate, acute, sub mucronate, somewhat obtuse at base; glabrous above, reticulate; fuscous and stellate pubescent beneath; margin entire, petiole short. Fruit ovate, sub acute, mucronate, sub-sessile; cup shallow, margin thin, scales minute appressed, hoary-fuscous tipped with brown, stellate pubescent. Biennial?

This species of oak is abundant on the lofty mountains of California. The Trinity, Scott and Siskiyou mountains are clothed with extensive thickets of this shrub. It is rarely found over one inch in diameter, and 4 to 6 feet in height. The branches are smooth, round and slender, and together with the buds and foliage resemble the Whortleberry. The leaves are about one inch in length, dilated at the base on slender petioles two to three lines in length, lamina about twice that in width; the lower surface somewhat tan-colored.

The Academy are indebted to M. F. Beardsley for the specimen and fruit.

The following Standing Committees were elected for the ensuing year:

Publication—Dr. W. O. Ayres, Dr. J. B. Trask, Col. L. Ransom, Dr. J. N. Eckel.

Library—Mr. W. Heffley, Dr. J. B. Trask, Dr. Eckel.

Finance—Mr. T. F. Moss, Mr. W. Heffley, Dr. Kellogg.

February 23, 1857.

President in the chair.

Mr. James Hepburn, Mr. Joseph Briton and Mr. A. A. Branda were elected Resident Members. Mr. Geo. Frauenfeld, of Vienna, was elected a Corresponding Member.

Donations to the Cabinet.

From Mr. Hearn, of Yreka, a Butterfly from Mt. Shasta, with plants and minerals from the same locality.

From Dr. Stillman, specimens of Zoophytes, Echinoderms, Mollusca, Crustacea and Fishes; also an Armadillo, from Panama and its vicinity.

From Mr. S. G. George, specimens of cordage made from the fibres of a species of Asclepias by the Indians of the Tulare Valley.

From Mr. Wm. R. Garrison, specimens of Coal with the accompanying rock, from Central America.

From Dr. J. M. Brown, specimens of Fish from the Santa Barbara Channel, and of Solen and Helix from the Island of San Clemente.

The thanks of the Academy were voted for the above donations.

From Mr. T. G. Cary, specimens of Pumice, from the surface of the ocean, June 25, 1856, in lat. 50° 53′ N., long. 158° 32′ W.

From Capt. L. J. W. Russel, specimens of Annelida, Crustacea and Mollusca, from the Gulf of California; also, of Specular Iron, Seeds and Shells, from Manzanillo.

From Col. Ransom, various Fossil Bones, found 100 N. E. of Los Angeles.

From Dr. Eckel, specimens of Neritina, from Japan.

From Mr. T. F. Moss, a valve of *Ostraea*, from the Amoor river.

From Dr. Lanszweert, Birds from New Caledonia.

Donations to the Library.

Proceedings of the Boston Society of Natural History, vol. 6, pp. 33–45, from the Society.

From Lieut. M. F. Maury, Washington Astronomical Observations, vol. 6, 1856.

From Dr. Eckel, Owens' Geological Survey.

From the Essex Institute, a copy of their Proceedings.

American Journal of Science, No. 67, from the Editors.

Report of the Commissioners of Common Schools, Canada.

From Mr. Heffley, Ancient History of Astronomy, by Waltz.

From Mr. T. F. Moss, six Nos. of La Science.

Mr. T. J. Nevins deposited seventeen volumes of the Natural History of New York.

Mr. T. J. Cary deposited Embryology of the Salonidia, and Systeme Glaciaire, by Agassiz.

The following paper, by W. P. Blake, was read:

NOTE ON THE OCCURRENCE OF TELLURET OF SILVER IN CALIFORNIA: BY WILLIAM T. BLAKE.

A specimen obtained from Georgetown, California, resembling a fragment of tarnished lead or silver-glance, is found on examination, to be chiefly composed of Silver and Tellurium. The mass is about one inch in length and breadth, and is entirely free from gangue, but incloses native gold, which appears at several points on its surface. An aggregation of cubical crystals, resembling galena, is implanted on one side, and the other is deeply indented with angular cavities—probably the prints of quartz crystals.

The massive part of the specimen is sectile and malleable, and does not show any traces of crystalization; it may be cut with a knife, like lead, and

gives a brilliant metallic surface. Hardness about 2 of Mohs' scale.

In the open tube, before the blowpipe flame, the mineral fuses quietly, coloring the glass a bright yellow under the assay; a white or gray sublimate is deposited at a short distance from, or directly over it, which, on being heated, fuses into transparent drops, resembling oil. On charcoal it fuses readily to a leaden-colored globule, which, on cooling, becomes covered with little points or dentrites. This globule flattens under the hammer, but breaks on the edges. With the addition of a little carbonate of soda, a globule of silver is readily obtained. A fragment heated to redness in a closed tube or matrass, with dry carbonate of soda and charcoal dust gives, on the addition of a few drops of boiling water, the beautiful violet-red or purple solution described by Berzelius as characteristic of tellurium.—This solution loses its color after standing for some time, and a dark colored powder is deposited. The mineral dissolves in hot nitric acid, with the separation of tellurous acid in crystals.

It is probably the species *Hessite*, but the decision is reserved until further examinations are made. Its color is darker than the Hessite of Savodinsky, Siberia, and is not quite so hard.

This very rare mineral has not hitherto been observed in America, and its occurrence is therefore of peculiar interest. I am indebted to P. C. Currier, Esq., of Georgetown, for the specimen. It was obtained in that vicinity, and probably taken from the auriferous drift; but it cannot have been transported far from its original source.

The crystals give reactions for lead and sulphur and a trace of selenium. They are probably galena, but may contain tellurium.

A specimen seen in California in 1854, weighing about two ounces, greatly resembled the massive part of the specimen above described. The small fragment of it which was then obtained, also gives the reactions for tellurium and silver. Its precise locality is not known.

The telluric silver of Siberia, according to Gustof Rose, is composed, in 100 parts, of:

Tellurium	36 96
Silver	62 42
Iron	0.24

It is probable that tellurium combined with silver, lead or bismuth, will be found in the auriferous quartz of Grass Valley and other localities. A few specimens in my possession contain small brilliant grains resembling tetradymite, but their exact character is not yet determined.

January 1, 1857.

A letter was read from M. Boisduval, stating that *Saturnia Californica* had been previously described by him as *S. eurgalus*.

The curators were authorized to send such duplicates of specimens as are available, to the Society of Natural History, at Stockton, Cal.

San Francisco, March 30, 1857.

President in the Chair.

Prof. Asa Gray, of Cambridge, Mass., and Dr. John Torry, of New York, were elected Honorary Members.

Dr. John Browne, of the U. S. steamer *Active*, Mr. Geo. Gibbs, of Port Townsend, M. Morcenhaut, of Monterey, Capt. Fauntleroy, Capt. Wilson and Dr. George Suckley, were elected Corresponding Members.

Donations to the Cabinet.

From Capt. J. D. Brown, of the schooner *Ada*, specimens of Reptiles, Fishes, Annelida and Crustacea, from the Gulf of California.

From Dr. Pigné Dupuytren, a fine collection of Marine Shells and a skull of *Belone*, from New Caledonia; also, a fabric made from the hair of the bat, by the natives of those islands.

From Dr. Welch, a skull of *Diomedea chlororynchos*, and a skull of a native of the Sandwich Islands.

From Dr. Czapkay, a large species of *Patella*.

From Mr. Parent, two specimens of *Chiton* and a *Cularis*, from the Gallipagos Islands.

From Mr. H. P. Wakelee, a suite of specimens from Nicaragua, consisting of the capsule of Cocoa Bean, Scorpion, skin of a large serpent, (called by the natives Bo-bo,) and Coal; also, Copper smelted at the La Mina del Padre, (Colima,) and Copper Ore from La Mina Truxcanisco, (Colima); also, Solar Salt from near Los Angeles, Cal.; also Auriferous Quartz from Kern river, and a shell of *Echinus*.

From Mr. H. R. Bloomer, a specimen of *Eutainia dorsalis*, from San Francisco.

From Barry & Patten, a specimen of *Ornothoryn-chus*, from Australia.

The thanks of the Academy were voted for the donations above recorded.

From Dr. Lanezweert, Lignite, from Sonoma.

From Dr. Bennett, a specimen of Gypsum, and one of native Alum, from Guaymas.

From Capt. Russell, a fine specimen of *Yucca*, in full bloom, from the Southern Coast; also, two young specimens of the same for cultivation; also, several specimens of *Mesembryanthemum*.

From Dr. Kellogg, a specimen of *Scolopendra*, from Monte Diabolo; also, a box of seeds.

From Dr. Ayres, a specimen of *Anarrhichthys ocellatus*, and one of *Cebidichthys crista-galli*, from San Francisco Bay.

From Mr. W. H. Pease, of Honolulu, a fine suite of specimens from the Sandwich Islands, consisting of Crustacea, Land and Marine Shells, Echinoderms and Corals.

From Mr. Hepburn, Calcareous Travertine, from the Geysers.

From Mr. Beardslee, a specimen of *Trillium*.

From Dr. George Suckley, specimens of *Mytilus*, from the Straits of Fuca.

From Dr. Trask, a specimen of Nereis, thirty-three inches in length, from San Francisco Bay; also, a fish allied to Gunnellus, of apparently a new generic type; also, a quantity of the ripe fruit of the Coffee Tree, from the Sandwich Islands. The curators were requested to distribute these seeds throughout the State, for the purpose of inducing their cultivation.

Capt. Russell deposited a Water Bottle and Beads, with a Mortar, which were made by the Indian woman Maria, on the Island of San Nicolas, during her solitary residence there of eighteen years.

ON THE DIRECTION AND VELOCITY OF THE EARTHQUAKE IN CALIFORNIA, JANUARY 9, 1857—BY DR. JOHN B. TRASK.

The earthquake which occurred in various parts of this State, on the morning of the 9th January last, excited at the time considerable attention.—This arose from two causes. First from the varied reports that appeared on the following day through the press of this city, detailing its occurrence in remote mountain towns and for which there was no foundation. Secondly, from the great extent over which the commotion was felt, as was subsequently proved.

Immediately following the occurrence of the phenomenon, letters were addressed to all the principal towns between Mariposa and Downieville, east of the valleys, for the purpose of learning how far the shocks may have extended eastward of this city.—These letters were forwarded by the Pacific Express Company to their agents, and through them answers were returned in every case but two through the same source. From the facts thus obtained, it was found that in no locality east of the foothills, *was any shock felt whatever on that day or night*.

Another report, equally unfounded, reached us on the arrival of the steamer from the Southern coast, to the effect that several houses had been demolished in San Diego from its violence, while the facts in the case are, *that the steamer left that port twenty-four hours before the shock occurred there*.

This earthquake, or more properly speaking the series of shocks that began on the night of the 8th in this city, and which continued in the south part of the State during the following day and night of the 9th, was probably the most extensive of any on record on this portion of the Pacific coast, excepting, perhaps, that of the wave of the Simoda earthquake in December, 1854. The linear distance over which we are able to trace its course, amounts to six hundred and two miles, and its breadth, so far as now ascertained, is two hundred and ninety miles. It has all the appearance of having been the terminal movement of some more violent commotion at a distance from our coast.

From the best evidence obtainable at present, it seems to have had its origin to the west and travelled in an easterly direction. This is conclusively proved from the fact that it was felt earlier at San Francisco than at any other locality east of this city within the State. We have no record as yet of its occurrence along the coast of Mexico or Oregon.

I have been able to determine with considerable accuracy the period of time at which the shock between eight and nine o'clock on the morning of the 9th took place, at four localities east of the city of San Francisco, in this State, as the shock at that hour seems to have been more generally noticed than those which either preceded or followed it here or elsewhere, though at this city it was much less marked than the shocks at 1h. 53m., 4h. 15m., and 7h., these three latter occurring at those hours of the morning when most persons are sleeping. The shock at 7h. produced a circular motion in the pendulum, the diameter of which was about five inches. The oscillations of the pendulum in all the others were in an easterly and westerly direction.

The precise period of time at which the shock took place at San Francisco, between eight and nine o'clock, is determined by the stopping of a time-piece belonging to J. W. Tucker, whose rate of error was three seconds fast. The time at San Diego was furnished by Mr. Cassidy, of the army, and that of the Tejon Reserve is by persons at that post. To private gentlemen at Sacramento and Stockton we are indebted for the time at those places. The accompanying table of latitudes and longitudes, of localities named gives the hour at which the shock took place at each; the difference or elapsed time, from which the velocity was deduced, are the mean times corrected for the places named, the time as given above being taken as the standard at San Francisco.

It is proper here to state that three minutes four seconds, was the greatest error in time found, and the least was twenty two seconds:—

	Lat.		Lon.		Time of shock.			Elapsed time.		Velocity
	°	′	°	′	h.	m.	s.	m	s.	miles
San Francisco	37	48	122	25	8	13	30	0	00	0 0
Sacramento	38	32	121	23	8	20	00	7	30	6 6
Stockton	37	52	121	34	8	23	00	9	30	6 5
Tejon	35	00	118	46	8	45	00	32	30	6 0
San Diego	32	42	117	13	8	50	00	36	30	7 0

The velocity is given in miles per minute, and by dividing the sum of the same by their number, it will be found that the movement of the wave at that time averages a fraction over 6.2 miles per minute.

The results obtained from the above data approximate closely the deductions of Prof. Bache on the wave which reached our shores resulting from the earthquake at Simoda on the 23d December, 1854, and which will be found in a paper read by that gentleman at the meeting of the American Association for the Advancement of Science, during the early part of last year.

From the facts before us, there can be but little doubt of the direction of the commotion, and that it proceeded from the west, or a little south of that point. The motion of the earth, as described at the different localities at which it was felt, with the motion of the pendulum—which was slightly south of a west line—leads to the latter conclusion. Time is an important element in aiding us to form correct conclusions regarding their phenomena, and it is to be hoped that our friends in different parts of the State, in reporting the same, will be precise in this particular. Of the incidents attending the shocks, many and varied reports have reached us; and it seems to have acted with greater violence in the vicinity of the Tejon Reserve and upper Tulare county than at any other places. It is most remarkable that so small an amount of intensity was manifested when the area over which it extended is taken into consideration.

The effects were felt in San Francisco several hours before they are reported to have been observed at any other place north or south. They began here at twenty minutes past eleven, on the night of the 8th, and continued till thirteen minutes past eight the following morning—six shocks occurring in the interim; while to the south, the first shock that was noticed at the Tejon was at 6 hours 30 minutes, on the 9th. In Los Angeles they continued at long intervals through the day until 23 hours 30 minutes of the same date. I have learned from persons who were present in Los Angeles at this time, and also at the shock of the 14th July, 1855, that the severity of the latter exceeded that of the 9th January last past.

Donations to the Library.

From Lieut. Maury, a full series of his Wind and Weather Charts.

From the Boston Society of Natural History, their Proceedings, vol. 6, pp. 49-64.

From the Natural History Society of Montreal, their Twenty-eighth Annual Report.

A Circular, from the California Society of Natural History, Stockton.

American Journal of Science, No. 68, from the Editors.

From Mr. T. F. Moss, eleven Nos. of La Science.

Mr. Moss deposited Paleontologie et Geologie, three volumes; also, Precis d'Analyse Chimique.

Capt. Russell deposited a volume of Records of the Mission of San Diego, in Spanish, dating back to A. D. 1770.

Letters were read from M. Rene Lenormand, Mr. W. H. Pease and Mr. W. P. Blake.

The thanks of the Academy were voted to the Editors of the *Pacific Sentinel*, Santa Cruz, for a file of their paper furnished regularly for several months past.

The Recording Secretary was requested to communicate to Mr. Joseph C. Palmer the thanks of the Academy, for his very liberal donation of the rent of the Academy rooms for the ensuing year.

Dr. Trask read the following paper

ON SOME NEW MICROSCOPIC ORGANISMS.

During the summer of 1855, while in the vicinity of Santa Barbara, engaged in the examination of several species of marine algae to which many zoophytes were attached, I accidentally met with the forms which constitute the subject of this paper. Since that time, further observations have been made, and examinations for their presence with more success than was at first anticipated.

The striated appearance of these minute organisms led to the belief at first that the lorica belonging to them was silicious, but the application of chemical agents has shown this not to be the case, for it is entirely destroyed by digestion in strong nitric acid, continued for a considerable length of time.

In the normal state the forms are brittle, and easily broken under a compressor, but after digestion in nitric acid the lorica becomes soft and flexible, losing none of its configuration except on the application of mechanical means. In this particular they comport themselves with the calcareous portions of animal structures. The striated appearance which they present is (by the above means) found to consist of septa, placed transversely across a longitudinal canal extending the entire length of the organism, and so far as present observations have extended, they present the peculiar features of being solid, for by compression they have been extruded from the canal, and retain their forms when thus free, the canal collapsing where the extrusion of the septa has taken place.

In view of the above facts it will be necessary to place these minute organisms among the family of crustaceas, their form and inorganic structure, with their configuration seeming to warrant this, more properly perhaps than among the zoophytes, or diatoms.

The mandibular process on the anterior end simulates in some particulars the vibracular organs of the zoophytes, but what particular office it performs in their economy is yet undetermined, having never had an opportunity of examining their movements when freshly collected, with instruments of sufficient power. The materials from which they have been obtained have laid for months, in most cases, before opportunity offered for their investigation.

The mandibular process is placed on a movable joint, and has the appearance of being attached and capable of motion through the agency of muscular filaments passing within the outer covering of the animal; by digestion in acid it is often very soon detached from the head of the styliform body to which it belongs, but when in place it has considerable lattitude of motion. The figures are drawn with the camera-lucida and a microscope by Oberhauser.

These forms are certainly most singular, partaking as they do, the appearance both of animal and vegetable forms. Certain it is, they belong to no genus at present known, or with which we are at present acquainted, and under this view we shall place them in a new genus, with the following definition:

LEPTOSIAGON—TRASK—*Nov. Gen.*

Lorica membrano-calcareous, styliform; straight or curved, having a central canal, which is divided by transverse septa its entire length; anterior extremity furcate, more or less enlarged, and traversed by one or more bands or ribs raised above the surface, and armed with a movable mandibular process more or less denticulated; posterior extremity either acute, rounded or capitate; body rounded, smooth, more or less compressed.

Leptosiagon gracilis ng. ns.—TRASK—Plate 6, fig. 1.—Lorica straight, smooth, compressed, anterior extremity furcate, forming two somewhat unequal beaks, and armed with a long smoothly curved mandible, having about sixteen fine acute denticulations on one side, its anterior end acutely terminated, broadest part of mandible about one-fifth greater than the body below; posterior extremity subcapitate and rounded, shows a terminal orifice to the central canal.—Transverse section ovate. Length of mandible contained about five and one-half times in the length of the body. Breadth of body about 1-80th its length. Mag. 550 diameters.

On algae attached to fish cars—Santa Barbara.

This species is adopted as typical of the genus, for the reason that it appears most plentiful when compared to the others, was the first met with and is beautifully marked, and symmetrical.

L. occidentalis. ng. ns.—TRASK — Plate 6, fig. 2—Lorica straight, smooth, anterior extremity equally furcate, and terminated on the ventral side by a somewhat bluntly rounded process, with a smaller one on the dorsal side, arm-

ed with a short and broad mandible, having a curved, blunted point, with four or five close-set somewhat acute and curved denticles, situated within its middle half; posterior extremity rounded, orrifice of the canal distinctly seen on its end. Length of mandible contained about seventeen-times in length of the body. Breadth of body about 1-77th its length. Mag. 460 diameters. Found with the preceding.

L. *magnas. ng. ns.*—Trask — Plate 6, fig. 3.—Lorica smooth, arcuate, gradually tapering from the anterior to the posterior extremity. Anterior end terminated by a wide, pointed beak on the ventral side, and a small rounded process on the dorsal, armed with a broad curved mandible, having a hooklike end, and a large pointed denticle near the middle; posterior extremity narrow and rounded; body tapering for nearly its entire length, compressed, transverse section oval.

Length of mandible contained about nineteen times in the length of the body. Breadth of body 1-22nd its length. Mag. 400 diameters.

Santa Barbara. Matsmai, Japan. On limpets and among the roots of zoophytes.

L. *falcata. ng. ns.* — Trask. — Plate 6, fig. 4—Lorica curved, anterior extremity very unequally furcate, the ventral side being projected into an acute long rostrate process, and a very small angular beak on the dorsal; armed with a somewhat narrow sickle-shaped mandible, which is finely dentlculated for little more than half its length; posterior extremity terminating in a narrow sharp point; body tapers uniformly throughout its length, much compressed. Length of mandible contained about eight-times in the length of the body. Mag. 540 diameters. On limpets. Japan, Island Mastsmai.

L.—var. (?)——Plate 6, fig. 5.—This at most is probably but a variety of the proceeding. I think it will prove a younger individual of the last species; it bears a strong resemblance to L. *falcata*. Mag. 540 diameters. Found with the preceding.

L. *glabrescus. ng. ns.*—Trask — Plate 6, fig. 6.—Lorica arcuate, anterior extremity widened, subacute beak, and two smaller processes opposite, the one more prominent and acute than the other; body tapers from anterior extremity to posterior, the latter terminating in a narrow rounded end, much compressed; mandible very long, subulate thin, smooth upon both edges; length of mandible contained about four-times in the length of the body; breadth of body nearly 1-28th of its length. 640 diameters.

On Ostrea, Gulf California and Manzanillo.

L. *semirectas. ng. ns.*—Trask — Plate 6, fig. 7.—Lorica slightly carved for little more than one-third its length from the anterior end, becoming nearly rectilinear for the rest of its length; anterior extremity formed of rather a bluntly rounded wide rostra on one side, and a sublanceolate process opposite; a broad rib-like lobe extends from the apex of the beak obliquely across the anterior end, and raised above the surface on which it rests; body contracts from the anterior portions to the posterior, which terminates in a rounded end, canal central, mandible curved, and obliquely connate, very finely denticulate, no aperture observed on the posterior end. Mandible contained about eight times in the length of the body. Manzanillo and Gulf of California. On Ostrea. 750 diamters.

L. *incurva*. ng. ns.—Trask. — Plate 6, fig. 8.—Lorica curved, smooth, anterior end projected into a short acute rostra, and a small, sharp process on the opposite side; posterior extremity rather obtusely rounded; mandible slightly curved on one side, nearly straight on the opposite, without denticles. Canal central. Mandible contained about five times in the length of the body. Manzanillo. On Ostrea. 1000 diameters.

L. *attenuata*. ng. ns. — Trask. — Plate 6, fig. 9.—Lorica straight, narrow, gracefully contracting from the anterior extremity to the posterior, which latter is capitate. Anterior end unequally bifid, forming two bluntly rounded beaks, in which is inserted a narrow, subulate mandible. Canal central. No denticles were observed on this species. Manzanillo and the Gulf of California. On Ostrea. 1000 diameters. These new forms, now for the first time figured and described, constitute some of the most beautiful organisms to be met with. The fineness of the denticulations on the mandibular process well fit them for test objects for the microscope.

From the localities above named it will be seen that they occupy an extended geographical range, being found from Mexico to the coast of Japan. They are not plentiful, so far as observation at present extends, yet sufficiently so that I have been enabled to obtain a dozen specimens from one or two ounces of material. I have met with the best success in specimens of algæ and shells, from depths from four to six fathoms. A good locality for obtaining them frequently is from the large mytilus, found only at very low tides on this coast, more particularly on shells, to which sertularia and other zoophytes are found attached. I have met with them from Monterey, Bolinos and Tomales—from the two latter places attached to laminaria, and about the roots of plumularia on stones. A locality in the Bay of San Francisco, that furnished specimens last year, has not produced any yet this season.

Dr. Trask read the following paper on nine new species of Zoophytes from the Bay of San Francisco and adjacent localities:

Genus Sertularia. Linn.

Sertularia anguina. Trask. Plate 5, fig. 1. Polypidom erect, one to three inches high, alternately branched and pinnated, color corneous; rachis tortuous, jointed, with two cells on each internode, and four between each branchlet; pinna jointed, two cells on each, placed somewhat sub-lateral and forward, nearly opposite, aperture free, with oval smooth margins; cells attached by a broad strong base, at the insertion of which a slightly raised rounded ring is apparent. Its affinity is with that of *S. fallax*, (Johnston,) more nearly than with any other species with which I am acquainted, and at first sight would easily be mistaken for that species. Its ovarian vesicles have not yet been seen.

Plentiful on a large mytilus brought to our

markets from Monterey, Tomales Point, Punta Reys, and old shells, Bay of San Francisco.

S. furcata. Trask. Plate 5, fig. 2, *a. b. c. d. e.*—Polypidom long, four to nine inches, adnate to the various marine algæ on which it grows, and often quite embeded in the fronds of marine plants, pinnated, color corneous; rachis cylindrical, jointed; the pinnæ are simple and for the most part free, arising from the lower portion of the joints of the rachis. Their attachment to the main stem is somewhat peculiar; for, like the rest of the members of this genus, they are not given off from the main stem by a fixed joint, but have their origin from the end of a sessile pedicel; this is attached to the rachis by a strong base, is sub-pyriform and cylindrical, is free for about three-fourths its length, terminating in a rather bluntly-rounded rostrate process on the outer and superior aspect.

From this pedicel the pinnæ arise by a flexible joint, allowing a latitude of motion indicated between their attachment and the rostral end of this process. Figure (*a*) represents two joints of the rachis and its pedicels, with the pinnæ arising therefrom as seen under a power of thirty linear diameters. The cells are immersed in the pinnæ for about two-thirds their length, opposite, two upon each joint, compressed, the superior ends considerably divergent, acutely sinuated on the upper and outer edge, as seen in *fig.* 2, *c. d*, they are a little in front of the lateral line. A back view is shown at *fig. b.*

The ovarian vessicles are produced from the lateral and back part of the pinnæ at the base of the cell, are sessile, of a light corneous color, polished, and have an elongated oval form, somewhat swelling on the outer side, with a large oval mouth, the edges of which are somewhat depressed below the summit.

It is not without some doubts that I have placed this zoophyte in this genus, believing that there are sufficient distinctions in the species to form a new generic type; but as no opportunity has offered to observe its habits, and nothing is at present known regarding the animal, it is thought best to place it provisionally in this genus for the present, until farther opportunities shall offer for its investigation.

Bay of San Francisco and Farrallone Islands.

S. turgida. Trask. Plate 4, fig. 1.—Polypidom erect, from two to three inches high, pinnated, color corneous, at times it is found aduate to substances on which it grows; pinnæ arise alternately from opposite sides, jointed, compressed; cells latero-frontal, alternate, one on each joint, and situated above the middle, are free for nearly three-fourths their length, divergent, subcylindrical, round, full, with a broad aperture which is somewhat constricted below the edges; the upper and outer edge is deeply sinuated, thus forming two rather large denticulations more or less rounded, but occasionally one or both are found sub-acute. This peculiarity is often met with in adjoining cells on the same pinnæ. The inner edge of the aperture is slightly everted, and rather more deeply constricted than the outer or lateral portions, and forms a broadly rounded margin with a slightly raised lip.

The ovarian vessicles arise from the back part of the pinnæ, sessile, large, sub-pyriform, the upper half armed wlth stout, rounded, blunt, spines, twenty to twenty-eight in number; mouth sub-cylindrical, the edges surrounded with ten to fifteen smaller spines. The whole polypidom presents a full, turgid appearance, and is more or less marked with fine wrinkles,

Bay of San Francisco, Monterey, Tomales Point. On mollusca and algæ. Rather rare.

Genus Plumularia (Lam.)

Plumularia Franciscana. Trask. Plate 4, fig. 3.—Polypidom six to eight inches high, color corneous, alternately branched, the branches pinnated, one branch to each internode of the stem. The pinnæ rise one above the other, are pointed, and support three cells at each joint.—On two specimens four cells have been met with, but may be regarded an exception rather than otherwise. The pinnæ are dictotomously branched in adult specimens. Cells lagenculate, smooth, free, slightly decumbent; the attachment of the base is marked by a slightly elevated rounded rim, apertures round and smooth.

Bay of San Francisco, among rejectamenta of the beach.

Genus Crisidia (M. Edw.)

Crisidia gracilis. Trask. Plate 5, fig. 3.—Polypidom confervoid, very slender, branched, calcareous, growing in little tufts from one-fourth to a half inch in height; each cell is jointed, flexible, and dark brown or black. Cells cylindrical, free, the upper fourth divergent, in some specimens slightly curved, the upper cell given off from above the middle of the one below it, and which becomes somewhat incrassate at that point. Apertures round, smooth, facing more or less alternate, surface smooth and shining. Sparingly found, attached to other zoophytes and marine plants.

Bay of San Francisco, Monterey, Punta Reys.

Genus Crisia (Lamx.)

Crisia occidentalis. Trask. Plate 5. fig. 4. Polypidon erect, not exceeding one inch in height, calcareous, irregularly branched, joints dark and flexible. Cells tubular, slightly compressed and diminishing in size from above downward, lateral, from seven to nine on each internode of the joints, alternate, surface finely granulated, a high and sharply-rounded process extending laterally and upward from the edge of the aperture, and covered with a thin calcareous operculum, which is apparently sessile, and somewhat excavated on its upper surface. Apertures a little ovate, with smooth edges and slightly oblique.

This species is closely allsed to *C. eburnea,* (Johnston,) and would easily be mistaken for that species on a mere casual examination.—May not Mr. Thomson's speoimen from California, which he thinks identical with *C. eburnea,* have been an imperfect form of *C. occidentalis?* (*vide* Johnston's Zooph., 2d ed., page 284.)—There are sufficient differences in *C. occidentalis* to separate it from *C. eburnea,* as may be seen by an inspection of the figure, notwithstanding there is a close alliance in many particulars. My figure is drawn with camera lucidla under a power of thirty linear diameters.

Attached to marine algæ from Santa Barbara

to Cape Mendocino; often met with in Bay of San Francisco.

GENUS MENIPEA. (LAMX.)

Menipea occidentalis. TRASK. Plate 4, fig. 4. —Polypidom tufted, alternately branched, calcareous, from one to two inches high, color white and yellowish; branchlets rise from the superior and lateral portions of the internodes. Cells much compressed, diminishing rapidly from above downward; three on each internode.—Apertures roundly oval, with a slightly raised, rounded rim, which is armed with two stout, rounded, curved and acute spines, pointing upward and inward, one always being more or less sub-central. Internodes sub-triangular, with a somewhat tortuous, rounded rib passing through the centre, the lateral and superior angles surmounted by two or three long, rounded, irregular spines; points dark colored. The upper nodes are armed with four long and irregular spines, the two central being much the longest. All the spines more or less acute.

From Cape Flattery (Oregon) to Santa Barbary. Frequent among rejectamenta, Bay San Francisco.

GENUS SCRUPOCELLARIA. (VAN BENEDEN.)

Scrupocellaria Californica. Trask. Plate 4, ffg. 2.—Polypidom confervoid, jointed, growing in bushy tufts, calcareous; cells biserial, alternate, from seven to nine on each point, facing somewhat obliquely outward; apertures roundly oval, margins incrassate, and sustaining a single spine, which rises from the rim of the aperture on its upper and outer edge from the base of the inner edge; a pedunculate, pear-shaped operculum covers a portion of the aperture. The vibracular and avicularian organs are wanting.—The lateral cup-like cells sustain two round, obliquely set spines rising from the posterior edge. The affinities of this species are with that of S. macandrei.

Bay San Francisco.

GENUMS HIPPOTHOA. (LAINX.)

Hippothoa amabilis. Trask. Plate 4, fig. 5. —Polypidom creeping, branched irregularly, calcareous, polished, branches anastomosing; apertures large, oval, with a rounded, thickened rim; within the upper part of the aperture a shining calcareous hemispherical operculum; the anastomosing branches are given off, for the most part, opposite the aperture, but this cannot be said to be a strict rule as regards this species.

Found on stones within half tides in the Bay of San Francisco.

Mr. Garratt's paper on new species of marine shells of the Sandwich Islands.

MUREX-EXIGUA. Garrett.

Shell, oblong-oval, solid, scabrous, and whitish; whorls about six, somewhat emgulated above, coarsely furrowed spirally, and crossed by numerous varices, which are crenulated by the spiral furrows; base furnished with a short, subclosed, slightly oblique canal; aperture round-oval; outer lip crenulated.

Length five lines.

Habitat: Pure, shallow pools on the rocky coasts of Hawaii.

PURPURA-STRIATELLA. Garrett.

Shell, ovate, solid, smoothish, ventricose above, blackish, with sub-equidistant, spiral, pale lines; spire short, conic, convex; aperture large, elongated, notched above, and faintly lineated within; outer lip dilated, slightly, toothed within, and minutely crenulated on the edge, where it is margined with purple; columellar lip depressed, spreading, smooth and toothed above; throat bluish.

Length seven lines.

Habitat: Hawaii.

Observations.—This species is not common at the above locality; they are generally found attached to the spines of the *Echinus-atratus* (*Lin*) in the circumlitteral zone.

TURBO-MULTILINEATA. Garrett.

Shell, solid, sub-globose, sub-perforated; spire consisting of about three volutions and slightly depressed; the whole surface marked with numerous, spiral, coarse, equidistant, elevated, reddish lines; in a pale ground.

Length less than a line.

Habitat: Hilo Bay, Hawaii.

In the circumlitteral zone.

TROCHUS-STRIATULA. Garrett.

Sub-genus.

Margarita.

Shell, thin, depressed, somewhat pellucid, glossy; surface marked with crowded, fine, regular, revolving striœ; body whorl large; spire small, with four volutions, separated by an obsolete sutural line; base somewhat flattened, and umbilicated; columella slightly reflected over the umbilicus; color, variously mottled and striped with pale fulvous, greenish and pink on a pearly ground.

Length one line; diameter the same.

Habitat: Laiminarian zone, Hawaii.

PLEUROTOMA-RETICULATA. Garrett.

Sub-genus.

Mangelia.

Shell, solid, sub-fusiform, turreted, whitish, with a pale purplish spiral zone; whorls six or seven, convex, and marked with numerous, regular, series of equidistant spiral rows of squarish punctures which give the surface a beautiful reticulated appearance; suture crenulated; base somewhat wrinkled and provided with a short, slightly oblique canal; aperture elongate, narrow and slightly contracted by the outer lip; labrum thickened outside and in, crenulated or toothed and deeply notched above; columella callosed.

Length three lines.

Habitat: Hilo Bay, Hawaii.

RISSOA-CRASSILABRUM. Garrett.

Shell, solid, acute, turrito-conical, smooth, glabrous, white or a very pale fawn color; whorls eight, plano-convex; sutural line faintly impressed; aperture ovate; labrum somewhat dilated, very much thickened and dentated in the inner margin; columellar lip broadly callosed.

Length four lines.

Habitat: Rocky coast of Hilo, under stones, in the circumlitteral zone.

RISSOA-MULTICOSTATA. Garrett.

Shell, solid, somewhat cylindrically elongated; whitish or pale-fulvous and marked with regular, crowded, equidistant, longitudinal ribs; whorls about nine, convex; sutures well impressed; aperture sub-ovate, slightly effuse below; labrum thick; columellar lip callosed.

Length, three lines.

Habitat: Circumlittoral zone under stones, or attached to species of Holothuria; Hilo, Hawaii.

ADEORBIS-COSTATA. Garrett.

Shell, ovate-globose, thick and whitish-brown color; spine consisting of three moderately elevated volutions; body whorl with three or four large spiral carina; the whole surface marked with coarse, crowded, slightly waved, spiral, impressed stria; base perforated; aperture round-oval; outer lip slightly fringed by the terminal ends of the external keels.

Length, two lines.

Habitat: Rocky coast of Hawaii.

HIPPONIX-MINOR. Garrett.

Sub-genus.

Amalthea.

Shell, depressed, thick, convex above, spine lateral, mamillated; surface with minute, concentric stria; margin simple, sharp, rarely crenulated; above grayish, with a suffusion of red towards the summit; inside rich-brown, which becomes greenish towards the margin.

Height, half a line.

Length, one line.

Habitat: on turbinate shells, Hawaii.

BULLA-SCRIPTA. Garrett.

Shell, oblong-oval, thin, fragile, semipellucid, shining, whitish, and marked with three distant, transverse black lines; these crossed by several longitudinal waved similar lineations; surface furnished with minute, crowded, regular, transverse, impressed, punctured striœ; spine retuse, and mamillated.

Length, nearly three lines.

Habitat: shallow pools on the rocky coasts of Hilo. Rare.

SUCCINEA-NEWCOMBIANUM. Garrett.

Shell, wide-ovate, very thin, fragile, somewhat inflated, pellucid, whitish-horn color; body-whorl very large and distinctly striated; spine very small, depressed, with one volution; aperture sub-orbicular and nearly the whole length of the shell; outer lip much expanded.

Length, three lines.

Animal, pale flesh-color, mantle obsoletely laciated and slightly reflected over the shell.—Foot narrow, elongated and minutely speckled with brown.

Habitat: District of Waimea, Hawaii.

Observation.—This singular species is somewhat rare, and occurs on bushes at an elevation of about four thousand feet above the level of the sea. This species is dedicated to Dr. W. Newcomb, late of Honolulu, S. I.

SAN FRANCISCO, Oct. 5th, 1857.

President, Col. Ransom, in the chair. Dr. Kellogg read the following paper, with appended remarks by Dr. Beardsley.

Dr. Kellogg exhibited a drawing and specimens of a new species of Cypress.

CUPRESSUS FRAGRANS, (Kellogg,) *or the Fragrant Cypress.*

Branchlets four-sided, somewhat compressed, densely crowded, sub-divisions numerous, with a frond-like arrangement; larger branches roundish, slightly compressed laterally, flexuose, *bark* madder brown; *leaves* diamond-acute and aculeate, shining, bright, vivid green, carinate, an oblong resinous gland along the back, appressed, imbricated in four rows; older leaves on the intermediate branches long, decurrent; point awl-shaped, incurved.

Cones pedicilate on long, scaly footstalks, similar to the branchlets, somewhat elongated; globose cinnamon color, size of a hazel-nut, composed of about nine peltate scales; centre depressed; margin thickened and rounded; disk corrugated and rough; a sharp, transverse ridge divides it somewhat above the centre; the mucro broad, thin or flat, pointed, fragile, curved outwards and pointed towards the apex; scales irregularly five-sided.

Seeds broadly winged all round, waved, oblique, scooped; base of the smooth cylindrical kernel portion prominent; apex emarginate, mucronate, bright cinnamon color.

This species bears the nearest resemblance to *C. Lawsonianna*, but differs from it most strikingly in the brighter green of its foliage and tis far denser branchlets; also in the leaves being narrower, much more angular, sharper pointed; the cones are from one-third to twice the size, more rough, also in color, form, and more sparce distribution, &c.; it is also a tree of larger proportions in all respects. The specific name chosen is intended to express its quality, *par excellence*. We know of no species so agreeably fragrant; the wood abounds in an oil which exhales a peculiar spicy aroma, in which the ginger odor prodominates. This notable odor has sometimes given it the common name of "Ginger Pine" among lumber-men. Some speak of it as "White Cedar;" in the market it is also known by the more indefinite name of "Oregon Cedar." The grain of the wood is commonly a fine, close texture, strong and elastic; the annual concentric circles are often as large and distinct as the Eastern white pine, (*P. Strobus*,) showing it to be a tree capable of rapid growth. It has gained a good reputation among carpenters, since it has been brought into market properly seasoned; it works easy, and burnishes smoother than the white pine.

We understand suitable machinery is now on the way to this city (S. F.) for the purpose of working this lumber into tubs, pails, and other domestic wares, similar to our Eastern "Cedar Coopers," as that class of mechanics is styled, who work only this species of wood.

The well-known collector, and enterprising discoverer of this, and several other new species of the Conifers—Mr. A. F. Beardsley—has furnished the following observations:

CUPRESSUS FRAGRANS.

Among the timber trees of the Pacific coast the White Cedar, as it is commonly called, of Southern Oregon, is among the most interesting for the beauty of its foliage and utility of its wood. It is found in almost every situation contiguous to the coast and for several miles inland, but most abundant in moist ground and low hills kept moist by the density of the forest. It nearly fills sections of the extensive forests in the maratime districts of Southern Oregon, latitude 52° to 44°. It is mingled with *Abies Canadensis*, *Abies Donglassii*, *Abies Menzsiesii* and a Silver Fir that I could not designate, it having neither fruit nor flower at the time, (May 25th,) resembling *Pinus Grandis* of Douglass. The trees stand so thick that the light can hardly penetrate the evergreen foliage, and in their gloomy shades spring at every step Rhododendrons, Dwarf Bay, Vacciniums, bearing a delicious red berry, and other shrubs and plants. This tree growes straight, six feet in diameter, 150 feet in height, and nearly destitute of branches for 50 to 70 feet; but when found singly, its long, slender, pendulous branches are retained down nearly to the ground, making the general outlines columnar, surmouuted by an elongated pyramid. The bark on the young stocks is thin, but as they grow old becomes thick, furrowed, and of a soft, fibrous texture, not unlike that of *Taxodium Sempivirens*, of a chocolate color. The color of the wood is white, rather heavier and firmer than white pine, (*Pinus Strobus*,) which it much resembles; is strong and durable, fine grain and easily wrought. It has a strong, fragrant, spicy odor, which it retains for a long time. This characteristic has suggested the name of Fragrant Cypress. The lumber made from it is of the best quality, being very clear from knots. It is extensively used in San Francisco for joiners' work, and commands the highest price in the market. It is preferred for clothes-presses, chests, etc., having the same properties in this respect as camphor wood (*Laurus Camphora*) in keeping away moths and other insects. It has been used in boat-building, and is highly recommended by those who have used it for this purpose. It would make excellent timbers in ship-building, where extra durability is required. There is no more valuable timber found on the Pacific coast—the famous sugar pine (*Pinus Lambertiuna*) not excepted. From the latitude in which it is found, it is unquestionably hardy, and its cultivation would be a valuable acquisition to Atlantic States and Northern Europe.

SAN FRANCISCO, Dec. 7, 1857

A letter was read from Mr. Swallow, State Geologist of Mississouri, acknowledging his election to membership.

Dr. J. A. Veatch read the following paper:

NOTES OF A VISIT TO THE "MUD VOLCANOES" IN THE COLORADO DESERT, IN THE MONTH OF JULY, A. D., 1857, BY JOHN A. VEATCH, M. D.

Among the numerous objects in California inviting the investigation of the scientific and the attention of the curious observer, none are more conspicuous than the "Salses" or "Mud Volcanoes" of the Colorado Desert. Hidden midst the burning sands of a frightful waste, few persons have had the temerity to encounter the labor and risk of visiting them. Even the Indians, inhabiting the border of this Western Sahara, do not willingly venture so far into its midst, unless it be during the annual rains. At any other period, to miss one of the few springs of brackish water, or to find the place occupied by drifting sands—a not unusual occurrence—would entail the certainty of the horrors of thrist, if not loss of life. From personal experience I cannot blame the repugnance of the natives to visit a district, which, in addition to its physical repulsiveness, they suppose to be the abode of dark and malignant spirits.

The striking peculiarities of this wild region are, however, too striking to remain long unsubjected to thorough exploration. The entire desert is supposed to have been the bed of a great brackish or fresh-water lake, and is said to lay many feet below the level of the ocean. The part I lately visited showed deep lacastrine deposits, inclosing, in myriads, the conchological records of the former sea.

It was the month of July of the present year that I had occasion, in the progress of a mineralogical excursion, to visit one of the above named salses. It is situated about one hundred and fifty miles from San Diego, and sixty miles in a north-easterly direction from the Indian village of San Filipe—the nearest inhabited habitable place. The exact locality, as reported by the U. S. Surveyors, is Township 11 South; range 13 East, San Bernardino meridian. The distance from San Felipe as above given is in an air line, but by any practicable route is, at least, thirty miles further, owing to the necessity of making a detour to the South, to find the only water on the route.

At the above named village, at the trading post of Messrs. Smith & Brill, we—myself and son—made preparation for our desert excursion, by procuring fresh horses and a guide, and providing provisions, and goards and leathern bottles for carrying water. Our guide, Jose Serano, who was one of the Captains of his village, spoke Spanish, and was the only one of his people who had ever been actually at the spot we wished to visit. The weather was intensely hot, and the guide advised starting late in the afternoon, so as to have the advantage of a night's journey, and thereby reach the watering-place early the next day,—before the heat became oppressive. The following I extract from my notes:

"Left San Felipe at 4 o'clock, P. M., July 17. Crossed the sharp Porphyritie Mountain Ridge separating San Felipe Valley from the desert. San Felipe Creek cuts through the ridge here and runs off in a narrow canon towards the desert. It is a bold, running stream, but never emerges from the canon in summer, being literally drank up by the first breath of the thirsty desert wind. The bed of the stream is not practicable for horses, so we climbed the moun-

tain, along an Indian pathway, and from the crest—about 1000 feet above the valley—had an extensive view of the desert, shading away into gloomy indistinctness and blending with the dull clouds that skirted the horizon toward the East. To the right and left, as far as the eye could reach, the mountain chain presented a series of fantastic and rugged seratures well in keeping with the sombre area of baron desolation it hedged in. A few stunted mesquit trees, a dwarf magey and a pretty fair representation of the cactacia, constituted the flora of the mountain. Descending the eastern slope at a rather sharp grade, we re-entered the San Felipe canon. We received now and again puffs of hot wind, giving us a foretaste of the furnace-temperature of the broad, herbless plain below. The canon sloped off rapidly, but with great regularity, expanding into a valley two or three miles wide and finally losing itself in the desert ten miles beyond. The soil—if the term be applicable—consisted of detrital matter and debris of the mountain rocks. A species of Catalpa, with slender, pendulous pods, grew in depressions marking the beds of winter torrents, and clusters of a tall shrub covered with strong secured prickles from the root to the extremities of the branches, gave warning not to approach them too closely. Succulent and arborescent Opuntias occurred in clumps and patches; and the Echinocactus, with its rigid fish-hook spines, lay often half covered in sand, and our horses frequently started suddenly to one side to avoid them. The columnar form of a huge cereus crowning some rocky eminences presented, often, a peculiar and picturesque appearance. Night overtook us in the valley, and our progress was much impeded by the opuntias constantly pricking the horses, rendering them restive and fretful. The road grew worse and worse every mile, and about 11 o'clock a dense forest of bristling vegetation completely blocked the way. In attempting to force the barrier, my horse became furious and commenced plunging, and I had to choose between throwing myself off into the spring moss or suffer the horse to do it for me. I chose the first, and in attempting to hold the infuriated animal, was dragged and shoved alternately amongst opuntias higher than my head, until my clothes were literally pinned to the flesh from head to foot by the barbed needle-like prickles. The horse fared no better, but I felt no great consolation on that score. Jose, with his *riata* came timely to the rescue, and the horse was secured just as the bridle reins broke in my hand and I came near experiencing the additional unpleasant mishap of being left horseless. Farther progress for the night was out of the question. The horse had freed himself from the saddle and riding gear, and was so covered with spines rankling in his skin, that to replace them was impossible; and even could the horse have borne the saddle the rider could not have borne the seat. So tying up in the most favorable spot that offered, a light was struck and the residue of the night spent in extracting prickles from the flesh of man and horse.

"*July* 18.—At early dawn started again and had the good fortune to thread our way through the horrid grove without further mishap. A smooth surface of baked clay, in which not even a cactus could root itself, gave place to the disintegrated mountain deposite, and over which we passed at a sweeping trot. A beautiful specimen of Selenite was picked up here, and water-worn pebbles occasionally occurred. Two hours' ride brought us on to an enormous clay deposite, with fragments of thin bivalve shells—probably the margin of the ancient lake. The soil became gradually more sandy and the variety and number of shells greatly increased. Finally the entire deposite consisted of fine sand and clay, with minute univalve shells in astonishing quantities. Hillocks formed by drifting sand accumulating around clumps of mesquit bushes, leaving only the branches exposed, gave some variety to the surface of the plain. A few black Tabanis came buzzing about the horses, and a large spotted winged Libellula flitted by us. The presence of these insects was the more remarkable as the distance to water was not less than ten miles. Their appearance, insignificant as were the little creatures, was cheering and relieved the sullen sadness always produced by the total absence of animated beings. At 10½ A. M. we reached water, after thirteen and a half hours' riding. Horses much fatigued, hungry and half mad with thrist. Water brackish and warm, proceeding from a large fountain which rises up in the bed of a ravine, boiling and bubbling with the constant evolution of gas—probably carbonic acid. It runs off northeast in a stream yielding about 500 gallons per minute; but within half a mile it is lost in the porous soil, and there is no further trace of it. The ravine in which it rises comes from the south-west, and is probably a continuation of Cariso Creek. It here forms a little valley some hundred yards broad, covered with bushes and coarse grass—among which the stream meanders from side to side of the valley. The depression below the common level of the desert is about forty feet. I will take occasion to mention here that appearances presented by the bottoms of ravines, wherever I observed them, indicated that water might any where be found at a depth not exceeding forty feet. A small grove of mesquit trees, (Prosopus Glandulosa) with a heavy crop of dry legumes, stood on the brink of the ravine. The fruit formed a welcome repast for the horses, and the slight shade of the scattering boughs afforded us some protection against the hot sun-rays; with blankets spread over them a tolerable shade was produced, but afforded no barrier to the parching blasts of wind that came like the breath of an oven. I was driven to the water, where, with the tall rushes bent into a kind of bower and sitting up to the neck in the stream, I voted myself the presiding genius of the place, and half dosing, rested comfortably for an hour.

"At 5½ o'clock P. M., started again, hoping to reach the volcanoes by midnight. To lighten the burden of the animals, all our provisions, blankets and extra wearing apparel, were left behind, taking no weight save our arms and supply of water. Two black buttes, betwixt which our course lay, in a north-easterly direction, served us as guides. Within two miles, came to

a small stream of water, rising in a ravine but not sunk more than fifteen feet below the plain. It ran toward the North a very little wry, and was lost by evaporation and absorption. Beyond this, crossed a superficial clay ridge, strewn with pebbles and fragments of obsidian; near sundown, entered a sandy district, the horses sinking fetlock deep each step; after dark the buttes being no longer visible, kept our course by the stars. By-and-by the atmosphere became hazy, and only occasional glimpses could be had of the stars. Wandering from our course, we got into loose, drifting sands, thrown by the winds into ridges and hillocks, through which the animals plunged and struggled, and finally we had to dismount and lead them. Jose declared himself lost, and refused to go any farther till morning. There being no means of securing the horses, in case of a halt, we continued to toil on, and fortunately got off the sand banks in a little while. Soon, a few sage bushes were encountered, and selecting the stoutest, the animals were fastened to await the coming of to-morrow. In attempting to make our beds, the burning temperature of the earth required the interposition of saddle-blankets and leathern covers of the saddles, and still it seemed like submitting our limbs to the process of baking. The restlessness of the horses kept us in constant fear lest they might break the insecure fastenings and leave us in a rather unenviable predicament. It is useless to say the night was not passed in refreshing slumbers, and the dawn was never more welcome.

"*July* 19.—At daylight it was found that we had wandered last night too far to the North, and had to turn to the South and East. The white clouds of steam, shooting upward from the Salse, soon became apparent at the distance of ten miles. At sunrise the steam-jets presented an imposing and singular appearance; the cones from which they issued were distinctly visible, and the dull roar of the subterranean tumult could occasionally be heard. The black buttes that served as land marks yesterday lay on either hand—that to the left less distant. It had the appearance of a mass of lava heaped into a rough and fantastically irregular hill, crowned with sharp pinnacles and rude arches, as if the whole had been hardened suddenly while in a state of most violent agitation from boiling. The more distant one to the right seemed a black, compact mass, with a glittering, smooth surface common to the granite and gnisease rocks bordering the desert. If volcanic, the character was not so apparent as in that to the left.

"A little after 6 A. M., reached a point as near the Salse as was deemed prudent, on horseback. The ground had become soft and muddy, and the sulphurous scents and strange sounds frightened the horses. Giving them in charge of Jose Serano, we proceeded on foot about a quarter of a mile to the scene of action. The scene presenting itself is difficult of description. The accompanying engraving from a drawing made by my son, on the spot, gives some idea of the appearance, but the effect can only be known by one who has heard the wild rush of steam, the rude hubbub of the mud explosions, and the dull murmur of the boiling cauldrons of slime. The space occupied by the Salse is a parallelogram, five hundred yards long and three hundred and fifty broad—a table of hardened bluish clay, a little elevated above the surrounding plain.—The adjacent ground is low and muddy, and during the rains entirely covered with water.—There is a gentle slope toward the North and East, the mud and water of the Salse running off slowly in that direction, where a lake of salt water exists in the rainy season, but presenting now a vast sheet of crystaline chloride of sodium. Into this lake the arm of the Colorado, known as New River, discharges itself. The lake, having no outlet, would probably soon regain its ancient area if the channel of New River afforded a regular and more generous supply of water.

"The steam-jets of the Salse issue from conical mounds of mud varying from three to fifteen feet in height, the sides presenting various angles, some being sharp and slender cones, others dome-shaped mounds that seemed to have spread and flattened out with their own weight, upon the discontinuance of the action that formed them. Out of some of the cones the steam rushes in a continuous stream, with a roaring or whizzing sound, as the orifices vary in diameter or jets differ in velocity. In others the action is intermittent, and each recurring rush of steam is accompanied by a discharge of a shower of hot mud, masses of which are thrown sometimes to the height of a hundred feet. These discharges take place every few few minutes from some of the mounds, while others seem to have been quiet for weeks or months. During our short stay we had specimens of the rapidity with which a sharp, conical mound could be built up and again tumbled down. In one place a stream of hot water was thrown up from fifteen to thirty feet, falling in a copious shower on every side, forming a circle within which one might stand without danger from the scalding drops, unless the wind chanced to drive them from their regular course. It issued from a superficial mound out of an opening about six inches in diameter; but the column of steam and water immediately upon issuing expanded to a much greater size. The orifice was lined with an incrustation of carbonate of lime, and around it, and particularly on the south-east side, stood a miniature grove of slender stalagmitic arborescent concretions of the same substance. They were from half an inch to one and a-half inches in diameter, and from four to eight inches in height. Many of them were branched and the tips colored red, contrasting beautifully with the marble-whiteness of the trunk, and resembling much a corral grove. Some were hollow, and delicate jets of steam issued from their summits, and this seemed to explain the mode of their formation. Some were not hollow throughout, being closed at the summit, but when detached from their base, a small orifice in the centre suffered hot steam to pass, and some degree of caution was required to remove them without scalded fingers. To approach the spot was a feat of some difficulty, surrounded as it was by a magic circle of hot rain. I retreated, scalded, from the only attempt I dared to make; but my son, more adventurous or more attracted by the beauty of the specimens, succeeded in bringing

away several. The falling water ran off into a pool a foot deep, but what became of it was not apparent, as it had no seeming outlet. I brought away a bottle of it for examination. It was transparent, but had an intensely bitter and saline taste. This spot is represented a little to the right of the centre in the engraving. A little beyond and on either hand, are two huge cauldron-like basins, sunk five or six feet below the general level, and near a hundred feet in diameter. Within these cauldrons a bluish argillaceus paste is continually boiling with a dull murmur, emitting copious sulphurous vapors, and huge bubbles, bursting, throw masses of mud to the height of several feet. These kettles sometimes boil over, and the matter runs off in a slimy stream toward the salt lake. This seems to have been the case recently, as we encountered the track of one of these streams, not yet dry, a mile from the Salse.

"The volcanic action was far more violent at some former period than at present, as is proved by the erupted butte, above named, as well as by fragments of pumice scattered over the plain.

"Our visit only lasted an hour and a quarter. The sun was already scorching hot, and our supply of water could not last, with the most rigid economy, more than three hours longer. The watering place, left yesterday, was not less than 20 miles distant. A spring was marked by the U. S. Surveyors, only 4 or 5 miles to the north, but as no land-marks were known by which it might be found, it would have been rash to waste time in seeking it. The tempting objects in the vicinity, which would require many days for examination, could only be greeted with a farewell glance, and our horses' heads were turned towards the water. Leaving the sand hills, that gave us so much trouble last night, to the right, our course lay south-west.

"We soon had reason to congratulate ourselves upon being clear of the drifting sands. The winds increasing as the day advanced, whirled the dust into a black cloud through which Jose declared it would be impossible to travel. It would certainly have been exceedingly unpleasant, to say the least. The season of the rains was due—the Sonora rains prevailing here—and showers were observed at a great distance, but none approached us.

"For the first three or four miles, after leaving the Salse, the plain presented a smooth surface of sand and bluish clay—baked and fissured—strewn sparingly with volcanic cinders and obsidian fragments. Round holes marked the escape of gas when the ground was softened by water. Soon the plain became cut up with ravines 3 or 4 feet in depth, which Jose said were the arms of "New River," which branched out before entering the salt lake. The remains of a most luxuriant vegetation, now dead and dry, proved the place to be only a desert for want of water. The suddenness and rankness of grass and weed-growth where the New River broke away from the Colorado, some years since, and irrigated the desert, is remembered by many who witnessed the magic-like transition from barrenness to fertility. An intervening sandy district confused our course—loose and drifting, but not deep—and fortunately no sand-storm was gotten up for our benefit while passing it.

"It was now near noon; the wind blew a gale, but seemed only to add, by its scorching dryness, to the raging solar heat. Our water bottles were exhausted, and the distance betwixt us and the watering place was yet ten or twelve miles. Two hours' deprivation of water is certainly no great inconvenience, under ordinary circumstances, but on the desert can only be appreciated by one who has felt it. About two o'clock, P. M., the green bushes and cheerful rippling of water greeted us, and men and horses plunged in and blessed the fountain in the desert,

"The tired condition of the animals made it imprudent to leave our present position until they were somewhat recruited, so arrangements were made for a shelter from the sun. A black cloud that had been slowly heaving up for some hours from the west, at last met the sun's track and brought its friendly shadow to our relief. After a refreshing nap of two hours, an attempt was made at getting up a breakfast—we had eaten nothing during the day—but all appetite was gone, and nothing craved but continued drafts of water. Jose, however, was a bright exception, and had certainly lost nothing of his gastronomic powers, but merrily devoured the meal prepared for the three.

"As night closed in, two or three black bats came forth from their hiding places, and a solitary goat-sucker flitted around in silence. No other animals appeared, save a lizard, whose movements were too quick for us to capture him, and three coleopterous insects, less agile than their neighbor, fell a sacrifice to the interests of science.

"On the morrow—Monday, the 20th—it was still thought imprudent to leave until evening, so as to make the most of the journey to San Felipe during the night and early the following day. The forenoon was therefore spent in collecting a few shells from the soil, one of which, the Physa humerosa, was still found inhabiting the water of the spring. Two species of fishes were observed, about an inch in length, one slender and of a whitish color, the other, broad in proportion to length, and dark colored, looking like a small perch. Our guide states that this secluded spot was his early home. He was born here, and the tribe he now rules over here had their lodges, and lived in abundance on the maize, melons and frijoles that he describes as growing with a luxuriousness unknown to any place away from the so called desert. A succession of rainless summers drove them away, and they have not since returned. They planted with the early rains, say in July or August.

"At 4 P. M., bid adieu to our camp and set out for San Felipe. About midnight we arrived on the margin of the cactus thicket—the scene of my former mishap.

"*July* 21.—At daylight again on the move, and startled a vagrant coyote, the only one ever seen in our route. A trail of a flock of mountain sheep was observed, and the head of one, probably killed by Indian hunters, lay by the wayside. A 10½, A. M., the welcome sight of San Felipe cheered us from the heights above it, and

a half hour more found us safe under the hospitable roof of Messrs. Smith & Brill."

Thus ended a hurried trip to a most interesting spot in the midst of a no less interesting district. The shells obtained were submitted to Dr. Trask and were found to consist of two species of Amnicola (A. protea and A. longinqua —Gould) and the Physa (P. humerosa—Gould) before named. A large bivalve was observed, but so thin and fragile that the specimens broke to small pieces for the want of safe means of transporting them.

The water from the volcano has the specific gravity of 1.075, and holds in solution free boracic acid, with borates and a large quantity of chloride of sodium, and other salts. These matters would indicate the true volcanic origin of the Salse, and but little doubt rests on my mind of its being so. The evidences of former volcanic action in the neighborhood and the testimony of the boracic acid, establish its true character. The acid and its compounds exist only in small quantities, but sufficient to be unequivocally determined. Similar Salses exist some thirty or forty miles further south. One made its appearance during the earthquake of November 29, 1852, a few miles below the line of the State. Two others exist in the same district, as I was informed by a person who professed to have visited them. One is represented as a single jet of steam and water from an opening a yard in diameter, situated in a plain of hardened clay. The other consists of several pools of warm water, through which hot gas is continually escaping. Another is again spoken of in the adjacent mountain, partaking of the true volcanic character, emitting fire and smoke. I hope some one may soon have occasion to examine these and other interesting localities, at a season when it will be practicable to pass a few days on the desert without danger of perishing with thirst.

The real character of this desert has not been generally understood. In its present condition it is truly a desert. But only a portion, however, of its immense area is condemned to irretrievable barrenness—viz: the part covered with drifting sands. The greater part, from the constituents of its soil, must be fertile in the extreme, and only wanting moisture to produce a wilderness of vegetation. This is proven in the case of New River, while it continued to run. This arm of the Colorado might be made permanent, but a far more convenient supply could be furnished by artesian wells, or better still, by wind mills raising water from common wells, as is now so successfully practiced throughout the fertile valley of San Jose. As stated before, there is every reason to believe water can be had any where at a depth not exceeding thirty or forty feet."

As the great Southern Railway must pass through this district, it is interesting to know that the now dreaded desert can easily be changed into the happy homes of a thriving people. Repulsive as are the features of the country at present, the presence of a rail-way will convert it into the garden of the Pacific slope, and it is destined to become the cotton and sugar growing district for Arizona, Utah, California and Oregon.

Since writing the above I have had the pleasure of seeing a letter from Dr. Newbury, Geologist of the Colorado Exploring Expedition, being now fitted out by the U. S. Government, to Dr. W. O. Ayers, of San Francisco, from which I am kindly permitted to make an extract. Speaking of the desert, he says: "I find it not a bad country—having, most of it, a better soil than the mountain districts west of it. If water could be supplied regularly to the New River country it would be a perfect garden."

San Francisco, Jan. 11, 1858.

Dr. Trask read the following paper on the occurrence of earthquakes during 1857:

EARTHQUAKES IN CALIFORNIA DURING THE YEAR 1857.

During the past year there has been rather a frequency in the occurrence of the phenomena of earthquakes, and, with the exception of two, there have been none that were particularly remarkable either for extent of surface affected or severity of action. In one, that of the 9th of January, the greatest extent of surface, and greatest intensity of action was manifest. Its principal force seems to have been expended in the more southerly portions of our State, and in the immediate vicinity of those volcanic vents found at different localities upon the Colorado Desert. It is manifest, however, that this shock and those which preceded it on the night of the 8th, had their origin to the west of our coast, as the times of occurrence of the shock at different localities most fully prove. This matter was fully discussed in my previous paper, "On the direction and velocity of the Earthquake of January 9th, 1857," read before this Society March 30th, which will be found on page 98 of their proceedings.

The other shock of greatest extent, on the 2d of September, extended over an area of about 200 miles, but was marked by no particular severity or injury except that of fright to those who experienced it.

The whole number that can be authenticated as occurring during 1857, amounts to seventeen, being greater than the number recorded in 1853 and 1856, and it would seem probable from our records that this number is the maximum to which we shall probably be subjected in this State.

From the Sandwich Islands we have no news of earthquakes save one, which is here inserted: "A very severe shock of earthquake was felt at Kawaihae, Hawaii, on the 24th of February, the most severe that the residents there have had for many years."

The arrival of the whaling fleet from the Northern seas brings no intelligence of the occurrence of these phenomena, as was the case of the preceeding year, hence, the presumption is, that subterranean action has not been violent in those distant regions during the year just passed.

On the coast of Mexico, and inclusive between the 25th and 32d parallels, we have received intelligence of the occurrence of one earthquake, which appears to have been felt on both shores of the gulf of California for a dis-

tance of nearly 200 miles, both North and South. We have no records South of that point.

The shocks which we can authenticate within the limits of our own State, are as follows:

Jan. 9.—This shock was felt from Sacramento to the Southern boundary of the State. It was preceded by three smart shocks the night and morning previous. The time of its occurrence at this city was 8h. 13m. 30s.

Jan. 18, 9 A. M.—A light shock at Martinez and Benicia.

Jan. 20, 8:30 A. M.—A smart shock was felt at Santa Cruz and Mission San Juan.

Jan. 21, 11 P. M.—On the evening of this day a smart shock was felt in Mariposa. The wave and sound seemed to travel from N. W. to S. E. It was accompanied with a report like that of a distant gun.

Feb. 5, 7 P. M.—A smart shock was felt in San Francisco, which shook the buildings that are situated on made ground very severely, while those situated on firmer bottoms were affected. This shock was felt at Oakland and Stockton, but was not felt at San Jose or Sacramento, as reported at the time.

March 14, 3 P. M.—A severe shock was felt at Santa Barbara and Monticito. It was momentary in duration, attended with a loud report.

March 23, 12:27 A. M.—A light shock in San Francisco.

May 3, 10 P. M.—A smart shock at Los Angeles and the Monte.

May 23.—A light shock at Angeles; a report also that a severe shock had been felt at Fort Tejon.

June 14.—A shock was felt at Humboldt Bay. On the same day several severe shocks were experienced at the penal island, Carmen, Gulf of California, and which extended almost ninety miles north and south of the island.

Aug. 8, 11 A. M.—A smart shock was felt at Rabbit Creek, Sierra county.

Aug. 29.—A severe shock at the Tejon Reserve. No time is given.

Sept. 2, 7:45 P. M.—A light shock at San Francisco. This shock was felt at Sacramento, Marysville, Nevada, San Juan, Downieville and Camptonville.

Sept. 14, 2 P. M.—A light shock in San Francisco.

Oct. 19, 6:30 P. M.—A severe shock of an earthquake in San Francisco. On the following morning, at 12:8 A. M., at 12:35 A. M., and 1:15 A. M., three other shocks occurred; the last was equally severe with that of Jan. 9th, at 8 A. M. People were much frightened, and left their beds. The shock was felt at San Jose, but not at Oakland.

Nov. 8, 3:45 A. M.—A shock at San Francisco, which was felt at Oakland and Bodega.

Dec. 23, 7 A. M.—A light shock at San Francisco.

Of the whole number which have occurred during the year, two only have been felt at San Francisco that were not experienced at other localities, and four others have occurred which have been felt in common at other portions of the State; thus making about one-third of the whole number that were in common here and elsewhere.

Eight of the aggregate have occurred between the summer and winter solstices.

Seven have occurred during the spring and summer months, and ten during the winter and autumn.

Eight have occurred between the vernal and autumnal equinoxes.

SAN FRANCISCO, June 29, 1857.

President, Col. L. Ransom, in the chair.

Donations to the Cabinet to Jan. 1, 1858.

Tibia of mastodon, from Shaw's Flat, by Mr. Charles H. Stokes.

Carolina limestone, from Alpha, Nevada Co., by Mr. Isaac Wisner.

One hundred and fifty species of marine and land shells from the Sandwich Islands, by Mr. Garrett.

Coleopterous insects, by Mr. T. F. Moss.

Serpentine, perforated with Pholas, from Oregon, by Mr. Beardsley, with tertiary fossils from the same coast.

Red and black oxide copper and sulphur from Lower California, by Dr. Norrline.

Copper ore from Hope Valley, by Hon. John Bigler.

A jar containing preparations of the nutmeg in every stage of growth, from Singapore, by Mr. Thomas Dalton.

Ores of copper from the Arizona mines; also fossil Ostrea from the Desert, by Mr. J. Wilson.

Dipterous insects of this State, by Mr. T. F. Moss.

Fossil vertebra of mammalia from Mission San Antonio, by Dr. Eckel.

Auriferous quartz and limestone from the crystal mine at Angels' Camp, by Mr. Benjamin.

Specimen of the new genus Loxorynchus, (Stimpson), by Nahl & Bro.

Kaolin clay from foothills San Joaquin county, by Mr. Patrick, of Stockton.

Marine fossils from Russian America, (tertiary), Mr. T. F. Moss.

Mastoid process temporal bone of whale from San Diego; recent and fossil shells of Physa humerosa, planorbis Ammon, and two species of Amnicola, Colorado Desert; also, three specimens of carabus, fruit of two species of mezquite and composite flowers, from same locality, by Dr. J. A. Veatch. Also specimens of botany from the vicinity of Santa Barbara.

A collection of plants from the vicinity of Port Orford, by Mr. Beardsley.

Specimens of Pinus tuberculata and other plants from Contra Costa, by Mr. Bloomer.

Specimens of Sienite from Yosemite Falls, by Mr. Hepburn. Also carbonate copper from the North Carolina Mine, Rough and Ready, Nevada county.

Argentiferous grey copper, with analysis of the same, from Tubac, G. P. Plomosa, Tubac. G. P.

Silver ore from La Mina Bolanos, Durango, by K. G. Killaly.

Silver ore from La Paz, L. C., by J. K. Moller & Co.

Picrolite (?) from Three Buttes, Mariposa county; also two specimens granite, with large crystals, black tourmaline, from Texas Flat, by Mr. James Hepburn.

Red oxide copper and Atacmite from La Mina Mozamique, Sinaloa, by Mr. G. F. Walker.

A bark tunic of South Sea Islands, by Mr. E. Stanley.

A collection of the honey ants found in the Gadsden Purchase, by Mr. Poston.

Sugar from the honey dew from Napa county, by Mr. R. T. Montgomery.

Deposited by Mr. Hutchings: two specimens indurated tufa from Mokelumne Hill; also a large specimen bark of Sequoia gigantea, in glass case.

Specimens of silicified wood from Mokelumne Hill, by Mr. S. A. Briggs.

Colepterous insects from Sierra Nevada, by Mr. Hepburn.

Malleable sulphuret silver with ruby ore, La Mina Guadalupe y Calvo, ruby blende in calcareous gangue, from Batopilas Chihuahua; Plumose Argent Galena, with grey copper, from Siberijou, Sinaloa, by R. G. Killaly.

Specimens of a new species of Sabella, and specimens of teredo from Bay of San Francisco, by Dr. Trask.

Wood of the Cupressus fragrans, (Kellogg) by Mr. Beardsley.

Auriferous limestone and quartz from Calaveras Mine, Angels Camp, by Mr. L. P. Bouton.

Ores from the Grain Gold Lode, Butte Co.; ores from Keystone Mine, Amador county, by Mr. Waitt.

Limestone from Santa Cruz, by Mr. Dunham.

Peroxide Manganeese from Mount Diablo Range, by Mr. Lyman.

Gum Acacia from Mazatlan.

Marine shells from Acapulco, by Dr. Stillman.

Specimens of heart of redwood, enclosing acorns, by Mr. Charles Simson.

Arraganite from Suisun, by Dr. Veatch.

Specimens of pinus contorta, (?) and cones of Abies menzezii, by Mr. Beardsley.

Skull of cannibal from New Caledonia, by Dr. Pique Dupuytren.

Marine shells from Panama, by Dr. Stillman.

Specimens of Clay from San Antonio, by Mr. Beardsley.

Specimens of serpentine from Amador county, by Mr. T. F. Moss.

Donations to the Library to the Close of the Year.

List of members of the Linnean Society.

Address of Thomas Bell to the Linnean Society.

Journal of the Proceedings of the Linnean Society, parts 1-3 Botany and parts 1-3 Zoology; vol. 1, 1856.

Kongl Vetenskaps Akad Handlinger; vol. 2, 1853-4.

Oversigt Kongl Vetenskaps Akad Forband, Stockholm; vol. 1, 1855.

Schriften, Russich, Kaiserl, fur die Gesam Mineralogie; parts 1 and 2, 1842. St. Petersburg.

Jahrbuck der Kaiser Konigl Geologischen Richenstalt; No. 1, Jan., Feb., March, 1853; No. 3, July, Aug., Sept., 1855; quarto.

Descriptions of land and fresh-water shells, by Isaac Lea, from the author.

Catalogue of human crania of the Museum of Philadelphia Academy Natural Sciences, by Mr. J. L. Sargent, Phila.

La Science for 1857, by T. F. Moss.

American Journal Science and Art, from the publishers.

Proceedings Boston Society Natural History, pp. 145-176, from society.

Researches on the Cyprinoid Fishes west of the Mississippi Valley, by Mr. Charles Girard, from the author.

Also contributions to Icthyology of the United States, and a notice of the genus Salmo of Oregon and California.

Report of the Sanitary Commission of New Orleans on the yellow fever of 1853; Report of Special Committee of New Orleans Academy on Survey of Louisiana; Annual Address before the New Orleans Academy; Proceedings of the New Orleans Academy—from the society.

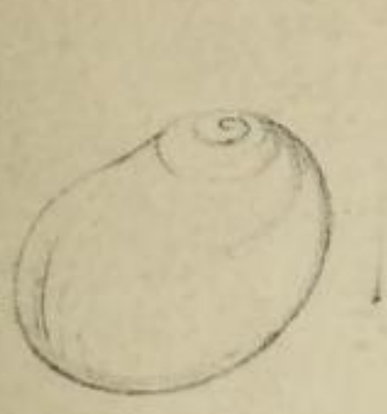
Prodromus Descript Animaliam Evertabratorium, Part 2, from author.

An account of the Smithsonian Institute, from the Institute.

Catalogue of North American Mammals, by S. F. Baird, from the author.

Maury's Wind and Current Charts, quarto, from Lt. Maury.

Zietschrift fur Wissen Zoologie, by Liebold &



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1. AMMONITE Chicoensis TRASK

2. BACULITE Chicoensis "

Lith. Britton & Rey S.F.

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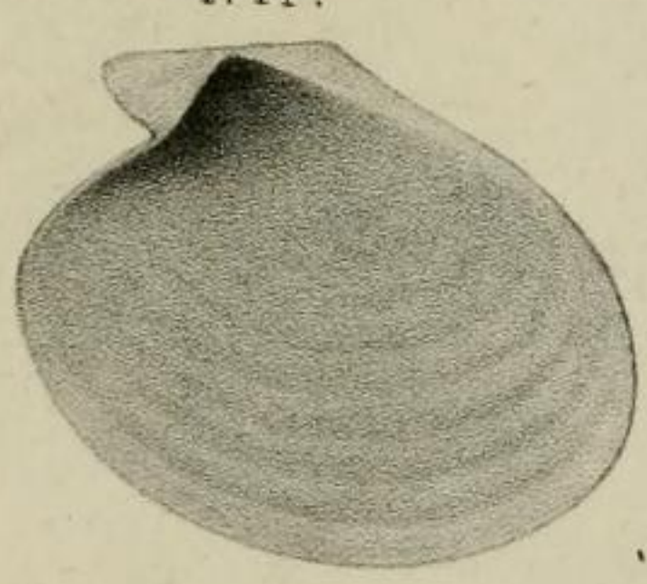
1. A.



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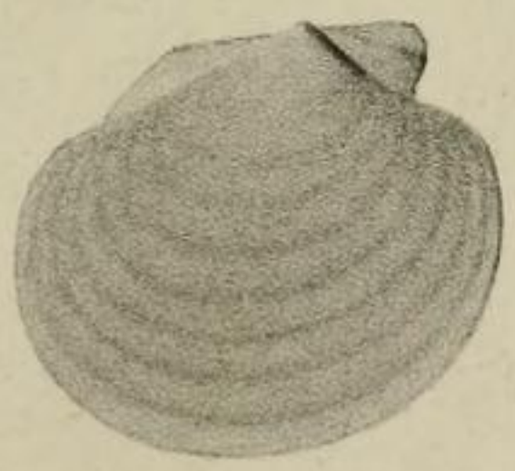

1. PLAGIOSTOMA (Sow.) Pedroana. TRASK.
2. " annulatus "
3. " truncata "

Lith. Britton & Rey S.F.

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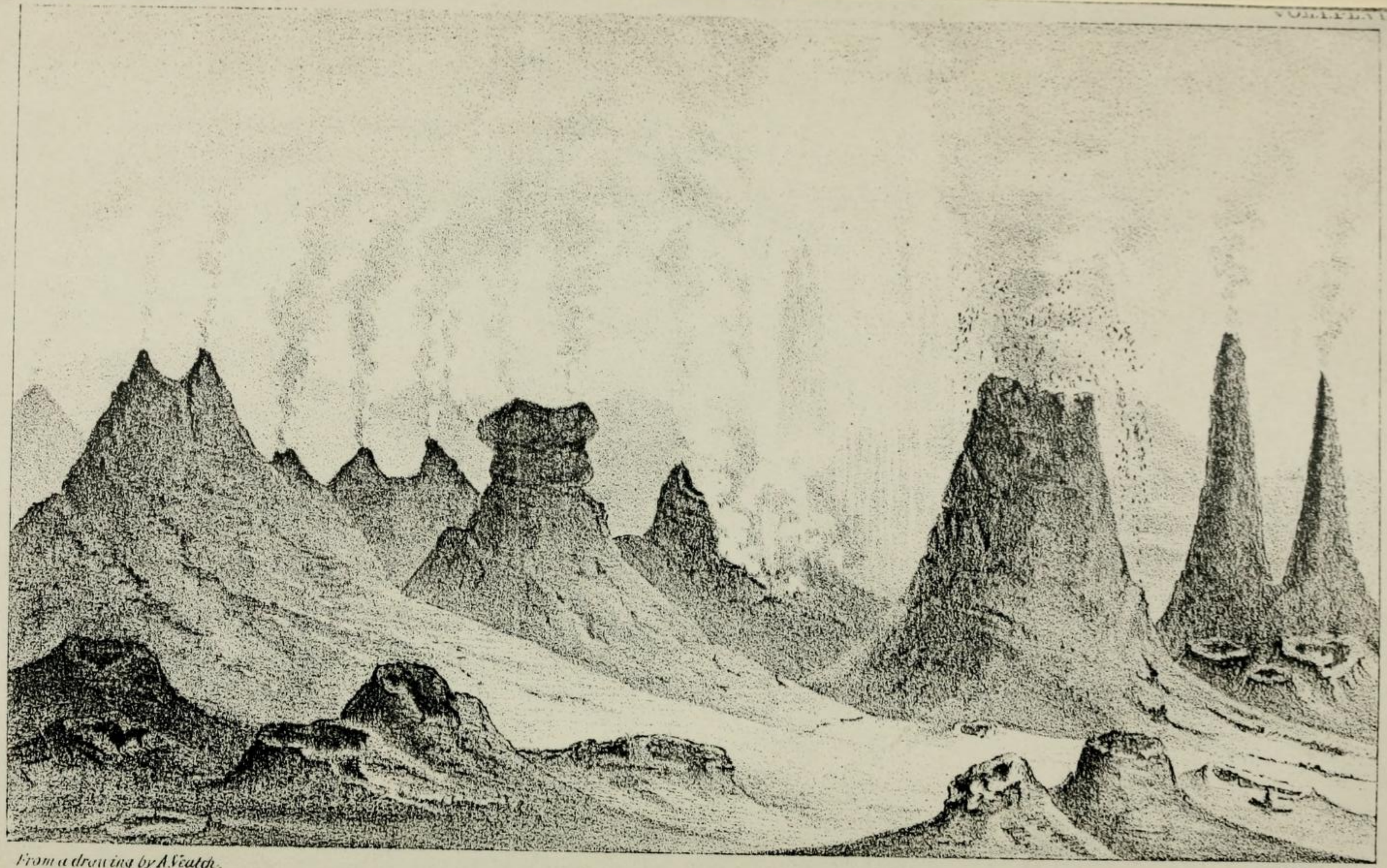
Lith. Britton & Rey S.F.

1. SERTULARIA TURGIDA TRASK
2. SCRUPOCELLARIA CALIFORNICA -
3. PLUMARALIA FRANCISCOANA TRASK.
4. MENIPEA OCCIDENTALIS. -
5. HIPPOTHOA AMABILA. TRASK

Lith. Britton & Rey. S.F.

1. SERTULARIA ANGUINA. TRASK.
2 " " FURCATA "
3 CRISIDIA GRACILIS TRASK.
4. CRISIA OCCIDENTALIS "



From a drawing by A. Veatch.

Britton & Rey lith.

FUMORALES OF THE COLORADO DESERT.