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January 7, 1857.

The President in the Chair.

Mr. James E. Mills exhibited specimens of slate from Somerville, Massachusetts, and read the accompanying account of an analysis made by Mr. L. M. Dornbach, of the Lawrence Scientific School.

The following analysis of a variety of Slate, found in the town of Somerville, Mass., near Boston, was commenced upon the supposition that it was a Dolomite; as the cleavage resembled, in many respects, that of rhombohedral carbonates.

The angle which the plane in the direction of the dip makes with the plane of stratification is 102.° The angle which the other plane of cleavage makes with that of stratification is 112°.

The angle which the two planes inclined to the plane of stratification make with each other is 110°, though this varies somewhat in different specimens. The specific gravity is the same as that of Dolomite, being 2.8192.

Analysis shows it to be a silicate of iron, alumina, lime, and magnesia, in which the lime forms less than one per cent. of the whole, as is shown by the following table: —

Water	3.439
Sesquioxide of Iron	8.324
Sesquioxide of Alumina	19.353
Lime	.625
Magnesia	4.944
Silica	63.238
	99.923

The President exhibited the dilated vena cava of an Otter, (*Lutra Canadensis,*) recently taken in Massachusetts, and explained the peculiar physiological condition of this animal in connection with its diving habits. He also pointed out some other interesting points in its anatomy.

Prof. H. D. Rogers made some remarks upon American and European Geology, in anticipation of a paper which he said he intended to bring before the Society.

Dr. T. M. Brewer read the following paper on Vireosylvia: —

In the Proceedings of the Academy of Natural Sciences of Philadelphia, (Vol. V. p. 153,) a description of a new species of

Vireosylvia is given by Mr. John Cassin of Philadelphia, from a single specimen obtained by him in Brigham's Woods, near that city. Its close resemblance to *V. gilva*, and the fact of its having been for some time an unique specimen, has led to the doubt whether it was a good species. Mr. Cassin described it as differing from the *gilva*, which it most resembled, in being smaller, in having a shorter and weaker bill, and a form generally shorter and stouter, with colors more vivid, and the superciliary line more distinct. He named it *Vireosylvia Philadelphica.*

Two years since, my attention was called by Thure Kumlien, Esq., a very accurate and careful ornithologist of Wisconsin, to a specimen of Vireosylvia obtained by him near Lake Koskouong, in the southwestern part of that State. He thought it a distinct species from any he had seen any description of, and quite distinct from the *V. gilva.* I gave the specimen to a friend, upon whose judgment I relied more than I could upon my own, who pronounced it a *V. gilva.* Mr. Kumlien was not satisfied with this decision, and still insisted that its habits, even more than its plumage and size, showed it to be a distinct species. The following year he sent me several specimens which I gave to Mr. Cassin, who had no doubt that they were of the species he had described as *V. Philadelphica,* though others to whom I showed them were still unconvinced. In answer to a letter in which I informed Mr. Kumlien that his birds were supposed to be the *V. gilva* in an unusually fresh plumage, he wrote me the answer which I give below. It proves, to my mind, conclusively his correctness, establishing the species to be a good one, distinct from *V. gilva* and identical with that described by Mr. Cassin as *V. Philadelphica.* I take the greatest pleasure in thus giving Mr. Kumlien the credit of having worked it out, unaided by any suggestion or help from any one, in view of the disadvantages under which he labors in the want of access to any text-books. His letter is interesting, as throwing the first light that has yet been given to the public upon the habits and distribution of this new and little known species. The following is the extract referred to:—

"In regard to the Vireo which I sent you last being the *Vireo gilvus* 'in an unusually fresh plumage,' I beg your perusal of the following remarks. You may think it bold in me, but so far as I read Wilson I am not satisfied in regard to this vireo matter.

"*Vireo gilvus*, Wilson — in every respect agreeing with Wilson's description — is common here from the 8th or 10th of May till September. It consequently breeds here. It is an excellent singer. I have a number of skins, and all agree in their markings. There is very little difference between its spring and autumnal dress. It is found in openings more than in thick timber, and frequently near farm-houses. Its length varies from 5½ to 6 inches; I have one that measures full six. *Vireo* —— ? — that which I sent you, and which cannot be *V. gilvus* if the preceding is — is by no means so common as the other, and I have never observed it before May 15th, and only from the 15th to the 25th of May and in September. I never heard this bird sing a note. It keeps in the most secluded thickets; I never found it anywhere else. It is a smaller bird than the other. Its length is from 5 to 5¼ inches, which is the longest I have ever found. I admit that in general markings both birds are very much alike, but the *gilvus* is a more slender bird than the other, which appears stouter. Between the spring and autumnal dress of the *gilvus*, as I have said, there is but little difference in the markings, but the other, in autumn, is considerably tinged with yellow. Another point is the difference in the relative length of the primaries, which is as follows: —

V. gilvus.	*Vireo* —— ?
First primary very short.	First primary longer than 5th.
Second do. longer than 6th.	Second do. } longest and of
Third do. } longest and of	Third do. } the same length.
Fourth do. } the same length.	Fourth do. longer than the 1st.
Fifth do. longer than 2d.	Fifth do. shortest.
Wing 3 inches.	Wing 2½ inches.

"This will, I think, separate them. This measurement was taken from several specimens.

"But the question may arise, is not my *V. gilvus* perhaps the *V. Noveboracensis*? It is not; the iris is hazel and not white, and moreover, on my *gilvus* there are no yellow markings, except a very faint greenish-yellow on the breast. *V. Noveboracensis* is

$5\frac{1}{4}$ inches in length, and I never had a specimen of *V. gilvus* so small as that."

I have given Mr. Kumlien's letter in nearly his own language, and in no instance have I varied from his meaning. I think it establishes his vireo to be a good species, and if so, it is the *Vireosylvia Philadelphica* of Mr. Cassin.

President Hitchcock exhibited specimens of impressions, which he supposed to be those of a Myriapod, found at Turner's Falls on Connecticut River.

President Hitchcock also presented specimens of depressions found in the Sandstone of the Connecticut Valley. They were of regular polygonal forms, generally from five to eight sided, shallow, and about an inch in diameter. Similar depressions have been found in the Niagara Limestone of New York, of two or three feet in diameter.

Mr. Hitchcock suggested that they might have been made by tadpoles. He had observed these animals in the water contained in the excavations, and had been informed by boys that they had seen tadpoles in the act of excavating them. In 1850, Prof. B. Silliman, Jr., exhibited similar specimens to the American Association for the Advancement of Science, and read a letter from a gentleman suggesting the same explanation of their formation. This explanation Prof. H. had not heard of, until he had conceived the idea himself.

Mr. Hitchcock further stated that he was now doubtful, if the tracks which he had supposed to have been made by birds, in the Connecticut Valley Sandstone, were really produced by birds, since one great argument, viz: that of the number of phalanges in the toe, is lost. Tracks of an animal, which was certainly a quadruped, are now found, presenting the same number of phalanges and toes as the dinornis.

Specimens of Clay Stones were exhibited by Mr. Charles Stodder and Mr. Ambrose Wellington.

The Committee appointed to memorialize Congress, reported that they had prepared a memorial and forwarded it to Washington.

Dr. Weinland read a paper on series in the animal kingdom, as follows:—

ON SERIES IN THE ANIMAL KINGDOM. BY DAVID F. WEINLAND.

The existence of certain Zoölogical Groups, namely, those of Classes, Orders, Families, and Genera, was first noticed by the father of Zoölogy, Aristotle. Two thousand years afterwards, these groups were again brought to light and named by Linnæus. They have since been improved by Cuvier and Baer, and the idea of type has been added. But it was not till lately that the signification, at least of three of them, viz: of Classes, Orders, and Families, was recognized and circumscribed by Agassiz. These ideas will henceforth stand and be acknowledged as founded in nature.

But the question arises, whether there do not exist still other relations and real affinities of animals to each other, which are not included in these groupings, which have an equal right to be introduced into our zoölogical system.

We think that this is in fact the case, and we shall endeavor to show in the following sketch, that there exist throughout the whole animal kingdom affinities of the animals to each other, which we can comprehend under the name of "Series." About twenty years since, a German Naturalist, Kaup, spoke of series in the animal kingdom, but his ideas proving somewhat arbitrary, the subject received less attention than it deserved. Nevertheless, its truth, if rightly understood, has been since recognized by some distinguished naturalists. Oken, for instance, spoke of a scale among Articulata, in which he placed the worms lowest, next the crustacea, and last the insects; and Agassiz has illustrated this gradation fully in the development of the butterfly, and has added still another amongst insects proper; starting from the principle that chewing rank below the sucking insects.

Another order of position has been recognized by Milne Edwards and by Dana among Polypi; another by Leopold von Buch among Cephalopods; another by Dana for Crustacea. We have tried to trace out these gradations also, among the higher animals, and the success which we have met with, wherever we have had accurate information, has convinced us that such gradations, which might very properly be termed series, really exist throughout the animal kingdom.

Thus, among Mammalia, we have recognized until now two natural series running parallel to each other, a carnivorous and a herbivorous series. The carnivorous begins with the whales, runs through the dolphin, seal, and lutra, to the marten, whence it divides into two branches, one Plantigradous, the other Digitigradous. The latter of these branches runs through the cat, leopard, and dog, where it ends; the other, that of the plantigradous, runs through Nasua, Procyon, (raccoon,) bear, to the cynocephalous monkey, and through the higher monkeys to man. In this latter series, we would call the attention of naturalists particularly to the bear, as the intermediate link between carnivorous animals and monkeys. When we consider the mixed animal and vegetable food of the bear, its manner of life, and general habits, its climbing and embracing propensities — for in the bear we find an arm capable of embracing as in the monkey — and when we observe its manner of standing upright on its plantigradous feet, which is evidently connected with the use of the fore legs as arms, there can be no doubt that the bear fills out that gap which seems to exist between carnivorous animals and monkeys. Such is the carnivorous series.

Parallel to this, and analogous to it, runs a herbivorous series; beginning with the Zeuglodons, and running through Sirenoids, Morse, Dinotherium to Anoplotherium. Here it divides into two, the Pachyderms and the Ruminants, and thus Owen was right when he said that the Anoplotherium includes the characters of Ruminants and Pachyderms. From Anoplotherium starts on one side the Ruminant series, running through camel, cow, antelope, deer, — and on the other side, the Pachyderm series, running from Anoplotherium to Palæotherium and Tapir. At this point we have another division into the series of horses, which culminates in our domesticated horse,— and the series of hogs, which embraces rhinoceros, elephants, and hogs.

Among Birds, there are at least four series: one starting from the ostriches, and ending with the Gallinaceæ; — (I would remark, in passing, upon the striking similarity which exists between the ostrich and the young of the domestic fowl) — a second beginning with the pelican, and ending with the Gallinula, a wader; a third beginning with the hawks, and ending with the singing-birds; a fourth beginning with Rhamphastos, and ending with the parrot; another beginning with the Buceros, and ending with the swallow and humming-bird.

In Reptiles, there seems to be but one series, — snakes, lizards, and turtles; the snakes moving by the dorsal column, and having head, neck, trunk, and tail united in one continuous body, are analogous to the whales, and the Sirenoids. The lizards, provided with a distinct neck, trunk, and tail, and with legs, are analogous, the lower ones, the Anguiformes, to the seals, the higher, to Lutra and Marten. In the turtles, the distinction of parts is carried still farther; the head and neck are very free, the trunk which, in lizards, assists in locomotion, is scarcely used for this purpose, and the four legs are the locomotory organs. In the class of Batrachia we have again the same series. Cæcilia is snake-like, and wholly analogous to the snakes and to whales. Icthyoids and Salamanders, provided with small or well-developed legs, are wholly analogous to lizards, and the frogs and toads to turtles. In frogs and toads also, the four legs are the only organs of locomotion, but the neck and head are not as free as in turtles. This goes far to prove that the class of Batrachians ranks lower than that of Reptiles.

January 21, 1857.

The President in the Chair.

Dr. Henry Bryant read the following paper, entitled —

A LIST OF BIRDS OBSERVED AT GRAND MANAN AND AT YARMOUTH, N. S., FROM JUNE 16 TO JULY 8, 1856.

In the early part of last summer I made an excursion, in company with J. E. Cabot, Esq., to the island of Grand Manan and to Yarmouth, N. S.; principally with the view of observing the habits of the birds breeding in those localities. The following species were seen by us; those marked with an * only at Manan, and those marked with a † only at Yarmouth: —

* *Haliætus leucocephalus.* A pair of full-plumaged birds were seen every day at low tide, apparently watching for an opportunity of robbing the gulls of any thing worth the trouble.

* *Hypotriorchis columbarius?* A bird which appeared to be of this species was seen at Duck Island.

* *Otus Cassinii.* A nest of this bird was found by Mr. Cabot in the midst of a dry, peaty bog. It was built on the ground, in a very slovenly manner, of small sticks and a few feathers, and presented hardly any excavation. It contained four eggs on the point of being hatched. A young bird, the size of a robin, was also found lying dead on a tussock of grass in another similar locality.

Chordeiles Virginianus. Only a few individuals seen.

Chætura pelasgica. Quite common. A number of these birds were seen flying round the northeastern head of Green Island at Yarmouth, and were, without doubt, nesting there, as they were seen to fly in and out of the crevices of the rocks — the impossibility of ascending the face of the cliffs prevented an actual verification of the fact.

Hirundo Americana. Not so common as either of the other two species of the genus.

Hirundo bicolor. Very common; breeding in hollow stumps. Incubation had generally commenced by the 2d of June.

Hirundo rufa. By far the most common swallow, particularly at Manan. The nests were almost universally built without the projecting neck. Of late years, these birds, as they become more habituated to building in sheltered situations, have nearly discontinued their former habit of building their nests in a retort shape.

Tyrannula flaviventris. This pretty little Flycatcher was more numerous at Manan than at Yarmouth. Though apparently unsuspicious, it was difficult to procure, in consequence of its restlessness and its frequenting almost exclusively the thickest clumps of alders and small firs. In its habits it approximates more nearly to the warblers, than does any other species of the genus that I am acquainted with. During our walks in the roads and paths through the woods, it was never seen perched on a dry twig or overhanging branch, waiting for passing insects, as is the favorite habit of most of the genus; it procured its food almost entirely by diligently hunting in the thickest foliage, rarely venturing a short distance in pursuit of its prey. The note of this bird is also much softer than that of the other Tyrannulæ.

Setophaga ruticella. More numerous than I have ever before seen them. The young were hatched at Yarmouth before the 1st of July.

Myiodioctes Canadensis. Particularly numerous at Yarmouth among the small ferns and bushes on the edges of swamps.

* *Sylvicola icterocephala.* Only one pair seen.

Sylvicola æstiva. Common at Yarmouth, though not so much so as at Eastport. None were seen on any of the small islands.

Sylvicola striata. Abundant in the alders.

Sylvicola virens. This species was the most common warbler observed. The males could be seen and heard in every direction; the females were not so numerous, being probably engaged in incubation or feeding their young brood.

Trichas Marilandica. Common everywhere in suitable localities.

Mniotilta varia. Quite abundant.

Parus atricapillus. Not so numerous as with us at the same season.

† *Parus Hudsonicus.* Quite a number of these little titmice were seen on the Big Mud Island. A pair of old birds with their young brood were seen near Yarmouth on the 3d of July. Their habits seemed identical with those of the common species. Though the young were fully fledged and could fly with ease, the old ones were so solicitous for their safety that I could almost catch them in my hands. A nest was found near by that probably belonged to this family; it was built in a dead white-birch, in the same warm manner that the common Chickadee builds with us. The note resembles that of the common species, but is sharper and more filing, and can readily be imitated by the syllables *Tzee-dee-dee-dee* uttered with the front teeth in juxtaposition.

Turdus migratorius. This bird, so preëminently domestic with us, confining itself almost entirely during the breeding season to the garden or orchard, was extremely numerous, but had apparently lost its desire for human society. We found it nesting everywhere, in the thickest woods and most secluded pastures, much oftener than in the neighborhood of houses. The eggs of the second brood were already laid, and incubation commenced by the 25th of June.

Turdus olivaceus. One specimen was seen at Long Island, Manan, and another at the Big Mud, Yarmouth. Its note differs entirely from that of the *T. solitarius;* it also differs very much in its habits, the latter species being generally seen on the ground, while the olivaceous Thrush prefers to procure its food among the branches. The one seen at Big Mud was perched on the top of a small dwarf-fir, and was hunting the passing insects, with all the dexterity of a typical flycatcher.

Turdus solitarius. Very numerous. The plumage of the old birds was much worn by rubbing against the thick bushes that they principally inhabit; there was also much less of the yellowish tint on the breast than on specimens procured at other localities. The first brood had already left the parent birds. One procured on the 27th of June, was fully fledged, but so unlike the adult that I append a description of it: Wings, tail, and greater wing-coverts as in adult. Rump reddish-brown, with light yellowish-brown spots, most distinct towards the back. All the rest of the upper parts olive-brown, with a long lanceolate whitish spot in the centre of each feather, and the tip blackish-brown. Smaller wing-coverts ferruginous-brown, with spots of light yellowish-white, in the centre of each feather, occupying the greater part of the tip, and running to a point towards the base. Throat whitish in the centre, a black line on each side from the base of lower mandible to below the eye. All the under parts more yellowish than in the adult, with the sides of the neck, breast, and flanks spotted with blackish-brown — the spots being rounded on the centre of the breast, transverse on the upper part of the abdomen, and V-shaped on the side of neck and breast, most distinctly so on the latter. The general effect of the plumage is precisely the same as that of the *Dendrocolaptinæ.*

Zonotrichia savanna. Particularly numerous on all the grassy islands; incubation nearly completed by the 25th of June.

Zonotrichia Pennsylvanica. On arriving at Manan, we were at first much puzzled by a note that we had never heard before; the bird that made it was always perched on the top of some small tree or bush, and before being approached sufficiently near to identify it, would drop into the bushes beneath. On watching the spot and shooting the bird, that we supposed had made the note, it proved to be a White-throated Sparrow; but the note was so different from the soft warble made by that bird with us in spring, that for some time we supposed that we had shot the wrong bird. This note can readily be imitated by pronouncing the syllables *Pee-pee-pee-peebody-peebody*, rather slowly and in the same key. Few were seen in the neighborhood of houses, but wherever the woods were thin, with an undergrowth of bushes, or in bushy pastures, they were quite numerous.

Struthio nivalis. This common and neat-looking sparrow, as Dr. Brewer observes, takes the place occupied by the *Emberizella socialis* with us, and is, if any thing, more confiding and domestic in its habits. The young were universally hatched by the 25th of June. The note is almost exactly similar to that of the Chipping Sparrow.

Carduelis tristis. Not common.

Erythrospiza purpurea. Not more numerous than in Massachusetts during the breeding season.

Quiscalus versicolor. A few seen.

* *Corvus corax.* One pair seen.

Corvus Americanus. Very common; more so at Manan than at Yarmouth.

Garrulus cristatus. Common.

† *Garrulus Canadensis.* At Yarmouth, we saw more of this species than of the common Blue-jay. The name generally given it by the inhabitants is Cat-bird. The bird called Cat-bird with us, *Mimus felivox*, we did not see either at Manan or at Yarmouth. Some others of our common birds that were not seen by us were *Mimus rufus, Turdus Wilsonii, Sialia Wilsonii, Dolychonyx oryzivora, Fringilla graminea, Pipillo erythrophthalmus, Sturnella ludoviciana, Molothrus pecoris, Sterna argentea.*

Bombycilla Carolinensis. Not common.

Picus pubescens. Several seen.

* *Picus arcticus.* One pair seen at Manan.

Colaptes auratus. Not nearly as common as in Massachusetts.

† *Ectopistes migratorius.* A dead female was found on Green Island, twelve miles from Yarmouth. It presented no appearance of having met a violent death.

Totanus macularius. Very abundant on all the grassy islands. Incubation generally terminated by the 1st of July.

† *Totanus semipalmatus.* One pair seen. A nest was found by the boatman, containing, as usual, four eggs. This bird I do not think has been observed breeding on the New England coast north of Cape Cod.

Charadrius melodus. Abundant; breeding on all the sandy or gravelly beaches. The young were observed running about by the 25th of June.

Charadrius semipalmatus. Only a few seen.

† *Anas obscura.* One pair seen at the Big Mud Island.

Somateria mollissima. During our stay at Manan we saw a dozen or two of these birds, and obtained two eggs at the inner Green Island. At the Mud Islands they were much more numerous. A number of females with their young broods were seen. The largest of the young were about a quarter grown. On approaching them, they dived with as much apparent facility as the old ones, and did not rise till they were at a safe distance.

† *Sula bassana.* On arriving at Yarmouth, we were informed that we should find plenty of Gannets on Gannet Rock. But it was with a feeling of surprise almost as much as satisfaction, that on approaching the rock sufficiently near, we first saw the birds. The rock itself is a miniature of the Gannet Rock of the Gulf of St. Lawrence, as described by Audubon, and is as difficult, probably more difficult, of access. On approaching it, the Gannets were seen to the number of some hundreds, covering the northern end of the summit; they were quite shy, and had all left the rock before we had arrived within a hundred rods of it; they flew round our heads a few times, and then gradually disappeared. The number of full-plumaged birds was greater than I expected, as, from this being probably their most southern breeding place, I had presumed, in accordance with the common laws governing the migration of birds to the colder regions, that the majority would be in immature plumage. The number of brown birds was about one to three of the white, or adult birds. On

scrambling to the summit of the rock, we found the nests ranged all round its borders, most numerous on the northern aspect, where they formed a continuous row; they were very bulky, composed entirely of eel-grass, and were apparently used for more than one season, as several of them had been recently repaired. The whole surface of the rock, as well as the outside of the nests, was white from the droppings of the birds, and the nests themselves, viewed from a short distance, looked more like petrifactions than any thing else, encrusted as they were with urea. The number of the nests, by count, was one hundred and fifty. Not a single egg was found in any of them, as they had been recently robbed. The same day we saw a fisherman at Green Island, who said that the Monday previous he had taken sixty eggs from the rock.

Sterna hirundo. A dozen pairs were breeding on the inner Green Island at Manan, and many hundreds on Green Island at Yarmouth. In consequence of the facility of access to Green Island from Yarmouth, the birds are much disturbed. During the short time that we passed on the Island, two other parties landed for the purpose of egging.

† *Sterna arctica.* We found several hundred pairs of these birds breeding on one of the Mud Islands. It was the first time that I had ever found them breeding apart from other species of the genus, and was therefore much pleased at being able to examine a large number of their eggs, the authenticity of which was positive. On comparing them with a number of the eggs of the common tern procured at Green Island, no specific difference could be discerned. Some of the nests were made in the short grass at the edge of the beach, others on the masses of sea-weed that had been driven up by storm above the ordinary reach of the waves, and others were mere excavations in the sand and gravel of the beach. On examining specimens the moment they are shot, the pearl-gray tint of the lower parts is frequently not readily perceived, except in certain lights, and if this color were the only specific character, it would frequently be impossible to distinguish them from the common tern. This color grows gradually deeper after death, and finally becomes nearly as dark as that of the upper parts. The length of the bill varies considerably in this as well as in some other species of tern, the difference

being more than a quarter part of the length of the shorter specimens. The long external tail-feathers are also very variable in length, being an inch and a half shorter in some specimens, without any appearance of having been broken or worn. The only diagnostic character that can be depended on in specimens of all ages is the comparative length of the tarsi which are always longer than the middle toe in the common species and never longer in the arctic. The following table gives the comparative length of the tarsus and middle toes of three specimens of each species taken at random:—

	S. Arctica.			*S. hirundo.*		
	♀	♀	♂	♂	♂	♀
	1	2	3	1	2	3
Tarsus	*15	15	14¾	18½	20½	19
Middle toe	15½	15½	16	17	18	16

Larus argentatus. The favorite breeding-places of this bird, at Manan and the neighboring islands, were the heaths, as they are called by the inhabitants — dry, peaty bogs, covered with coarse grass, scattered bushes, and dwarf firs. The nests were generally placed so as to be sheltered by the firs or bushes, seldom in the open heath. I should imagine, from Audubon's description, that the number of nests on trees was greater at the time of his visit than at present. This may be accounted for by the fact that the breeding-places having been protected for some time by the owners of the islands, the birds have not been so much disturbed as formerly. On the Big Mud Island, near Yarmouth, they were also found nesting on trees. More or less were found breeding on all the islands we visited; but everywhere with the exception of the places mentioned, the nests were placed in the grass among the rocks, or on the rocks themselves. The eggs found in places where the birds had probably not been disturbed were about half hatched by the sixth of July. Dr. T. M. Brewer states, in the 6th Vol. of the Journal, page 304, that the *Larus leucopterus* is occasionally found breeding on the island near Manan. As this bird is quite rare with us, and has always been supposed to breed only on the shores of the Arctic Ocean, it was an object of special search both to Mr. Cabot and myself; but with

* Millimetres.

the exception of a single pair of Saddle-backs, *Larus marinus*, no large gulls, other than the herring-gulls, were seen by either of us. All the inhabitants at Manan, with whom we conversed on this subject, stated that there was a bird, called by them Farmer Gull, larger than the herring-gull, with a dark head and shoulders, which was occasionally found breeding in solitary pairs on the rocky islands. This description of the farmer gull is probably correct as far as it goes, more particularly as their attention had been called to a specimen, unfortunately destroyed before our arrival, which had been procured for Dr. Brewer. When at Manan, we were told that we should find this bird much more numerous at the Seal Islands, near Yarmouth. On arriving at Yarmouth, we still heard of the Farmer Gull, and the same description was given of it as at Manan, but we were told that it was seldom seen there, though quite abundant at the Bay Chaleur. What species this bird may prove to be I do not know, but am inclined to think, if a described species, it is a black-backed gull in immature plumage, though the inhabitants who had been in the habit of seeing this gull, did not consider it the same as their so-called Farmer Gull.

† *Larus marinus.* One pair seen at Big Mud Island.

† *Larus atricilla.* Two pair seen at Green Island near Yarmouth. Their nests were not discovered, but the birds were shot, and evidently, from the enlarged state of the oviducts of the females, had recently finished laying. This is another of the birds which are common on the shore south of Cape Cod, and mentioned by Richardson as inhabitants of the fur countries; they are not known to breed between Cape Cod and the Bay of Fundy.

* *Lestris Richardsonii.* One pair seen near Green Island.

Thalassidroma Leachii. This bird was found breeding in the manner described by Dr. T. M. Brewer, on some of the small islands near Manan; and also on the islands near Yarmouth, including the Mud Islands, mentioned by Audubon as the breeding places of the Wilson Petrel.

Mormon Arcticus. Only one specimen of this singular bird was seen near Manan, but at the islands in the neighborhood of Yarmouth they are still quite abundant. The only place where we found them breeding was at Green Island. One egg was found here laid in a crevice in the rocks. Several burrows were seen, much too large for the Petrels, and were probably made by the Puffin, but neither eggs nor birds were found in them.

Uria grylle. This bird was found breeding wherever the locality was suitable. On one of the islands near Manan, called the Inner Green Island, we purchased twenty from a man who had collected them there. From the number of inaccessible rocks in this vicinity, (the breeding-places by choice of this bird,) its number will not probably be much diminished for years. It breeds as far south as Mt. Desert on the coast of Maine.

† *Uria troille.* Gannet Rock is nearly divided, by a deep chasm, into two portions. On scrambling up its sides, we saw a number of guillemots standing on the rocky shelves of the most precipitous part; seven eggs could be seen within the space of three or four feet square; these were procured with great difficulty and some danger, by the boatman. They were all light blue, with fewer marks than is generally the case. Incubation had commenced in five of them. The birds were quite tame, and would occasionally alight on the rocky shelves within thirty yards of where we were standing watching them. Most of the time they were flying through the fissure in the rock, always coming from the same side, and passing sometimes within a few feet of our heads. On Green Island, a single young one was procured, apparently a few days old.

† *Alca torda.* A number of auks were seen at Gannet Rock and also at Green Island. Two eggs were found at the latter place, and an old female was caught alive by Mr. Cabot. A much greater number of the four last-mentioned birds was seen, than were apparently breeding in the neighborhood; this might very probably be caused by the larger proportion of them being barren birds. This fact was not ascertained, as it might have been, by dissecting a number of the birds, as we did not feel inclined to aid in their fast approaching extirpation from this their most southern stronghold.

Dr. Gould inquired how these birds compared with those of Northern Europe, and the Northwest Coast of North America. The Arctic circle has been considered one uniform Zoölogical Region; he had recently examined shells collected by Mr. Stimpson in Behring's Straits and upon the northwest coast of North

America, and had found many of them to be identical with those found between us and Labrador. One shell in particular, *Nucula thracïæformis*, he alluded to; one valve of this shell brought from Japan, exactly mated an opposite valve taken at Provincetown, Mass. At Hakodadi, Japan, the Arctic fauna exists, and some shells of our coast are found; whilst at Simoda the shells are those of the China seas. Birds can traverse the ocean in the northern regions where the continents approach each other, but it is a question if mollusca can travel such distances.

Dr. Bryant stated that the majority of our Arctic birds are identical with those of Europe; and that the Arctic Ornithology of the Western Coast of North America differs more from that of the Eastern Coast than the latter does from that of Europe. He also stated that the migration of birds is an interesting subject bearing upon this question, the causes of migration being by no means fully understood. This present winter, one of our most common migratory birds, the Song Sparrow, (*Zonotrichia meloda*,) is quite abundant in the vicinity of Boston, and two, which Dr. Bryant killed for the purpose of examining them, were fat and in good condition, showing that they had not suffered from the severity of the weather, or the want of food, causes generally assigned for the autumnal emigration of birds from this region.

Dr. T. M. Brewer stated that it had been ascertained that there is a greater diversity of species among the birds of the Eastern and Western North Atlantic coasts than was formerly supposed. Several species, bearing close resemblance upon the two continents, have been established to be different — for example, the Velvet Duck, the Peregrine Falcon, and the Fish Hawk. It was interesting to observe that, for no apparent cause in their organization different from that common to both shores, many birds are found only on one or the other shore; for instance, the Manx Shearwater, the lesser Saddleback Gull, the European Scoter, (differing only in size from the American,) are found only in Europe. Between the birds of the Atlantic and Pacific coasts there is more diversity, and also there are observable differences of distribution. Thus, Brunnich's Guillemot, found by Dr. Kane in latitude 70° North, and rarely found so far south as Massachusetts Bay, in midwinter breeds in the harbor of San Francisco, in latitude nearly corresponding with that of Richmond, Virginia. The *Uria grylle*, whose extreme southern breeding-point on the Atlantic is the Bay of Fundy, breeds also near San Francisco. It may be, however, that the Eastern and the Western birds will yet be found to be of different species. Dr. Brewer believed that they would be.

Dr. Pickering observed that the Song Sparrow lives all the year at Philadelphia. As to the passage of birds across the ocean, he could say that a flock of gulls kept company with the ship, in which he crossed the Atlantic some time since, the whole distance.

Capt. Atwood remarked that, as to fishes, it is often the most delicate, and those having the thinnest skins, which are the last to migrate.

The President stated that he had recently an opportunity, through the kindness of Dr. Bartlett, of New Bedford, of dissecting the eye of a Sperm Whale, and the parts surrounding it.

On examining the region of the eye, an enormous development of the muscles was immediately observed. The sclerotic coat of the eye was very thick, and likewise formed a very thick sheath around the optic nerve, imbedding the bloodvessels, and almost as hard as bone. It was found, however, to contain no ossific matter, and to be simply very dense fibrous tissue. Behind the globe of the eye, and occupying a large space, was a large venous plexus. The eyelids were thick, and the conjunctiva folded back in such a manner as to permit the eye to recede in the socket. The globe of the eye, together with the optic nerve, weighed three and a half ounces. The powerful retractor muscle, analogous to that of ruminants, weighed five and a half ounces. The other muscles seemed only indirectly connected with the globe, and their use seemed rather to be to open the lid than to move the globe. The muscles which were attached to the lids were of great size; and together weighed one and a half pounds. The object of such muscular power he could not divine. The vascular plexus distended would tend somewhat to force forward the eye, and a sphincter muscle behind the eye would have a similar effect; but these do not seem to demand such extensive muscular power.

Mr. N. H. Bishop gave an account of the Zonda Wind of South America.

The "Viente de Zonda" may be called a local wind, as it only blows in the vicinity of San Juan, of the Argentine Republic, S. A. The town lies at the eastern base of the Andes, three or four leagues from the outer Sierra, South lat. 31° 4′, (Molina,) long. 68° 57′ West, (Arrowsmith.) Behind the first sierra, in the valley of the Andes, are four or five farms which constitute the hamlet of Zonda, from which the wind is named. To all appearance, the wind is formed outside the range, and blows west upon the town; but some old guides pretend that it comes from off the snowy caps of the main Cordillera. It blows at all seasons, though in the month of August (midwinter) it is most frequent. This wind is hot and parching to the skin, and brings with it clouds of dust and dirt, that fill the houses of the people with fine sand. All persons leave their work and seek refuge in their houses, while many of the huts of the gauchos are blown away by the force of the wind. Most persons are troubled with severe headaches; those who have been suffering from diseases of the heart, find their complaints greatly aggravated, and frequently there are cases of sudden death. Three or four years since, five persons fell dead during Zondas in the mouth of August. The Zonda lasts sometimes but two or three hours, at other times more than forty-eight hours.

While the Zonda is at its height, a few puffs of cold air from the south announce a change, and immediately the weathercock veers from east and west to north and south, and a cold wind, equally as strong as the hot Zonda, now prevails from the south; all nature is refreshed, and men return to their labors.

Mr. Bishop stated that he had opened a communication with a North American residing at the base of the Andes, in South America, and that, through him, he hoped to be enabled to obtain specimens of natural history from that region.

The President exhibited the skeleton of a young South American Ostrich belonging to the Society, and pointed out some interesting anatomical features in the bones of the neck and leg.

The President also exhibited the Cranium of a Digger Indian, brought by Mr. Samuels from California. Its internal capacity was about seventy-six cubic inches, nearly the same as that of the Australian and Hottentot. The forehead was very narrow, and the posterior part of the head very broad.

The President likewise exhibited and pointed out the homologies of the cranial bones of a Python, the entire skeleton of which serpent belongs to the Society.

Dr. J. P. Reynolds presented, in the name of Rev. Louis B. Schwarz, a Bulbous Root, from Africa (15° or 18° S. L.) together with a gum found in the sandy soil. In the rainy season these roots throw out a leaf a foot in length, and produce a most beautiful flower. A resinous substance exudes from the bulbs when cut, and probably this resin, found in the soil, comes from the plant.

The thanks of the Society were voted to Mr. Schwarz for the donation. The plant was referred to Mr. Sprague, and the resin to Dr. Hayes, for examination.

Messrs. L. M. Dornbach, B. C. Ward, Charles Kessmann, and Edward Habicht, were elected Resident Members.

February 4, 1857.

The President in the Chair.

The Corresponding Secretary presented a communication from Mr. Charles Whittlesey, of Cleveland, Ohio, entitled "Remarks explanatory of a Section of the Drift or superficial Materials of the Northwest, from Lake Erie to the Lake of the Woods." Referred to the publishing committee.

A communication was read from Mr. E. S. Morse, of Portland, Me., on *Helix asteriscus*, and specimens of the shell were presented.

HELIX ASTERISCUS, Morse. Animal, short, bluish.

Shell, small, orbicular, very much depressed; whorls four, rounded above and below; banded by twenty-five to thirty very thin, transparent, and prominent ribs, very oblique, inclined backward; spire not rising above the last whorl; suture deeply impressed; umbilicus moderately large, showing all the volutions; finely striated between the ribs; in some specimens parallel lines may be observed. Color, light brown.

Dimensions: breadth, $\frac{1}{16}$ in.; height, $\frac{1}{32}$ in.

Found at Bethel, Me., in company with *Pupa pentodon* and *Pupa exigua*, Sept. 28, 1856.

Observations. This shell differs from *H. annulata*, Case, in being smaller, the umbilicus not so large, spire not elevated, intercostal space not marked with parallel lines, but finely striated; the color is also different.

Its peculiar thin, transparent ribs, depressed spire, and deep umbilicus, are prominent features that can never confound it with other species.

Mr. Amos Binney read the following communication from his brother, Mr. W. G. Binney, and presented the specimens referred to: —

PHILADELPHIA, December 27, 1856.

Enclosed you will find a suite of the common American Snail, *Helix thyroidus*, Say, for the Museum of the Society.

Being engaged in a careful study of the land shells of the United States, I am paying particular attention to their *geographical distribution*. In forming suites of all the species from every part of the Union, some interesting results have been reached. The snail in question has been found in nearly every section of the country, and probably exists in all the States east of the Rocky Mountains, with the exception, perhaps, of the peninsula of Florida. In New England it is comparatively rare. In the Middle States it is much more abundant, and reaches its maximum size. In the Southwestern States it is represented by the form which Dr. Gould considers as specifically distinct, and has described as *Helix bucculenta.* It is distinguished by its smaller size, the umbilicus being generally closed, and in many individuals it has a strong resemblance to *H. clausa,* Say. The specimens from Alabama are at once recognized by the greater quantity of calcareous matter in their shells, their larger size and peculiar yellowish tinge. Georgia specimens received from the Rt. Rev. Bishop Elliott of Savannah, are furnished with a strong denticle on the inner portion of the peristome, near the umbilicus. St. Simon's Isle, on the coast of Georgia, has a very peculiar variety, which has been furnished by Mr. Postell. It is at once distinguished from those of the main land, by a smaller and more triangular aperture, and elevated, pyramidal spire. Another curious form is found only near Philadelphia. It is only one half and often not more than one third the size of the Ohio shell — has a very orbicular aperture, generally not furnished with the parietal denticle. It seems restricted to the immediate vicinity of the city, those from New Jersey, only ten miles distant, being of the common form. Its resemblance to *H. bucculenta* will at once be noticed — a curious fact, when we consider that one is found on the primary formations, while the other is peculiar to the limestone countries of the Southwest. When fresh, the Philadelphia variety is of a pretty pink color.

Dr. A. A. Hayes read the following report: —

ANALYSIS OF A SPECIMEN OF GUM FROM AFRICA, PRESENTED BY REV. MR. SCHWARZ.

The specimen was transparent, of a fine red-brown color, externally hard and brittle; within, it was tough and slightly elastic. It dissolved in the mouth, becoming tough, like jujube paste, and gave the impression of agreeable sweetness; after a few minutes, a slightly acrid sensation followed, like that produced by unripe guavas. Its Spec. Grav. is 1.406.

In cold water it dissolves wholly, and the solution bears the addition of its bulk of pure alcohol. More alcohol renders it turbid, and as an emulsion it long retains its opacity and uniformity of diffusion. Alcohol does not dissolve it.

100 parts consist of —

Moisture dissipated at 212° F.	3.46
Pure colorless Arabine	83.42
Glucose	10.80
Salts and Earths	1.28
Coloring and acrid matter, and loss . . .	1.04
	100.00

The coloring matter resembles a humate, having an alkaline base, and the salts obtained were carbonates of lime and potash, with silicate and phosphate of lime, and a trace of manganese oxide. All attempts to isolate the body giving the slightly acrid impression, failed, from its easy decomposition.

It will be seen, that, as a natural mixture of arabine and glucose, this specimen differs from the known gums. Excepting the coloring matter, it is also remarkably pure, and the glucose does not crystallize.

An examination of the bulb, which accompanied the specimen of gum, was made, so far as to prove that the bulb furnished a like body, apparently as an excretion. In the bulb, the gum is associated with a bitter principle, which seems to be lost as the gum matures.

Economically considered, this gum has some importance. As presented, it has all the valuable qualities desired for uniting surfaces by gumming. Its color can be removed, to adapt it to cases where color would be objectionable.

As a mixture of gum and glucose, having the peculiar elasticity found in jujube paste, it might be used with advantage in the manufacture of lozenges, and all preparations of a similar kind, into which gum and sugar enter in mixture, as well as in inks and water-colors. Being destitute of Bassorine, it cannot be substituted for other bodies for thickening mordant mixtures.

Mr. Sprague stated that he had been unable as yet to determine the species, or even genus of this bulb. In endeavoring to obtain further information relative to this plant, Dr. Reynolds had ascertained that the missionary station, where it was obtained, was called Otymbingo amongst the Ovambo tribe, about three weeks' journey from Walfisch Bay, the nearest seaport. The bulbs are found in very great abundance around the mission, in a poor soil of reddish-looking clay. During the dry season they give no evidence of activity; but when the average amount of water falls during the rainy season, they shoot out their leaves to the height of three or four feet. There is a kind of spiral turning of each leaf, and it is curvėd outward at the tip. The stem, which is four or five feet in height, bears several flowers. Mr. Schwarz considers the plant allied to the Amaryllis tribe, and is inclined to place it amongst the Brunswigia.

Dr. C. T. Jackson exhibited a very handsome specimen of Hematite Iron Ore, belonging to the Brandon Iron and Car Wheel Company. This iron is remarkable for its stalactitic character, and is probably of hydrous origin. It is composed of hydrated peroxide of iron, 85½ per cent., water, 14½ per cent., with a minute quantity of manganese and silica. This ore produces the very best kind of iron, and is easily smelted. It yields about fifty per cent.

Dr. Hayes stated that he had proved, from careful analysis and examinations of pseudomorphs, as well as the more ordinary forms of hematite, that the infiltration of an aqueous solution of silicates of proto-peroxides of iron and manganese, *caused the production of hematite.* The beautiful black, glossy covering, which confers so much beauty on the ores of iron not truly hematites, as well as the ore of manganese, is always composed of silicate of proto-peroxide of iron, with silicate of one or both oxides of manganese; and the compact peroxides of manganese, often owe their density and hardness to this compound.

Mr. T. T. Bouvé, referring to a discussion on a previous evening, upon the slide or fall of land upon the Presumpscot River, near Portland, Maine, some years since, in which discussion he had participated, read documents from parties who visited the locality immediately after the event occurred, in order to show that the views maintained by him were correct, viz: that the phenomenon was due primarily to a partial washing out of the substrata by the action of the river; — that it might be more truly described as a fall or sinking of the surface, attended with some sliding towards the river, which it crowded from its course, rather than to a sliding action alone of the surface, occasioning a denudation of the substratum of clay. The presence of this clay to such an extent on the surface, he described as resulting from its being forced up by the crushing weight of the soil over it, through the fissures and divisions that occurred above when the fall took place. This spread over the disturbed area to a considerable extent, and formed numerous hillocks. Mr. Bouvé then exhibited a fine series of concretions from the clay, most of which had a nucleus of some organic body. Among these nuclei were coprolites of fishes, fish-bones, joints of crabs, Balani, shells of the genera Mya, Bulla, Nucula, and Saxicava. These concretions, and those from other deposits of clay, are not, as has been supposed by some, mere balls or masses of clay which have become indurated by carbonate of lime imparted from the nucleus, but true segregations of carbonate of lime from the solution of this substance disseminated in the plastic clay. These bodies ordinarily contain about 50 per cent. of carbonate of lime. They do not always have a nucleus; on the contrary, those from many localities very seldom have any. These seem by no means necessary for their production. Undoubtedly the carbonate of lime in the plastic clay, acted upon by elective affinity, was led to draw itself towards certain points, and to arrange itself more or less concentrically about a centre where might be or not a nucleus of some foreign body. Why the carbonate of lime did not in such cases crystallize, is more than is clearly understood. Probably, it might have something to do with the mechanical action of the clay as a disturbing element.

In cases where the forms are flattened disks, or lenticular, as in some deposits, it may be supposed that the strata of clay were of different density. This would account for the flattening, inasmuch as the force, acting in a radius from a centre, would be more free to exert itself horizontally than otherwise.

Dr. Charles T. Jackson stated that he had several times, during his geological survey of the State of Maine, examined the slide on the Presumpscot River, in Westbrook, and had published a short description of it in his annual reports on that survey.

He agreed with Mr. Bouvé in opinion that an undermining of the strata of clay, by the action of the river, probably induced the slide, but he was satisfied that the strata of clay marl had slid forward toward the river as well as fallen from the original level of the remaining bank. Whether the frosts of winter cracked the clay at its junction with the bank now standing, and thus let in the water to the soft, plastic clay below, rendering it very slippery, or the desiccation of it had caused such a fissure, was unknown, but there cannot be a doubt that it was owing to the extreme plasticity of the under blue clay that the strata were enabled to slide toward the river, as they have done.

The positions of the fir-trees upon the clay bed prove a sliding motion of the mass toward the river.

With regard to the concretions found at the slide, Dr. Jackson stated that the clay marl in which they are found contains about ten per cent. of carbonate of lime, while the concretions generally contain as much as 50 per cent. He considered the crystallizing force of the carbonate of lime to be the cause of the concretionary structure and form of these bodies, the foreign bodies occasionally found within them serving as nuclei around which this semi-crystallization took place, the carbonate of lime segregating and carrying with it the inert particles of clay, the spheroidal form being that which would result from this action when the force was not adequate to the production of crystals. He illustrated this view by reference to the spheroidal structure of hyalite and of various hydrous silicates which form from a gelatinous paste in which there is not sufficient freedom of motion to allow of the formation of perfect crystals. In case there were a larger proportion of carbonate of lime in solution as a bicarbonate, the crystalline forms would become more perfect, as in the well-known crystallized sandstone of Fontainbleau, in which grains of silicious sand are forced into the form of calcareous spar by the energetic segregation of the crystallizing carbonate of lime; the sand being inert matter which was forced by the calcareous salt to enter into the crystalline form of the spar.

Similar illustrations were adduced from chemical experiments and observations in which spheroidal forms result, and also in which foreign bodies are forced to enter into the structure of crystals. He quoted the experiments of Beudant, which he had repeated, in which Prussian blue was included in crystals of nitre and alum. He also alluded to the effects of different menstrua, in modifying the forms of crystals or totally changing their forms, instancing the crystallization of sea salt in the forms of the regular octahedron in a solution of urea, whereas the cube is its usual form.

Dr. A. A. Hayes followed Dr. Jackson, in remarking on the concretions called claystones. Having inquired of Dr. J. how large was the proportion of sand in the Fontainbleau crystallized sandstone, and received for answer about fifty per cent., he said that he had often examined the spots where they were forming, and had noticed a growth equal to the size of a garden bean, to take place in the course of two or three weeks of wet, spring-time weather. To form a just conception of the conditions, the fact must be kept in view, that the beds containing them are composed of fine silts, and in the case immediately under view, these were arranged in planes of deposition of alternate courses, covered by much finer material, in layers of different thickness; so that the mass was stratified; the coarser layers being very permeable to water. The rounded forms, often strongly resembling organic remains, are found resting between these layers, and a condition necessary to their formation is, *the presence in the layer or rock above them of abundance of carbonate of lime.*

The force exerted by some salts in their tendency to crystallize is brought into view only when we study their formation, and carbonate of lime is one of the constantly occurring salts which well illustrates, in a remarkable manner, this power of assuming regular forms. As has been stated, with fifty per cent. of its weight of *sand*, it forms regular rhomboids, but the more recent observations of some African travellers, who found their progress impeded by "stone plants," six or eight inches high, formed of aggregates of spear-shaped crystals of sand, cemented by carbonate of lime, show, that this large proportion may be exceeded, while the foreign material is in a somewhat *coarse state.*

In the formation of claystones, however, we are to consider the presence of finely-divided matter suspended in, or so mixed with water of infiltration in spring-time, or general saturation from position, that it has nearly a semi-fluid state. A saturated solution of bicarbonate, or more commonly crenate of lime, finds its way into the soft mass, by frost crevices, or channels left by roots, or even air bubbles, and at these points the concretions commence, when no nuclei of similar chemical composition exist. The finely-divided matter interposes an obstacle to the formation of crystals of carbonate of lime, far greater than an equal amount of coarser foreign matter would do; and we observe, then, the influence of that beautiful law in accordance with which *rounded forms* are produced. In the laboratory similar forms daily occur, where the presence of finely-divided and diffused bodies, arrests the formation of crystals, and globular, or curved-surfaced solids are produced; as in the animal frame, the cell structure causes the dissolved phosphate of lime to take the curvilinear form pertaining to organization. The claystones which are produced under the simple conditions here described, have no concentric structure; a slight conformity to this structure being observed, when a bubble of air, or a vacant space, marks the point of commencing deposition. In other cases, a shell in its calcareous composition offers a preferred nucleus, and as it contributes its lime salt, a concentric arrangement may be noticed in the forms resulting, especially after exposing them to heat. Rounded masses once formed become centres, or nuclei of secondary occurring aggregates, one central mass being surrounded by spheres attached; but in all it is easy to read the influence of the tendency of carbonate of lime to crystallize, and the opposition of the finely-divided silt, causing the particles of both to assume forms without straight bounding lines, as the polarizing force of crystallization is arrested in all directions.

It may be added that a great number of bodies present rounded forms dependent on a modification of this law of restrained crystallization, such as numerous iron ores, bog manganese, and even the more compact forms, where infiltrated solutions, forming part of the material, existed at the moment of aggregation.

Dr. Hayes made some remarks on the formation of macle crystals, the true theory of which he stated that he had many years since illustrated by numerous specimens and examples. Starting from the point where Beudant left the subject resting on a supposition, it occurred to him that the law was quite within the scope of a chemical demonstration, which would place this and similar instances of crystallization among known scientific facts. Without entering minutely into the matter, we may take as an example a salt exerting a strong tendency to crystallize from a hot solution on cooling,—ordinary saltpetre. A solution of this salt, in a pure state, slowly cooled, affords solid, six-sided prisms, or the crystals become solid if allowed to rest in the fluid, and we observe nothing but the result of ordinary crystallization. If the process has been carefully watched,—and it is a most interesting and instructive exhibition,—it will be observed that the particles of solid, so soon as they become visible, are rectangular, and that they are polarized. Motion may cause similar poles to approach within the limits of repulsion, when the particle turns and brings its opposite pole in contact, the union taking place at a certain angle, and the frame-work thus laid out becomes closed in by successive layers of polarized particles, forming a regular, solid crystal of a hexagonal form.

The same operation going on in a solution of the same salt, mixed with a solution of common salt, exhibits for some time the same process of construction; but it soon becomes apparent that a *solid prismatic crystal will not form*, and time does not change the condition of the solution. A frame-work, or *skeleton crystal* is built up as before, and possibly the interstices may be solidly filled, but there will appear a *hexagonal cavity in the centre, representing a considerable part of the volume of the crystal.* If we carefully seal this cavity and remove the crystal, we find the fluid contents to be a strong solution of common salt, and the interior of the crystal has quite finished surfaces. The suggestion at once arises that the crystal, having used in its structure all the saltpetre within reach, has completed its form with a strong solution of common salt. To test the correctness of this supposition, we may substitute a solid body, choosing one which from its fineness can be diffused uniformly, and we shall find that a pure salt will, by its polarizing action on this suspended matter, *fill its cavity quite closely*, and make up its true solid crystal in part of clay, Prussian blue, or other bodies. Ranging through the ordinary salts, cooling from solutions, or the melted state, macle crystals will be obtained almost constantly, while in all cases of slow evaporation and avoidance of those conditions favoring the production of macles, solid transparent crystals only form. Employing thus many thousands of pounds, or only a few grains of salt, the operation of this law of *polarization extended to contiguous matter* is seen, and in the experiments alluded to, it was shown that its modified and more complex action gave beautiful results. Skeleton crystals, such as sublimates, and snow-flakes, and frost-work may be assumed to be *solid crystals*, at the instant of their formation: the vapor, or air, being polarized to fill the vacancies, which afterwards appear, gives the beauty and variety so strikingly presented by them.

Mr. Charles Stodder stated that Professor Hitchcock, in his "Final Report on the Geology of Massachusetts," 1841, devotes several pages to the subject of claystones. He says: "They are undoubtedly concretions, formed by laws somewhat analogous to those of crystallization. I freely confess, however, that so far as my means of information extend, the subject of concretions is involved in great obscurity."—*Report*, p. 406. "When broken, the concretion appears compact and perfectly homogeneous throughout. *In no case have I discovered a concentric or oölitic structure;* nor did the application of strong heat develop it." p. 409. "In a very few cases I have met with a pebble, or a congeries of coarse sand, near the centre of the claystone, which appeared to have been the nucleus around which the particles collected; but in ninety-nine cases out of a hundred, no such nucleus can be discovered; although it is undoubtedly true, that there must have been something to determine the particles to a particular centre." p. 410.

Since Professor Hitchcock's Report, Mr. Stodder was not aware that any observations had been made throwing any light on the origin or structure of these concretions. He exhibited two specimens, cut open,—one, No. 1614 of the State collection from Amherst, was, as Prof. H. found them, compact and perfectly homogeneous, and no nucleus was visible. The other, a very fine example of these claystones, from an unknown locality, was a depressed spheroid, almost a perfect circle in outline, presenting the markings which gave it the appearance of having been turned in a lathe, with an appendage on one side, apparently another spheroid attached to the principal one.

On cutting this open and polishing the cut surface, it displayed a concentric structure with slight variations in color. There was no lamination; the whole mass being perfectly compact, and the lines of colors not sharply defined, but fading almost imperceptibly one into the other; but the contrast of colors was sufficient, in a favorable light, to exhibit unmistakably the concentric arrangement of the material and the origin of the lines on the surface which give these concretions so much the appearance of works of art. There is a minute nucleus less than $\frac{1}{16}$ of an inch in diameter. The first concentric layer exhibits its arrangement about the nucleus in the form of an ellipse, assuming the spheroidal form at the outset; the succeeding layers extend the long diameter more than they do the short one; then a layer extends over the long diameter and one side only of the short; on the other side of the now lenticular body, the layer terminates before reaching the centre, and its edge makes one of the lines, that so much resemble the marks of the turner's tool. Other layers are added to the long diameter, only increasing the compression of the spheroid, their edges making each a line on both sides. The lines of color in the appendage before referred to are concentric with the centre of the concretion, showing that that was not formed around an independent nucleus as might be supposed by the external appearance.

The minute size of the nucleus, and its position outside of the centre, render it very difficult to be found without great care, and very liable to be destroyed by cutting or breaking the stone. No failure to find a nucleus is sufficient evidence that the concretion was formed without it.

Mr. Stodder also called attention to another form of clay concretion or segregation, which he saw some years since in Windsor, Ct.

On the bank of the Farmington River, was a bold, nearly perpendicular bluff of the Connecticut valley clay, stratified in horizontal layers of from half an inch to an inch, and perhaps two inches in thickness. The divisional planes between the strata were indurated, perhaps $\frac{1}{16}$ of an inch thick, and somewhat harder than the mass of the clay. Exposed to the elements the softer clay had been washed out between the hardened divisional planes, to the depth of one or two inches. Extending from one hardened plane to another, were cylindrical concretions of from $\frac{1}{4}$ to $\frac{3}{4}$ of an inch in diameter, at various distances apart. The bluff, seen in front, presented the appearance of small shelves supported by innumerable small columns, many of which had a small hole through the centre. They looked as if they might have collected about the rootlets of plants, but it is questionable whether roots would penetrate clay to the depth of ten or fifteen feet, or their direction would always be vertical.

The columns undoubtedly were not lime and clay like the claystones, but merely indurated clay, as none of them could be found at the base of the bluff, the fallen ones having decomposed.

Dr. Jackson referred to the Fossil from Lake Superior, which accompanied the collection of minerals presented by Dr. Kneeland at the last meeting, and which it was suggested by Mr. Stodder, might assist in determining the age of the copper-bearing rocks of that region. Dr. Jackson stated that the fossil was a Cyathophyllum, and undoubtedly came in the drift from the upper Silurian Rocks of the northern shore of the lake.

Dr. Jackson exhibited specimens of Aluminium, consisting of a table-fork made of the metal, some wire, foil, and an ingot. Aluminium is now obtained in France at the cost of nine dollars a pound, and Dr. J. has been informed by a manufacturing chemist that it will soon be produced at the cost of only four dollars a pound in this country.

The Corresponding Secretary read the following letters, viz: from the Regents of the University of New

York, January 15, 1857; the Royal Institution, November 26, 1856, acknowledging the receipt of the Proceedings of the Society; from the Société Imperiale d'Agriculture, &c., de Lyon, July 9, 1856, the Société Linnéene de Lyon, July 9, 1856, the Académie Imperiale &c., de Lyon, July 14, 1856, the Académie Royale des Sciences de Stockholm, August 1, 1856, presenting their various publications; from Dr. John S. Newberry, Washington, Dec. 22, 1856, acknowledging the receipt of his diploma as Corresponding Member; from Robert Kennicott, Esq., West Northfield, Illinois, January 15, 1857, acknowledging the donation of the Journal; from Isaac Lea, Philadelphia, January 2, 1857, and M. L. A. Huguet Latour, Montreal, Jan. 3, 1857, requesting that missing numbers of the Proceedings may be sent to them; from William Stimpson, Washington, Jan. 2d, 26th, and 29th, concerning his papers on the Crustacea of California; from Charles Girard, New York, Jan. 19, concerning his descriptions of new California fishes; from Charles Whittlesey, Cleveland, Ohio, Jan. 25, accompanying a geological paper.

Mr. Leander Wetherell was elected a Resident Member.

February 18, 1857.

Dr. C. T. Jackson, Vice-President, in the Chair.

Prof. H. D. Rogers read the following paper entitled,—

CLASSIFICATION OF THE METAMORPHIC STRATA OF THE ATLANTIC SLOPE OF THE MIDDLE AND SOUTHERN STATES.

The following is a concise sketch of the Geological composition of the Atlantic Slope of the Middle and Southern States, derived chiefly from a study of the formations of this portion of Pennsylvania.

Discarding from our present survey the newer deposits of the region, or those long, narrow, superficial troughs of unconformably overlying red and gray shales and sandstones of mesozoic, or middle secondary age, which partially cover the older or crystalline, and semi-crystalline strata, and restricting our attention to these, we shall find,—that when carefully studied, they rank themselves, so far as they admit of subdivision at all, into three natural physical groups. All the sedimentary mineral masses, without exception, are in a condition, more or less, of metamorphism or transformation from the earthy to the crystalline state by heat, and therefore using the term in a critical sense, all of them are Metamorphic Rocks. In the more current conventional application of this word, only some of them, however, pertain to the usually recognized Metamorphic or Gneissic series; others belong unequivocally to the Paleozoic, or ancient life-representing system, while others again constitute an extensive, intermediate group, not typically gneissic or granitoid in their degree of crystalline structure or metamorphism on the one hand, nor yet fossiliferous on the other, at least so far as the closest scrutiny can discover. For a long while, indeed, from the commencement of geological researches in this district of the Atlantic slope, until the geological surveys of Pennsylvania and Virginia had unravelled the composition and structure of the region, all of these ancient, and more or less altered strata of the Atlantic slope, from its summit in the Blue Ridge and South Mountain, to its base at the margin of tide water, were regarded and designated alike as primary rocks, and were supposed to constitute but one group, and that the oldest known to geologists. Early, however, in the course of those surveys, it came to light that by far the larger portion of the rocky masses of at least the middle and northwestern tracts of the Atlantic slope, including much of the Blue Ridge and of the Green Mountains, was of a different type and age from the oldest metamorphic, or true gneissic system. The evidence in support of this conclusion was, first, an obvious and very general difference in the composition of the two sets of strata; secondly, a marked difference in their conditions of metamorphism, and thirdly and more especially, a striking contrast in their directions and manner of uplift, the plications and undulations of the less metamorphic series, dipping almost invariably southeastward, while the gneiss presents in many localities, no symmetrical foldings, but only a broad outcrop, dipping to a different quarter. These structural dissimilitudes imply essential differences in the direction and date of the crust movements, lifting and transforming the respective groups, and led the geologists of Pennsylvania and Virginia to a conviction, that over at least many tracts, a physical unconformity, both in strike and dip, would be yet discovered. It was not, however, till a relatively late date in the prosecution of the geological survey of Pennsylvania, that the geologists of that State detected there positive evidences of this physical break, and interval in time between the two groups of strata, and established by ocular proof the correctness of the previous induction. This unconformity, reflecting so much light on the whole geology of the Atlantic slope, was first clearly discerned in tracing the common boundary of the two formations from the Schuylkill to the Brandywine, and the Susquehanna, but it was quickly afterwards recognized on the borders of the gneissic district, north of the Chester County limestone valley, and again, soon after, in the Lehigh Hills at their intersection with the Delaware.

Prior to the suspension of the geological survey from 1843 to 1851, the true Paleozoic Age of the non-fossiliferous crystalline marbles, and semi-crystalline talcoid slates, and vitreous sandstones of the Chester and Montgomery Valley, had been clearly demonstrated by the State geologist, through a comparison of the strata with their corresponding formations in a less altered condition further north; but it was not until the resumption of field research, upon the revival of the survey in 1851, that any distinctive fossils were detected in these greatly changed rocks, which even in their original state seem to have been almost destitute of their usual organic remains.

Assembling all the evidence which we now possess, we have in the Atlantic slope by actual demonstration but one physical break or horizon of unconformity throughout the whole immense succession of altered crystalline, sedimentary strata, and within this region but one paleontological horizon, that, namely, of the already-discovered dawn of life among the American strata.

This latter plane or limit, marking the transition from the non-fossiliferous or azoic deposits to those containing organic remains, lies within the middle of the primal series or group, of the Pennsylvania Survey, that is to say, in the Primal White Sandstone, which even where very vitreous, and abounding in crystalline mineral segregations, contains its distinctive fossil, the *Scolithus linearis*. The primal slates beneath the sandstone, and in immediate alternation with it, possess not a vestige of organic life, nor has any such been yet discovered anywhere within the limits of the Atlantic slope, or on the northern or western borders of the great Appalachian basin of North America, either in this lower primal slate, or in the other semi-metamorphic grits and schists physically conformable with it, and into which the true Paleozoic sequence of our formations physically extends downward. We have thus, then, two main horizons, subdividing the more or less metamorphic strata of the Atlantic slope into three systems or groups; the one, a physical break or interruption in the original deposition of the masses; the other, a life-limit or plane, denoting the first advent, so far as is yet discovered, of organic beings. As these two planes are not coincident, but include between them a thick group of sedimentary rocks, separated from the lower physically, from the upper ontologically, we are fully authorized, in the existing state of research, to employ a classification, which recognizes a threefold division of all these lower rocks. To the most ancient or lowest group, it is proposed to continue the name of gneiss, preferring, however, to call this division generically the GNEISSIC SERIES, employing sometimes the technical synonyme Hypozoic, proposed by Professor John Phillips, for these lowest of the metamorphic strata. To the great middle group, less crystalline than the gneissic, and yet destitute of fossils, the descriptive terms semi-metamorphic or Azoic are applicable. And to the third uppermost system, or entire succession of the American Appalachian strata from the primal, containing the earliest traces of life, to the latest true coal rocks, or last deposits of the Appalachian sea, it is here proposed to affix, as for many years past, the well-chosen title, conferred on corresponding formations in Europe, of the Paleozoic, or ancient life-entombing system or series. Thus we have the *Hypozoic* rocks, or those *underneath* any life-bearing strata;

Azoic, or those destitute of any discovered relics of life; and *Paleozoic*, or those entombing the remains of the earth's most ancient extinct forms of once living beings.

The Atlantic slope of Pennsylvania includes all these three systems of strata. Where the azoic strata display their maximum amount of crystalline structure or metamorphism, they often simulate the true ancient hypozoic or gneissic rocks so closely, and they are indeed so identical with them in mineral aspect and structure, that the observer is baffled in his attempts to distinguish the two groups lithologically; nevertheless, it clearly appears, as the sections illustrating this country prove, that they are distinct systems, occupying separate zones, susceptible of independent definition on the geological map.

At the time of the first construction of the general geological map of the State, the true limits separating the hypozoic or gneissic from the azoic or semi-metamorphic rocks were but vaguely understood, and the State geologist did not venture to define them on the map, but shaded the one system into the other, indicating, however, what he has since proved, that the true gneissic rocks, in their southwestward course, pass out of the State at the Susquehanna, only a short distance north of its southern boundary, while the azoic, or talco-micaceous group, as a genuine, downward extension of the primal, paleozoic series, widens progressively going westward, until, from a very narrow outcrop at the River Schuylkill, it occupies at the Susquehanna the whole broad zone south of the limestone valleys of the Conestoga and Codorus streams in Lancaster and York counties. Since the revival of the field work of the survey, the dividing limit of these two sets of metamorphic strata has been traced and mapped with precision. To the southwest of the Susquehanna it has never, it is believed, been pursued through Maryland and the other southern States, though one may readily discern it in going northward or westward from Baltimore, or ascending the Atlantic slope in Virginia. In Maryland it crosses the Baltimore and Susquehanna Railroad about twelve miles north of Baltimore, and it is intersected by the Baltimore and Ohio railroad a little east of Sykesville; it crosses the Potomac above Georgetown, and the James River in Virginia, west of Richmond. The line of boundary is, however, not a simple one, but is intricately looped, in consequence of numerous nearly parallel anticlinal foldings of the strata, sending promontories or fingers of the older rocks, within the area of the newer or semi-metamorphic, to the west of their average boundary, and causing, of course, corresponding troughs, or synclinal folds of the newer, to enter eastward of the average boundary, the general area of the older. The Atlantic slope has received hitherto so little exact geological study, that we are, as yet, without the data for determining with any precision, either the succession of its much broken and closely-plicated strata, or the geographical limits which separate even the larger sub-groups. It is sufficient, however, for our present purpose, to show the existence and the approximate range of two great metamorphic systems, separated by a physical break; and the conformable relations of the later or upper of these to well known lower paleozoic formations of the Appalachian chain.

Mr. T. T. Bouvé said he was incredulous as to the matter of slates being so altered as to be mistaken for gneiss or altered into true gneiss; he questioned whether gneiss ever were a deposited rock.

Dr. C. T. Jackson made some remarks dissenting from Prof. Rogers upon certain points in the metamorphic theory, and adduced some observations upon the slates of Pequauket Mountain, in New Hampshire, in support of his views.

Prof. Wm. B. Rogers supported the theory of Prof. H. D. Rogers.

Dr. T. M. Brewer read the following

LIST AND DESCRIPTIONS OF EGGS OBTAINED IN CALIFORNIA BY E. SAMUELS.

Buteo montanus, Nuttall. The Western Red-tailed Hawk or White-throated Buzzard. This bird was first recognized as a distinct species by Mr. Nuttall, (Manual, 1840.) Its claims to this distinction have remained unrecognized until very recently. In the Proceedings of the Philadelphia Academy, Feb. 1856, Mr. Cassin, for the first time, refers to this hawk as a distinct species from the variety found in the eastern States. *(B. borealis.)*

Two eggs belonging to a bird of this species were obtained by Mr. Samuels near Petaluma, California, in 1856, one of which measures $2\frac{5}{16}$ inches in length, by $1\frac{14}{16}$ inches in its greatest breadth. The shape of the egg is an almost exact ovoid, slightly tending to a spheroid, one end being hardly perceptibly larger than the other. Its ground color is a very light buff, the spottings and markings giving to it the effect of a yellowish-white. The egg is marked over the entire surface with blotches, dashes, and lines of a light tint of a brown tending to Vandyke. These are mixed with markings of a lighter purplish-brown. The markings, of both shades, are chiefly oblong in shape, and run with the length of the egg. They bear no resemblance to any eggs of the *B. borealis* that I have ever seen, and are also quite unlike those of any other hawk, so far as I am aware.

The nest was discovered by Mr. Samuels, not far from Petaluma, California, close to the Mission House, near Petaluma Flat. It was built on the top of a large evergreen oak, at least seventy feet from the ground, and was constructed entirely of large, coarse sticks, lined with a few stray feathers. The eggs were two in number, and had been set upon a short time. The male bird was shot as it flew from the nest, which was so hidden by the thick branches that it would have escaped detection.

Buteo calurus, Cassin. Black Red-tail Hawk. This hawk is comparatively a new species, having been met with for the first time by T. Charlton Henry, M. D., U. S. Army, in the vicinity of Fort Webster, New Mexico, and described by Mr. Cassin in the Proceedings of the Academy of Natural Sciences, Philadelphia, February, 1855, p. 277. The specimen obtained by Mr. Samuels, with the egg, is the second that has been discovered at the present time, so far as I am aware. In regard to its habits and specific peculiarities but little is known, and its geographical distribution can only be conjectured from the two points, about a thousand miles apart, where the two representatives of this species were obtained,—Fort Webster and Petaluma.

The nest was found by Mr. Samuels on a hill north of Petaluma, California. It was built near the top of an evergreen oak, at the height of about sixty feet from the ground. The nest contained two eggs at the time it was discovered, which were just on the point of hatching. It was constructed of sticks, and was lined with moss. Both birds were about the spot. The male bird manifesting much more courage than his mate in resistance to the intruders, was shot. The female was wounded, but escaped.

The egg of the *B. calurus* measures $2\frac{4}{16}$ inches in length by $1\frac{3}{16}$ in breadth. Its capacity is considerably less than that of the *B. montanus;* its shape is a much more oblong oval; one end is evidently more pointed than the other. Its ground color is a dirty cream-white. It is covered, chiefly at the larger end, with blotches and smaller markings of a dark shade of a brown almost exactly corresponding with that known as Vandyke-brown, with smaller markings and spottings of a lighter shade of the same. The latter are distributed at intervals over its entire surface.

Buteo insignatus ? The Canada Buzzard or Brown Buzzard. In the collection of eggs obtained in California by Mr. Samuels, were two eggs of a hawk which he had no doubt belonged to a bird of this species. The parent was shot on the nest, but escaped into a deep ravine below, and was not obtained. The egg is different from that of any other hawk that I am acquainted with, and it has been assigned to this bird, on the strength of Mr. Samuels's impressions. It should be added, however, that his view of the bird was necessarily incomplete, and he may have been mistaken in regard to it. It is possibly the egg of *Buteo Bairdii*, (a variety of *B. Swainsoni*,) or it may belong to the *B. elegans*, all of which bear sufficient resemblance to the *B. insignatus* to be confounded with it, without an opportunity of closer inspection than he possessed. The nest was on a large white-oak, over a deep ravine, on San Antonio Creek, near Petaluma. It was very large, was constructed of coarse sticks, and was at least sixty feet from the ground.

In regard to the habits and the geographical distribution of this hawk, but little is known to naturalists. It was first described from a specimen belonging to the Natural History Society of Montreal, and obtained in that vicinity. Specimens have since been met with in California; but to what extent it is distributed through the intervening country remains to be ascertained. It is not improbable that it is a more common species on the Pacific coast, and that it is of rare and accidental occurrence in the eastern part of the continent. Dr. Heermann has ascertained that this hawk rears its young in California, where he met with both adult and young specimens.

The egg supposed to be that of this hawk, measures $2\frac{4}{16}$ inches in length by $1\frac{4}{16}$ in breadth. Its shape is an oblong oval, and neither end is perceptibly larger than the other. The ground color of the egg is a cream-white, but little obscured by markings or secondary colors. The egg is marked, chiefly at one end, with lines, dottings, and small blotches of a light reddish-brown. The lines with which one end of the egg is sparingly marbled are much darker, and are more nearly of a Vandyke-brown. The greater portion of the egg, especially that which corresponds with the smaller end, is free from any markings. This has no close resemblance to the egg of any other American hawk that I have ever met with, but most nearly approaches that of the Rough-legged Falcon from Labrador.

Hirundo bicolor. White-bellied Swallow.

Hirundo lunifrons. Republican or Cliff-Swallow.

Mellisuga anna. Anna Humming-Bird. Two nests with the eggs of this bird were obtained by Mr. Samuels. They are not new, but are probably to be found in few collections. The nest and eggs procured by Mr. S. correspond substantially with the descriptions and measurements given by Mr. Nuttall and quoted by Mr. Audubon. (Birds of America, Vol. X. p. 188.)

Tyrannus verticalis. Arkansas Flycatcher.

Scolecophagus Mexicanus. Brewer's Blackbird, Audubon. This bird was first met with in the territory of the United States by Mr. Audubon, who found it in the country about Fort Union, near the confluence of the Yellow Stone and the Missouri. He called it, supposing it to be undescribed, *Quiscalus Brewerii.* It had, however, been previously given by Mr. Swainson as *Mexicanus.* Mr. Samuels was so fortunate as to meet with several of the nests, with the eggs of this bird. The egg measures

$1\frac{1}{16}$ inches in length by $\frac{12}{16}$ of an inch in breadth. It is an oblong oval, but slightly pointed at the smaller end, and, except in size, bears some resemblance to the egg of the common Song Sparrow, (*Zonotrichia melodia.*) Its ground color is a greenish-white, over which are diffused, in most of the specimens, numerous blotches and markings of a ferruginous brown. The nests were in low bushes in wet places, and did not essentially vary from those constructed by the Red-winged Blackbird.

Agelaius gubernator. Crimson-winged Blackbird. The nests and eggs obtained by Mr. Samuels correspond with the description given by Dr. A. L. Heermann in the Journal of the Philadelphia Academy.

Cyanocorax Californicus. California Jay. This is probably the same bird given by Mr. Audubon as the Ultramarine Jay, *Garrulus sordidus*, of Swainson, and *G. ultramarinus*, of Bonaparte. Its eggs have been described by Dr. Heerman

Sturnella neglecta. Missouri Meadow Lark.

Zonotrichia grammaca. Lark Bunting.

Carpodacus familiaris. California Purple Finch.

Melanerpes formicivorus. California Woodpecker.

Ectopistes Carolinensis. Carolina Turtle-Dove.

Callipepla Californica. California Quail.

The Secretary read the following communication from Dr. James Lewis, of Mohawk, N. Y., addressed to the Corresponding Secretary:

I received yesterday the fourth sheet of Vol. VI. of the Proceedings of the Boston Society of Natural History, in which I find some remarks by Dr. Weinland relative to the causes of erosions on fresh-water shells. This subject has attracted my attention to a considerable extent, and I am glad there are others who are similarly interested.

Although I assent to the propositions of Dr. Weinland as being sufficient to explain the subject in some instances, I have not regarded the presence of small worms on shells, nor the presence of carbonic acid in water, as sufficient to account for the great diversity of appearances presented by the same species in different localities.

From what information I have been able to obtain in relation to the geological characters of various regions in which shells are found, it appears that those bodies of water having large quantities of calcareous salts in solution produce shells very little liable to erosion; while on the contrary, where there is very little lime, and the water holds in solution considerable quantities of saline alkalis and ferruginous salts, the shells are very liable to be eroded. Among the numerous specimens that I have, illustrating the above, are large numbers of shells from streams in Georgia, where the waters abound in saline alkalis. The shells are very generally eroded. I have also shells from other regions where the saline alkalis are more abundant than lime, and they present the same character.

I have also shells from Ohio, Illinois, Wisconsin, &c., which are from streams abounding in lime, and an eroded specimen is seldom to be seen among them, except, perhaps, a few aged shells that are evidently worn by long contact with abrading surfaces of other bodies.

I have also shells from a lake in Herkimer county, N. Y., nearly all of which have perfect beaks, and the few that are eroded are by no means as *chalky* in their texture as some specimens I have seen from localities deficient in lime. The bottom of the lake, in the instance specified, is a bed of marl.

But a more satisfactory proof that the freedom of shells from erosion depends on the relative proportions of various salts or alkalis in solution in the water, is presented in a limited body of water under my own immediate inspection.

Near the village of Mohawk, is a slowly-moving body of water, in which considerable numbers of shells are found. In those portions of this body of water where the various salts bear their natural and proper relation to each other, the shells are very perfect, and generally very free from erosions. But at and below, where the refuse ashes from an ashery are drained or leached into this body of water after every shower, a considerable quantity of saline alkalis finds its way into the water, where, in consequence of its specific gravity, it falls to the bottom, and every shell within reach of the influence of this alkaline matter, is more or less eroded, and most of them very much so. But further down, the shells grow more perfect, probably in consequence of the dilution of the alkalis, and their more general diffusion in the whole body of the water, by the influence of the slight current in it.

It may be thought strange that the presence of saline alkalis in water is urged as a cause of the erosion of shells, but it may be explained in this way. Where two or more alkalis are present in the food of an animal, and only one of them is necessary and proper to enable it to perform its healthy functions, the others may, in part, take the place of the proper substance, and if so, the shell formed under such circumstances would be more or less liable to erosion, in proportion to the solubility of the substituted materials.

We have now only to inquire respecting a locality producing eroded shells,—Is the water so highly charged with lime, that the presence of a more soluble alkali in small quantity can have no material influence in the *formation* of the shells? If the answer be yes, then we may reasonably ascribe the eroded character of the shells of such a locality *entirely* to minute parasites; but if there be a preponderance of saline alkalis in the water, they may be reasonably expected to enter into the organization of the shells, and a very slight abrasion of the epidermis of the shell from *any cause*, would expose the soluble alkalis to the solvent action ot water alone, and the remaining portion of the shell becoming less dense (and "chalky") by a removal of a portion of its substance, would, of course, wear away very rapidly. It is easy to understand why the beaks of bivalves, and the apices of univalves are first attacked by the erosive process. Firstly, the epidermis is thinner at those points: secondly, those portions of the shell formed in early life may be presumed to contain more gelatinous, and less calcareous matter, than the parts formed at or near maturity. I do not know demonstratively that this is the case, but analogy teaches it.

Dr. Gould observed, that shells in limestone waters are less liable to erosion, not from any difference in their composition, but simply because there is less tendency in such waters to abstract lime from the shell.

Prof. William B. Rogers suggested, that an analysis of shells from various waters should be made, to determine any difference in their chemical composition.

The Secretary read a letter from Dr. Samuel Kneeland on a supposed new species of Siredon from Lake Superior. The following account was subsequently received:

SIREDON HYEMALIS, Kneeland. From 9 to 10 inches long; color on back olive-green, with a few small blackish spots, arranged for the most part in longitudinal rows, and with a few smaller spots varying in color from bright to rufous-yellow. A line, more distinct towards the tail, separating the olive-color of the back from the sides, which are of a purplish-brown, with more numerous yellowish spots sometimes coalescing into patches half an inch long and two lines broad; brightest on sides of head and tail. Under surface of body of an ashy-brown color, with a more or less distinct median white line, or linea alba; the yellow spots occur on the under surface of the jaw. From the nostrils, which are situated at the extreme corner of the truncated muzzle, about half an inch wide, there runs a dark line through the centre of the eye back to near the external gills; upper and lower segment of the iris of a yellowish silvery color. Tail flattened laterally, terminating in a rounded thin edge, more mottled than any other part of the body. Gills, three in number on each side, external, provided with an immense number of exceedingly delicate fringes, of a deep red color when the animal is breathing actively; these gills are kept waving to and fro in a most graceful manner during active respiration; when at rest they are shrunken, still, and colorless. Just behind these gills are the anterior extremities, about an inch in length, provided with four fingers, mottled like the sides of the body; under surface of the wrist and hand whitish, almost translucent, with the finger-tips black. About five inches further back are the posterior extremities, in size, color, and number of toes, like the anterior limbs. About three fourths of an inch behind the posterior limbs, is the vent, of a bright orange-red color, in some specimens surrounded with fringe-like projections. General shape and aspect of the head, snaky; some specimens, between the eyes and gills are much broader than others; average greatest width, just anterior the gills, 1¼ inch,—slight constriction in region of gills,—behind the last the body is cylindrical and eel-like, about an inch in diameter, gradually tapering towards the tail. The mouth is provided with sharp conical teeth, and the palatine roof is studded with them. Besides the motions of the gills, the animals suck in water which passes out by the narrow openings at the base of the gills. I have kept several of the animals for months, giving them nothing whatever to eat except what they got from the lake water, which I changed every day or two. The water of Portage Lake is very full of vegetable, and, probably, animalcular impurities, on which, doubtless, the creatures fed; but their teeth indicate more substantial food than this. They have been kept for months in clear spring water, so that the preservation of life is probably due rather to the tenacity of the vital principle in reptiles, than to any thing they find to eat in the water. The animals in my possession, have been frozen under ice half an inch thick, every night for three months, without any apparent diminution of their activity; though the water around them was not entirely frozen. I kept one an hour out of the water, during which time it became quite sluggish, occasionally opening its mouth spasmodically, as if to swallow water or air; at the end of the hour, on replacing it in the water, it soon regained its activity. Removing one entirely from the water, all motions of life had ceased at the end of four hours. Their motions in the water are very lively, and performed by the motions of the body and tail; they now and then come to the surface to take in or force out a globule of air; the last they often do under water. Their feet serve them for a slow and difficult locomotion on the bottom; when they move quickly in a jar their limbs are stretched at right angles, as if to steady the body; perhaps in a larger space they would be applied close to the body.

These animals are rarely if ever seen, except during the winter; those I obtained were sucked up through the pumps for the supply of the water for the copper stamps; they are never thus caught in the summer or autumn. They change their skin at this season; I have had several with the old skin hanging to the new in shreds and patches, which are washed off by the water in two or three days, leaving the colors of the new skin very bright; the edges of the tail are then so thin and transparent that the network of bloodvessels can be seen with the naked eye. The reason why they approach the shore at this season may be on account of this change in the skin, and possibly for breeding purposes. About once a week they pass from the anus a gelatinous mass, about the size of a pea, of a whitish color. I thought this might be possibly an egg, but the envelop soon becomes soft in the water, and its contents are lengthened out into a somewhat convoluted form. If this should not have been described, I would propose for it the name of *Siredon hyemalis*.

The Secretary read a communication from Mr. Robert Kennicott, of Chicago, informing the society that he had several living specimens of the Great-tailed Fox-Squirrel, (*Sciurus magnicaudatus*, Harlan,) which he held at the disposal of the Society or its members.

Mr. Kennicott also announced the organization of the Chicago Academy of Natural Sciences. President, Prof. J. V. Z. Blaney.

Dr. T. M. Brewer announced the organization of the California Society of Natural History, at Stockton. President, R. K. Reid; and presented its circular, which was referred to the Council.

Messrs. James R. Gatliff, of Buenos Ayres, and Russell Loring, of Valparaiso, were elected Corresponding members.

Messrs. Edward S. Rand, Jr., and John P. Robinson, were elected Resident members.

March 4, 1857.

Dr. C. T. Jackson, Vice-President, in the Chair.

Mr. Amos Binney presented, in the name of his brother, a Monograph on the group of American Heliçes represented by *H. fuliginosa.* Referred to the Publishing Committee.

Mr. Amos Binney also presented, in the name of his brother, the following paper:

DESCRIPTIONS OF TWO SUPPOSED NEW SPECIES OF AMERICAN LAND SHELLS, BY WM. G. BINNEY.

1. SUCCINEA LINEATA.

Testa oblongo-ovata, solidior, albida aut cinerea; spira elevata, acuta; anfractus 3 convexi, lineis parallelis inter rugas incrementales volventibus ornati; sutura impressa; apertura orbiculata-ovata, oviformis, partem testæ dimidiam æquans; columella plicata, callo albo induta.

DESCRIPTION.

Animal not observed.

Shell oblong-ovate, with three very convex whorls; spire elevated, acute; surface marked with irregular wrinkles of growth, between which are coarse parallel revolving lines, somewhat removed from each other. Aperture large, about as long as one half of the whole length of the shell, egg-shaped; columella folded; a deposition of callus on the parietal wall of the aperture.

Greatest diameter, 6; alt. 12 millimetres.

Geographical Distribution. Collected in considerable quantity by Dr. F. V. Hayden, on high hills near Fort Union.

Remarks. The specimens collected being dead and eroded, it is impossible to say what is the color of the shell when fresh. It is probably ashy white, resembling the true S. *campestris* of the Southern States. The revolving lines which distinguish it at once from every other described American species, are more apparent on the middle of the body whorl. These are quite coarse, and placed at irregular intervals;—on some specimens scarcely discernible. The aperture is unlike that of any other of our species; being correctly egg-shaped,—it is nearest in form to that of *S. campestris*, but is less expanded. The parietal wall of the aperture is unusually horizontal.

In general aspect it resembles somewhat *S. vermeta*, but is distinguished from that shell by its more oval shape, and the greater convexity of the whorls. It is the heaviest American species.

HELIX INTERCISA.

Testa solidissima, luteo-cinerea, apice rufâ, globoso-conica; spira brevis; sutura impressa; anfractus quinque, convexiusculi, lineis parallelis volventibus, valdè demissis, strias incrementales distinctas intercidentibus notati; anfr. ultimus globosus, supra peripheriam fasciâ unicâ, rufâ obscurissimâ ornatus; apertura maximè obliqua, formâ equi calcei, rotundata; labrum albo-cinereum, incrassatum, subtus reflexiusculum, subunidentatum, umbilicum totum tegens; marginibus approximatis, callo interjunctis.

SYNONYMS AND REFERENCES.

Helix Nickliniana. Lea. var. Binney Terrestrial Mollusks, II. p. 120, III. pl. VI. f. 1. *Icon in medio posita.*

DESCRIPTION.

Animal not observed.

Shell globose-conic, with five slightly-rounded whorls; spire little elevated; suture distinct; upon the body whorl a dark revolving band, hardly discernible; aperture very oblique, shape of a horseshoe; peristome thickened, heavy, dirty white, slightly reflected at the umbilicus, which it entirely conceals near its junction with the columella, furnished with a tooth-like process, the extremities connected by a heavy ash-colored callus, which is spread more lightly over the whole parietal wall; epidermis grayish yellow, apex rufous. The striæ of growth are very numerous and distinct, crossed by numerous, regular, revolving lines, so deeply impressed as to entirely separate them into small sections; thus the whole surface of the shell is divided into minute, raised parallelograms, separated by the deep longitudinal and horizontal furrows.

Greatest diameter, 22; less, 19; alt. 15 millimetres.

Geographical Distribution. Found in Oregon Territory.

Remarks. This shell I found in the collection of my father, Dr. Amos Binney. It was labelled H. Nickliniana, Lea. var., and as such is figured in the terrestrial mollusks. I cannot believe, however, that any species can admit of varieties differing so much as this does from *Nickliniana.* To Mr. Lea's figure and description it bears no resemblance whatever, either in shape or sculpturing.

It may readily be distinguished among the Helices of the Pacific coast, by its grayish, heavy shell, its thickened lip, and above all, by the peculiar markings of the surface.

Dr. A. A. Hayes exhibited a specimen of rock guano, from a lately-discovered deposit on an island not far distant from the main land in the Atlantic Ocean.

Dr. Hayes called attention to this substance chiefly, as an illustration offered of the solution and subsequent deposition of phosphate of lime from decomposing bones. Referring to a paper which he lately read here, in explanation of the chemical action, he showed that the solution of bibasic phosphate, eliminated from tribasic phosphate of lime, had penetrated into and cemented not only the phosphate of comminuted bones, but had united a mass of bivalve shells; in some cases actually removing the excess of carbonate of lime, leaving a partly bibasic phosphate behind.

He had examined a number of cases of this transference, and found sand and gravel aggregated by the phosphate which had been removed from bone-phosphate, through the agency of carbonic and crenic acids, formed in the humid decomposition of the animal matter present in the bird droppings,—so as to form a compound rock.

The facts already observed prove that mineral masses containing phosphate of lime, may be thus formed from animal phosphate of lime, and present all the characters which we recognize in the phosphate of lime engaged in the oldest slates. Additional interest has been given to this subject, by communications from Prof.

Booth of Philadelphia, and Dr. S. L. Snowden Piggott of Baltimore, who have analyzed specimens, in which the phosphoric acid had combined with both oxide of iron and alumina.

Dr. Hayes stated that the economical value of this substance is great, as a mineral fertilizer, it differing in this respect from the common guano which derives its importance in agriculture from its organic elements.

Dr. Hayes also gave an account of the formation of Monk's Island, with the probable changes that its surface had undergone.

Dr. Bryant read the following communication on a supposed new species of Turkey recently described by Mr. Gould.

In the January number of the Annals of Natural History, Mr. Gould describes a new species of turkey, from the mountains of Mexico. In the same article, he states that the domestic turkey did not originate from the common wild turkey, *Meleagris gallopavo ;* grounding this assertion principally on two facts, namely, the difference in the structure of the two birds, and their not readily breeding together. How far climate and other influences may have affected the domestic variety in England, I do not know, but with us neither of these statements is correct. If it were not for the difference of plumage it would be impossible in many cases to distinguish the two birds ; and even with this aid it is sometimes very difficult to decide with certainty when the specimen is a female. I can give no reason why the wild turkey should be unwilling to breed with the domestic variety in England, except that they are probably kept in confinement, to which even the domestic bird with us unwillingly submits. At any rate, this is not the case in the United States. The wild turkey breeds here with the tame variety quite as readily as could be expected ; whenever wild turkeys are numerous, it is an ordinary occurrence for the tame hen to prefer the wild gobbler to the domestic ones. I have had in my own possession wild hens that bred with a tame gobbler, a fact much stranger than that of the wild gobbler breeding with the tame hen. But the most satisfactory proof of their specific identity is that the offspring of mixed blood is known to be both hardier and more prolific than the more domestic variety,—a fact which cannot be reconciled with the theory of specific difference.

Dr. C. T. Jackson exhibited specimens of Aluminium and several of its most important alloys with other metals, and read a condensed *resumé* of the various communications on the subject contained in the *Comptes Rendus* of the French Academy of Sciences.

The three most interesting alloys of aluminium are those with silver, copper, and zinc.

When five per cent. of aluminium is added to pure silver it increases the hardness of the metal and improves its quality for plate, since this alloy is capable of receiving a high polish, and is less liable to corrosion than the usual alloy of silver with copper.

When ten per cent. of aluminium is fused with pure silver, a much harder alloy results, which is still quite malleable and takes a resplendent polish. This alloy also resists the action of sulphide of hydrogen which at once blackens pure silver and its usual copper alloy. It is also well adapted, from its superior hardness and stiffness, for the manufacture of forks and knives, and plate made of it is less liable to be scratched and defaced by use.

The effects of aluminium on copper are quite remarkable, and a very small proportion of aluminium is found to change the color of copper to that of gold, while the alloy is much softer and more ductile than pure copper. The whitening power of aluminium when alloyed with copper, is much greater than that possessed by zinc, and the alloys with aluminium are all malleable both when hot and cold.

A specimen of an alloy of one hundred parts by weight of copper and five parts by weight of aluminium was of the color of British gold coin, and was readily rolled out into sheets thin as letter paper, it working as easily as fine silver.

It is stated in a communication published in the *Comptes Rendus*, that this alloy is not affected by sulphide of ammonium; but this Dr. Jackson finds to be an error; for the moment a drop of the sulphide is let fall on this alloy a deep red spot is produced, and this quickly changes to a perfect black stain.

When larger proportions than 10 per cent. of aluminium are melted with copper, the alloys become hard, and ultimately, by increasing the proportion of aluminium, the alloy is made brittle.

The alloy of 10 per cent. of aluminium and 90 of copper is malleable, ductile, and has a golden color, but it is not capable of withstanding the action of acids or of sulphide of ammonium.

An alloy of 10 parts of aluminium and 90 of zinc is malleable, and takes a very brilliant polish with the lustre and color of highly-polished steel.

Dr. Jackson remarked that we know, as yet, but little of the uses of aluminium and of its alloys, and that the introduction of the new metal, at moderate cost, into the workshops of our mechanics and artisans, is likely to open a new field for enterprise in metallurgy.

Numerous experiments are required, and larger quantities of the alloys should be made, so as to test their properties and value in a practical way, and the sacrifice of some hundreds of pounds of aluminium could well be afforded in view of the useful results that would be obtained by experiments with its numerous alloys.

Were aluminium works erected in this country, it is probable that the first few years' production from them would be consumed in experiments by our practical artisans, or be sold for specimens to schools and colleges, or to private gentlemen. By manufacturing this metal on a large scale, the cost of its production can undoubtedly be made quite moderate. It is stated that it can now be made in Paris at a cost of nine dollars a pound. This is a considerable reduction from the former prices, for the specimens now before the Society cost one hundred and sixty dollars per pound.

The following paper was read at the meeting of October 1st, 1856, by Dr. David Weinland.

A PSYCHOLOGICAL VIEW OF THE MOTIONS OF ANIMALS, BY DR. DAVID WEINLAND.

There is hardly any part of the science of natural history which has been so little studied as the psychology of animals.

The ability to descend to the level of the mental constitution (ψυχή) of animals, to understand their feelings, thoughts, and desires, seems to have diminished in proportion to the progress of civilization; or, at least, in proportion as cultivated minds of civilized nations have secluded themselves from free nature in cities and students' closets. Still, we think the psychology of animals is by no means the least interesting subject of human thought. It is acknowledged that man is the crowning work of creation, and this has been proved and illustrated often enough by comparison of the structure of his *body* with that of other vertebrates; by showing that there exists an ideal series of development from the horizontally moving fish to the erect man. Now, may not this truth be as clearly, or more clearly traced, in following out the degrees of development of the psychical element, from the low, feeding, and propagating fish, to man as made in the image of God—that is, thinking in the same categories with him. Undoubtedly such a series of psychical development exists, but its steps have never been marked out, though many materials have been collected in regard to the subject. In the effort to attain a method of studying this part of the science of nature, the following considerations have occurred to me.

We know the condition of a man's soul, or of its representative in an animal, only by external manifestations. Thus, in order to have a standard of comparison for the different degrees of psychical development of animals, we may start from an analysis of what is called the characteristic of animals, in opposition to plants, namely, voluntary motion.

In considering closely the motions of a dog, we recognize in them two entirely different kinds. One, and that by far the most common, serves only and immediately the animal itself as the means by which to obtain whatever it desires and enjoys, (food, for instance,) and to shun whatever it dislikes. This kind of motions we may call subjective; that is, selfish motions; because they serve only the subject itself. But again, we see another kind of motions. Thus, the dog plays with other dogs, with other animals, and with man. It makes many movements with the head, eyes, ears, and tail, which serve no other purpose than to show to other animals, or to man, the present condition of its inner nature; to show them what it feels, what it thinks, and what it seeks. These motions are not subjective; they are made in relation to the inner natures of others, and therefore may be properly called sympathetic motions. Which of these two kinds of motions is the higher? Undoubtedly the latter. All animals have the first; the second are not common to all. Does an hermaphrodite worm, for instance, know that another being lives and feels? If not, it has no sympathetic motions.

Having considered how to view the motions of an animal, let us return to our problem, namely, to find a standard for the comparison of the different degrees in which, in the series of animals, the mental constitution is developed; and to show that the greater or less degree of development of the sympathetic motions in an animal, and of its organs to perform them, exhibits at the same time, the degree of its psychical development. That such is the case is because no degree of this development, beyond eating and drinking, can possibly exist, except in society with, and in regard to, fellow-beings. All those animals of higher mental organization, are social animals, or, at least, are connected by certain psychical relations, with other animals. Thus, among insects, the hymenoptera rank psychically very high. The greater part of them live in communities; that is to say, each individual lives and cares not only for itself, but also for its fellow-citizens. It knows that it belongs to a certain community, has certain duties there, &c.; and whenever we admire the sagacity of a bee or an ant, it is its working and thinking in relation to other beings that we admire. Moreover, only animals which are social by their nature, can be domesticated; that is, made friendly to man. Man himself becomes human only when in society with fellow-men. Children lost in forests when young, growing up there, resemble beasts. The higher the civilization of men, the closer and more complicated are the relations between them. Now if this be so; if the social life is the only field where, in men or in animals, a higher growth of the spirit is possible; and if with man the social life is far more developed than with any other member of the animal kingdom, we may draw our final conclusion, namely, that we can determine the psychical rank of any animal, from a knowledge of the degree of its ability to manifest itself to its fellow-beings, or, what is the same thing, of its organs for sympathetic motions.

An example may illustrate the truth more fully. Let us look at these organs in a fish, a lizard, and in man. The fish rests horizontally in the water; the head, neck, and trunk form one bulky mass; the dorsal column itself is the locomotatory organ; the four limbs, fins, are used for balancing the body; the ears are rudimentary; the eyes stiff, cold, without eyelids, and thus without expression, and from their position and slight mobility, of a very narrow horizon; there is no voice with which to call a companion. What means has this animal, by which to show to another being what it feels? Now as we see in fishes hardly any organs for sympathetic motions, or senses for sympathetic perceptions, we think we are justified in saying, that there must be also in them very little sympathetic feeling or thinking. Let us rise some steps further in the series of vertebrates, to the lizard,—that quick, lively, sagacious animal. While in fishes, the greater part of the body, and all four limbs, are used in locomotion, we find here four developed legs, the body nearly exempt from the function of locomotion, and thus capable of further differentiation; and the head, neck, trunk, and tail are distinct. With the distinct neck, and consequent ability to turn the head, are immediately connected, not only a larger horizon, but also many motions which manifest whatever moves or excites the animal. Together with the larger horizon, the eyes are very well developed, and the play of the eyelids (which are wanting in fishes and even in snakes) gives expression; so much, indeed, that I have been able to tell from a glance at the eyes alone of some lizards which I once kept alive for a long time, and which were tame, whether they felt well or not. The ears, also, the organs of the real social sense, are well developed in lizards; and though the animals themselves have no voice, still they seem to like music. The tongue, which rarely exists in fishes, and when present, is a mere organ for swallowing food, has here not only become an organ of touch, but a means of expressing sympathy, for I have seen them licking each other in play. In turtles, which are higher than lizards, we find already a voice; and even the fore feet are used as organs for sympathetic motions. Prof. J. Wyman, in observing two of our common pond turtles at the breeding season, saw the male gently stroke the head of the female for some minutes.

Rising a step higher, we find in birds the voice developed to a high degree, but yet confined to a narrow range of modulated sounds. In mammalia, the organs for sympathetic motions are more developed than in birds, except, perhaps, those connected with the voice, although even this point remains to be settled. In mammalia, we find the first hints of what shall come in man. The first idea of an arm, we find in the bear,—it embraces; and this idea of an arm is connected with the ability to stand erect upon the flat of the foot. In mammalia, too, we first find the idea of a hand, hinted at already in the bear, but carried out more fully in the monkey. The features of the face we find remarkable in the dog, and still more so in the monkey. We could find a like series in the organs of reproduction, which from this merely natural view, must be considered organs of sympathy. It is interesting to consider hermaphroditism from this standpoint: it will be evident that it cannot occur in any animal of high psychical endowments. We will in addition, merely call attention to the fact that fishes have no organs of copulation, or very rudimentary ones, that in many species the male does not know the mother of the eggs which it fecundates, while on the other hand, some reptiles, many birds, and most mammalia live in pairs, or, at least, their males and females go together throughout life, helping and taking care of each other. All the family life, the only fountain of moral and intellectual beauty, rests in the distinction and voluntary union of the sexes, and this distinction and union only make possible the highest unity of two beings which exists.

We will dwell no longer on these steps, but consider man himself. If our principle of coincidence of the degree of psychical development, with the degree of the development of the organs of sympathetic motions, be true, we must find these latter in their highest condition in man. And so it is. Man, standing upright on his feet, has all his body free for sympathetic motions; and the organs by which they are performed are here in perfection. What we saw in the fish as a balancing instrument, in the lizard as a mere locomotatory organ, is in man an arm which embraces the child, the friend. With the hand, of which we saw no sign in the fish, which is a foot and a locomotatory organ in the lizard, and the same in all mammalia, even monkeys, man grasps the hand of his fellow-man, and shows him what he feels, and with it, he emphasizes his language. Here are the features of the face, expressing by the most diversified play of motions, the varying conditions of the spirit, telling love and hate, joy and pain. Here are the eyes, the mirror of the soul. All these organs we find in a lower condition, in the higher mammalia, especially in monkeys. But there is one kind of sympathetic motions, which man alone enjoys,—those employed in language,—the power to express fully his ideas, his emotions to other men, by modulated sounds, produced by the complicated motion of the larynx, the tongue, the lips, &c. Many animals, it is true, have a voice, but none of them can express a series of thoughts or feelings. The cry of an animal is always the last concluding word of a sentence. It may be the result of a series of thoughts, but this series itself is never expressed. Men have also this kind of sounds—the sounds of laughing, crying, and many others: thus the war-cry of the Indian is no language; it is an animal sound, like the cry of a wolf, when it calls others to help. But all men have, beyond these animal sounds, the free, flexible language. They not only show to each other, some of the points of their thinking, and feeling, and willing; they show, or can show, all the process which goes on within; that is, their inner natures can, by means of language, communicate with each other freely. We recognize in language the highest kind of sympathetic motions.

Conclusions. Firstly, when trying to study the psychical endowments of animals, we have to start from the study of their motions, as the only manifestation of their mental constitutions (ψυχή) which we can perceive. Secondly, There are to be distinguished in animals two kinds of voluntary motion,—the subjective and the sympathetic. The latter furnish the principal data for the study of the psychical rank; for every higher endowment flows from the sympathy of one feeling and thinking being with another. Sympathy is only a flowing forth of love, and love is the fountain of all moral and intellectual beauty in man.

Mr. C. J. Sprague stated that he had been informed by a friend, who had recently visited Singapore, of a curious fact, viz: that many of the bodies of the natives who are killed by the tigers, are left unconsumed, and that, upon an average, one body daily is found with the neck dislocated.

Dr. Charles Pickering observed that undoubtedly many bodies are found, but probably a much larger number are carried off by the tigers into the thick jungles, and consumed at their leisure.

Dr. A. A. Gould presented, in the name of J. P. Couthoy, Esq., specimens of corals taken in seventy feet of water from the well-known wreck near the Island of Magdalena. The vessel has been under water about forty years, and consequently these corals are not above that age. He supposed them to be the largest specimens found upon the wreck, and suggested that they might aid in determining the rate of coral growths.

Capt. Atwood exhibited a bottle of oil, a specimen of a substance which is occasionally thrown up on the shore of Provincetown, and which is supposed to come from the remains of the brig Hollander, which was lost some twenty years since in that neighborhood, and which was probably laden with linseed oil.

The specimen was referred to Dr. Hayes for examination.

Dr. Bryant exhibited several of the birds presented last year by the Victoria Society, at Melbourne, and a portion of Mr. Samuels's birds from California.

Dr. Gould presented, according to the directions of the late Dr. Binney, the third volume of the Terrestrial Mollusks and Shells of the United States, described and illustrated by Dr. Binney, and edited by Dr. Gould.

March 18, 1857.

Dr. C. T. Jackson, Vice-President, in the Chair.

Dr. A. A. Hayes reported that the specimen of linseed oil which was referred to him at the last meeting, had been tested. It was found to be slightly acid, in consequence of well-known reactions taking place between a minute quantity of fermentable matter expressed from the seed and the oil, resulting in the production of an oily acid. The oil is not, however, in the state which it assumes on exposure to air, but closely resembles fresh-drawn oil, in all respects but odor and slight acidity. When boiled as usual, it becomes capable of forming the elastic film after exposure to air, and its useful properties have not been lost or impaired after its long submersion in sea water.

In answer to a question from Mr. Mills, as to the composition of pudding-stone, Dr. Hayes replied that he had made a somewhat extended examination of the cementing material of the Roxbury conglomerate, and found that it is silicate of lime generally. There are cases where finely-divided slaty argillite forms, with silicate of lime, quite large quantities of cement, uniting pebbles of considerable size; but these exhibitions are only another feature, referable to the action of the same silicious compound. The rock contains chlorine, and as chloride of calcium is readily decomposed by hydrous silica, it might be assumed that the silicate of lime was thus formed. But the conglomerate is very frequently traversed by bold dykes of trap, which contain a large amount of sulphuret of iron, and the fissures in the conglomerate, being often filled with sublimed quartz, the more probable supposition is, that the silicate of lime was formed by the transportation of silica in the heated vapor of water. Such silica would combine with the lime and alumina of the comminuted slates, and form the cement at the points where we now find it.

In reply to a question, Dr. Hayes expressed as his conclusions, respecting the silicification and consequent preservation of organisms,—that the process proceeded, step by step, with the change of the organism into gaseous or aqueous matter. The mollusca may be considered as simply *organized water*, for one hundred parts by weight, often contain ninety-seven parts of water, volatile at 150° F. The cell walls of albumino-gelatinous matter are permeable, and the infiltration of aqueous solutions of silicate of lime, would displace the water, gradually depositing silica in a hydrous state, while the lime passed out with the water. As consolidation is hastened by the decomposition of the animal matter, the cell walls become changed, and the carbon or humus, in excess over that which can become gaseous or aqueous, remains; retaining as a mere skeleton the forms of the walls. These silicified forms are always porous, and the flints contain the carbon of the organic matter, unevenly distributed. As a beautiful illustration of silicification, he referred to the specimens of trees from California, frequently found in the explorations for gold; many of the specimens presenting the sap vessels entire in all their delicate organization and nearly natural color, while near by, on the same piece, may be seen black portions, in which the organized forms are lost, and the color is deep black. This striking diversity is due to the fact that the wood at some points had passed into the last stage of humus,—carbon and water,—before silicification took place, and hence the specimens present us with both silicified wood and silicified charcoal. He observed the same changes, though less obvious, while examining the highly interesting locality on the Island of Antigua, and at a future meeting will exhibit illustrative specimens.

Dr. C. T. Jackson remarked that he had examined the materials which enter into the composition and cementation of sandstones and conglomerates, and had found the cements to be different in different cases. In some, carbonate of lime forms the principal cement, in others, oxide of iron composed a large proportion of the cementing matters, and in others, finer particles of the same rocks that composed the conglomerate had formed a paste, which had been hardened by the agency of heat and by the production of silicate of lime derived, undoubtedly, from the decomposition of chloride of calcium. He stated that when pebbles are moistened with a solution of chloride of calcium, and then placed in contact and heated, the chlorine of the chloride of calcium escapes, and the oxide of calcium or lime unites with the silex and forms silicate of lime. There could be no doubt that the chloride of calcium was derived from sea-water. Sometimes in the vicinity of trap dykes, as at Purgatory, near Newport, Rhode Island, specular iron ore, evidently derived from sublimation of oxide of iron from the chloride of iron, had invested the pebbles with a thin crystalline film, which served as a cement. He stated somė experimental results of M. Gay Lussac, on sublimation of specular iron ore, from chloride of iron, and his observations on the production of this ore in the crater of Mt. Vesuvius; experiments and observations which Dr. Jackson had repeated and verified.

The cementing materials of some sandstones are so largely calcareous, that on removal of the carbonate of lime by the action of acids, the stone crumbles into sand. In such sandstones the carbonate of lime was probably infiltrated as a bi-carbonate, and on losing one equivalent of carbonic acid, the carbonate of lime would solidify in crystalline form and firmly unite the sand, making it into a solid rock.

If a sandstone, cemented by carbonate of lime, is exposed to a high temperature, silicate of lime would be produced by combination of silex with the lime, and carbonic acid gas would be disengaged.

Dr. Henry Bryant called the attention of the Society to some of the birds presented by the Royal Victoria Society of Melbourne, Australia.

Among them was a pigeon resembling more nearly the *Phaps elegans* of Gould than any other species he had found described; but differing sufficiently from Gould's description to lead him to believe that it might prove to be a new species. The difference consists in the present specimen having a whitish line beneath the eye, not found in the *P. elegans,* and in the back being a greenish brown, with slight metallic reflections, instead of "deep, rich, lustrous chestnut," as described by Gould.

One of the birds on the table did not belong to the Society, but was placed there merely for exhibition. It was one of three belonging to a gentleman of this city, which had been mounted by the taxidermist. It was the Magnificent Trogon, (*Calurus resplendens*, Gould,) one of the most brilliant birds known, and though it would not, perhaps, bear a minute comparison with some of the humming-birds, yet, from its size and graceful plumage, it must be unsurpassed as seen in its native wood.

Dr. Bryant also remarked, that, in consequence of the unusual mildness of the weather in February, the blue-birds and other of the earlier migratory birds, made their appearance this year by the 15th, nearly a month earlier than they ordinarily arrive from the South; and that, although the weather had subsequently been quite severe, (the thermometer falling to near zero,) the blue-birds had remained with us, and were singing and apparently enjoying themselves at this low temperature.

In reply to a question from Mr. Wetherell, as to the production of sugar from the Chinese Sugar-cane raised in this neighborhood, Dr. Jackson stated that crystallized sugar could not be profitably made, but that a syrup suitable for food or distillation could be obtained. The amount of crystallizable sugar in the plant increases the farther south the plant is raised. Dr. Jackson has obtained a certain quantity of crystallized sugar in the cane grown at Watertown, Mass.

Dr. Durkee exhibited the Algæ brought from California, by Mr. Samuels, and Dr. Bryant exhibited some of the birds which had been recently mounted.

The Corresponding Secretary announced the receipt of the following letters, viz: —

From the Linnæan Society, London, Nov. 25, 1856, Entomological Society, London, Dec. 3, 1856, Geological Society, London, Dec. 4, 1856, American Philosophical Society, March 13, 1857, and the Société de Géographie, Paris, Feb. 7, 1857, acknowledging the receipt of the publications of the Society; Naturforschende Gesellschaft, in Emden, Oct. 2, 1856, and the Académie des Sciences, Paris, Feb. 14, 1857, presenting their publications.

Mr. A. M. Gay was elected a Resident Member.

DONATIONS TO THE MUSEUM.

January 7, 1857. Specimens of impressions in the Connecticut Valley Sandstone, possibly made by tadpoles, by Prof. Edw. Hitchcock. (See printed Proceedings, Vol. VI. p. 111, for an account of these impressions.) *Emys marmorata*, *Crotalus lucifer*, and *Rana longipes*, from California, by E. Samuels. *Regina Kirtlandii*, from Illinois, by Robert Kennicott.

January 21. Cranium of a Digger Indian, from California, by E. Samuels. A Bulbous Root, and a specimen of Gum from Africa, by Rev. Louis B. Schwarz, (For an analysis of this gum and an account of the plant, see printed Proceedings, Vol. VI. p. 129.) A white-throated Sparrow, (*Fringilla Pennsylvanica*, Aud.) a Rusty Blackbird, (*Icterus pecoris*, Aud.) and a Yellow-rumped Warbler, (*Sylvia coronata*, Aud.) together with a Black Squirrel, (*Sciurus niger*, Linn.) all from Lake Superior; by Dr. S. Kneeland, Jr.

February 4. Specimens of a new minute species of Snail, *Helix asteriscus*, Morse, from Bethel, Maine; by E. S. Morse. A suite of *Helix thyroidus*, Say, from various localities; by W. G. Binney. Specimens of Red Gum Wood and the Common Building-Stone of Australia, by O. H. Holden.

February 18. Four crania of birds; a fragment of the jaw-bone of an alligator, illustrating the development of the teeth; an egg-shell with a peculiar protuberance; and some fossil shells from Georgia; by Dr. H. Bryant. A specimen of Silicified Wood from the Colorado Desert, California; by W. P. Blake.

March 4. Corals, taken in seventy feet of water from the Spanish wrecked vessel off the Island of Magdalena; by J. P. Couthoy. Two specimens of Downy Woodpecker, (*Picus pubescens*, Linn,) from Milton; by E. Samuels. Minerals from California and a neuropterous insect, *Corydalis cornutus*, from Boston; by S. Adams.

March 18. The Saw of a Sawfish taken in the Persian Gulf and a Fossil, *Mycraster cor-anguinum*, Agass.; by Rev. J. P. Robinson. A Glossy Finch, (*Amadina nitens*); Beautiful Weaver-Bird, (*Hyphantornis personata*;) and an undetermined species of Hyphantornis; by Dr. F. J. Bumstead.

BOOKS RECEIVED DURING THE QUARTER ENDING MARCH 31, 1857.

Terrestrial Air-Breathing Mollusks of the United States and adjacent Territories of North America, described and illustrated by Amos Binney. Edited by Augustus A. Gould, M. D. 4to. Vol. III. Plates. Boston, 1857. *From the Heirs of Amos Binney.*

Descriptions of Terrestrial Shells of North America. 12mo. Pamph. By Thomas Say. Philadelphia. 1856. *From W. G. Binney.*

Annual Report of the Geological Survey of the State of Wisconsin. By J. A. Percival. 8vo. Pamph. Madison, 1856. *From J. A. Lapham.*

On the Avoidance of Cyclones, with Notices of a Typhoon at the Bonin Islands. By J. Rodgers, U. S. N., and A. Schönborn. 8vo. Pamph. New Haven, 1857. *From W. C. Redfield.*

First and Second Reports on the Noxious, Beneficial, and other Insects of the State of New York. By Asa Fitch, M. D. 8vo. Albany, 1856. *From the Author.*

Notes on American Species of Cyclas. By Temple Prime, L. L. B. Part I. 8vo. Pamph. The Hague, 1857. *From the Author.*

Prodromus animalium evertebratorum quae in Expeditione ad Oceanum Pacificum Septentrionalem observavit et descripsit W. Stimpson. 8vo. Part I. pp. 1–18. Philadelphia, 1857. *From the Author.*

Report of the Commissioner of Patents for 1855. Agriculture. 8vo. Washington, 1856. *From the Hon. Henry Wilson.*

Memoir of James Brown. By G. S. Hillard. 8vo. Boston, 1856. *From Messrs. Little, Brown & Co.*

Nachrichten von der Georg-Augusts-Universität und der Königl. Gesellschaft der Wissenschaften zu Göttingen, 1855. 12mo. Pamph. *From the Society.*

United States Astronomical Expedition in 1849–52. Vol. VI. Under direction of Lieut. J. M. Gilliss. 4to. Washington, 1856. *From Lieut. J. M. Gilliss.*

Narrative of the Expedition of an American Squadron to the Chinese Sea and Japan, in 1852–4, under Commander M. C. Perry, U. S. N. 4to. Washington, 1856. Vols. I. III.

Report of Commissioner of Patents for 1855. Arts & Manufactures. Vols I. II. 8vo. Washington, 1856. *From the Hon. Chas. Sumner.*

Magnetical and Meteorological Observations at Lake Athabasca and Fort Simpson. By Capt. J. H. Lefroy, and at Fort Confidence in Great Bear Lake, by Sir John Richardson. 8vo. London, 1855.

Ichthyology. Article in Encyclopædia Britannica. 4to. Pamph. London, 1857. *From Sir John Richardson.*

Quadrature of the Circle, &c. By A. Young. 8vo. Pamph. Burlington, Vt., 1853.

Theory and Laws of Solar Attraction. By A. Young. 8vo. Pamph. St. Albans, Vt., 1856. *From G. F. Houghton.*

Rendiconto della Società Reale Borbonica. Anno, 1855. 2 Nos. Naples.

Memoria sullo Incendio Vesuviano del Mese di Maggio, 1855, fatta per incarico della R. Accad. delle Scienze dai Socii, G. Guarini, L. Palmieri ed A. Scacchi. 4to. Pamph. Naples, 1855. *From the Accademia delle Scienze.*

Canada at the Universal Exhibition. 8vo. Toronto, 1856.

Tables of the Trade and Navigation of the Province of Canada, for 1855. 8vo. Toronto.

Annual Reports for 1854 and 1855 of the Normal, Model, Grammar, and Common Schools in Upper Canada. 8vo. Pamph. Toronto.

Reports of the Superintendent of Education for Lower Canada. 8vo. Pamph. Toronto, 1850, 1851, 1855.

An Act to regulate the Militia of the Province. 8vo. Pamph. Quebec, 1855.

Acte des Municipalités et des Chemins de 1855. 8vo. Quebec.

Annual Reports (1830–1836) of the Natural History Society of Montreal. 18mo. Pamph. Montreal.

Catalogue de la Collection Envoyée du Canada à l'Exposition Universelle de Paris, 1855. 12mo. Pamph. Paris, 1855. *From L. A. Huguet-Latour.*

New York Journal of Medicine. Vol. II. Nos. 1, 2. 8vo. New York.

Silliman's American Journal of Science and Arts, Nos. 67, 68.

Schriften der in St. Petersburg Gestifteten Russisch Kaiserlichen Gesellschaft für die Gesammte Mineralogie, I. 8vo. St. Petersburg, 1842.

Notices of the Meetings of Members of the Royal Institution of Great Britain. Part VI. 8vo. July, 1855–6. London, 1856.

Also, List of Members, &c. Pamph. London.

Kongl. Vetenskaps-Akademiens Handlingen, fur 1853, 54, 55. 8vo. Stockholm.

Proceedings of the American Philosophical Society. Vol. VI. No. 56. July–December, 1856. 8vo. Pamph. Philadelphia.

Memoirs of the American Academy of Arts and Sciences. New Series. Vol. VI. Part. I. 4to. Cambridge, 1857.

Proceedings of the Academy of Natural Sciences, pp. 1–16, and 87–94. 8vo. Pamph. Philadelphia, 1857.

Bulletin de la Société de Géographie. Tome XII. 8vo. Paris, 1857.

Canada Naturalist and Geologist. Vol. II. No. 1. Montreal, 1857.

Transactions of the Linnæan Society of London. Vol. XXII. Part. I. 4to. London, 1856.

Journal of the Proceedings of the Linnæan Society. Botany. Vol. I. Nos. 1–3. Zoölogy. Vol. I. Parts 1–3. 8vo. London, 1856.

List of the Members of the Linnæan Society of London. 8vo. Pamph. 1856. *Received in Exchange.*

Annals and Magazine of Natural History. Nos. 108, 109, 110, for Dec. 1856, and January and February, 1857. 8vo. London. *From the Courtis Fund.*

Encyclopædia Metropolitana. Vol. XII. 4to. London, 1856. Also. Vol. I. Part 4, containing Dissertation 6th, Mathematical and Physical Science. 4to. Pamph. London, 1856. *Deposited by the Republican Institution.*

April 1, 1857.

Dr. D. H. Storer, Vice-President, in the Chair.

Dr. A. A. Gould offered the following preamble and resolutions relative to the decease of Prof. J. W. Bailey, and they were unanimously adopted :—

In addition to those immediate and corresponding members who have been recently removed by death,—men of original research and large contributors to the extension of the boundaries of science,—men equally notable for their blameless lives and scientific attainments,—Forbes, Johnston, Redfield, Thompson, Harris, Warren,—we have now to associate the name of Bailey, for a long time one of the professors at West Point. None who have had the good fortune to know him can fail to appreciate his truly philosophical spirit, his zeal, his accuracy, and his extreme modesty.

With his early life I am unacquainted, and so far as I know, the first paper of any extent which he communicated, was one which he read to the Association of Geologists and Naturalists at their meeting in Boston in 1843, entitled "Sketch of the Infusoria of the family Bacillaria, with some account of the most interesting species which have been found in a recent or fossil condition in the United States." It extended to upwards of fifty pages, was illustrated by six plates and gave him at once a high place among scientific men. Since then he has published numerous papers, mostly in Silliman's Journal, on the microscopic forms of animal and vegetable life, to which, and to the perfection of the microscope as an optical instrument, he chiefly limited his investigations. Prof. Harvey, in the introduction to his work on the Algæ of North America, thus writes: "Well known in his own peculiar branch of science, he has found a relaxation from more wearing thought in exploring the microscopic world, and his various papers on what may be called 'vegetable atoms,' (Diatomaceæ) are widely known and highly appreciated. From him I received the first specimens of United States Algæ which I possessed; and, though residing at a distance from the coast, he has been of essential service in diffusing a taste for this department of botany." I think none will gainsay me when I characterize him as the Ehrenberg of America,—and that in having been selected to preside at the next meeting of the American Association for Science, he had received but a merited honor.

Resolved, That in the death of Prof. Jacob W. Bailey, we, in common with the numerous scientific associations with which he was connected, deplore the loss of a true philosopher, a laborious coadjutor, and a most amiable man.

Resolved, That we tender our sympathies to the deeply-afflicted survivors of his family left orphans by the sudden and heart-rending removal of a mother, and by the premature death of an endeared father.

Captain N. E. Atwood, of Provincetown, having been requested to favor the Society with some remarks upon fishes and their habits, related many interesting facts which had come to his knowledge during a life spent as a New England Fisherman.

He first remarked upon the senses of taste, smell, sight, and touch. It has been said by eminent ichthyologists that taste and smell are very imperfectly developed in fishes; but this is not the fact. Many fish are very particular in the choice of food; others, such, as the mackerel and blue-fish, and mid-water and top-water fish generally, seem to be governed by sight in their selection of food. He had often seen mackerel, when they were abundant around a vessel, take all the bait that was thrown overboard, but at the same time carefully avoid the baited hook. He had also noticed that tobacco thrown overboard was seized by mackerel but immediately rejected, showing as he thought a sense of taste. It is to be presumed, however, that taste must be imperfectly developed in animals which have a tongue more or less cartilaginous, and covered with recurved teeth; being obliged unceasingly to open and close the jaws for the purpose of respiration, they cannot long retain food in the mouth, but are obliged to swallow it without mastication.

The sense of smell seems to be well-developed in some fishes. For instance, the ground swimmers generally have a choice as to their food. Halibut and cod are attracted a great distance with certain kinds of bait. Herring, when fresh and in good condition, will be very readily taken by cod, but when it has become stale from long keeping, it will be rejected. Crustaceans, also, as lobsters and crabs, are attracted by certain bait, which leaves no doubt that they likewise possess some sense of smell. Although the cod seems to swallow almost any thing that comes in his way, even stones, wood, and fragments of nearly every thing thrown overboard, Mr. Atwood had never seen an univalve mollusk in its stomach. The bivalve shell is found, and the bank clam is very common in the stomach, the shells being placed within each other in the most compact manner, when there are several of them in that organ.

In some other ground swimmers, both bivalve and univalve mollusks are found. The haddock, ling, catfish, and one species of flounder are great shell-eaters, and very frequently undescribed species of mollusca are taken in their stomachs.

The cod lives mostly upon live fish. It is very greedy, and even when distended with food, it will bite briskly at the hook. It is frequently taken with a full-grown mackerel partly in its stomach and partly in its mouth, with the tail still projecting. At other times, when the alimentary sack is empty, it appears to have no desire to partake of food. When kept alive in the holds of vessels, no other nourishment is given the cod than the minute animalcules contained in the water. A very curious fact Mr. Atwood stated that he had observed,—the cod often swallows alive the tant or sand-eel and the pipe-fish, both having heads very much elongated anteriorly and pointed. These fish sometimes pierce the stomach of the cod and escape into the abdominal cavity, and there they are found in a perfect state of preservation, adherent to its walls, but changed in color to a dark red, and in substance so hard that they are not readily divided with a knife. They have to be cut away before the cod can be split open. The fish is always in good health apparently, and there are no marks of inflammation about the stomach or abdominal cavity, unless the material of attachment be considered as such.

Fish migrate considerable distances in quest of prey, sometimes totally deserting localities where they have been very abundant. There is a species of crustacean called commonly by fishermen the sea-flea, which infests spots upon the Grand Banks, hundreds of square miles in extent, and which drives before it the cod and other fish. During his last voyage to the Banks, Capt. Atwood tried to fish with clam bait, which, however, came up untouched; he then put on menhaden for bait and lowered to the bottom, but upon raising the hook nothing was found but the skeleton of the fish, the soft parts having been consumed by the sea-flea.

Dr. Chas. Pickering observed, with reference to the sense of smell in fishes, that he had examined the brain of the shark, and that in this, as well as in cartilaginous fishes generally, the development of the olfactory nerve and the olfactory lobe of the brain was very considerable.

The chairman, Dr. D. H. Storer, called attention to the last volume of the work on the Terrestrial Mollusca of the United States, by the late Dr. Binney, edited by Dr. A. A. Gould, a copy of which had been recently presented to the Society. He stated that Dr. Binney was desirous, and left directions for the completion of the work, the charge of which was committed to Dr. Gould. It had taken ten years to complete it; but the duty had been nobly and admirably performed, and it was exceedingly gratifying to him to say that it would prove most creditable to the Society and to the country.

Mr. Amos Binney said that ten years might seem a long period for the completion of the work, but any apparent delay was more than sufficiently accounted for by the time occupied in collecting the materials, which, at the decease of his father, were very widely scattered.

Dr. A. A. Hayes exhibited some fragments of iron and bronze vessels from the volcanic ashes of Pompeii, which had repassed from the state of a wrought metal to that of the original ore.

Dr. J. B. S. Jackson exhibited an Intestinal Worm, (*Ascaris lumbricoïdes*,) which was passed from the rectum of a child, with about an inch of its body inserted through the eye of a common dress-hook. He observed that this example illustrated the singular tendency of this worm to crawl through perforations in the intestine, into the duct of the gall-bladder, or into the appendix cœci.

Dr. A. A. Gould presented, in the name of Lieut. Preble, U. S. Navy, a specimen of *Dipsas plicata*, upon the inner surface of which were a number of beautiful elevated pearly figures, representing the god Boodh, produced during the lifetime of the animal, upon nuclei placed within the shell. The following account of the process, by Dr. Magowan of Ningpo, accompanied it:—

The introduction of the pearl nuclei is an operation of considerable delicacy. The shell is gently opened with a spatula of mother of pearl, and the free portion of the mollusc is carefully separated from one surface of the shell with an iron probe; the foreign bodies are then introduced between the points of a bifurcated bamboo stick, and placed in two parallel rows upon the mantle or fleshy surface of the animal. A sufficient number having been placed on one side, the operation is repeated on the other. Stimulated by the irritating bodies, the suffering animal spasmodically presses against both sides of its testaceous skeleton, keeping the matrices in place. This being done, the animals are deposited one by one in canals, streams, or pools connected therewith, five or six inches apart, at depths of from two to five feet, in lots of from five to fifty thousand. If taken up a few days after the introduction of the moulds, they will be found attached to the shell by a membranous secretion, which at a later period becomes impregnated with calcareous matter; and finally layers of nacre are found deposited around each nucleus, the process being analogous to the formation of calculous concretions in animals of a higher development. A ridge of nacre generally extends from one pearly tumor to another, connecting them all together.

About six times in the course of the season several tubs of night soil are thrown into the reservoir for the nourishment of the animals. Great care is taken to prevent goat manure falling in, as it is highly detrimental to the mollusc, preventing the secretion of good nacre, or killing them, according as the quantity is great or small.

In November the shells are carefully collected by hand.

Dr. Storer presented a specimen of the Trumpet Fish, (*Centriscus scolopax*,) caught at Provincetown, the first known to him to have been taken upon this coast. It is common upon the European coast and in the Mediterranean.

Messrs. James G. Shute, of Woburn, and Henry J. Clarke of Cambridge, were elected Resident Members.

April 15, 1857.

Dr. Chas. T. Jackson, Vice-President, in the Chair.

Dr. A. A. Gould announced a bequest to the Society, by the late Professor Jacob W. Bailey, of West Point, N. Y., a Corresponding Member, dated February 11, 1857, communicated in a letter from his brother William M. Bailey, Esq., of Providence, as follows: —

BEQUEST OF PROF. J. W. BAILEY.

"*First.* A microscopic collection, contained in cases resembling books, together with said cases, and the index volumes thereunto belonging; the whole bearing for titles, 'Microscopic Collections.'

"*Second.* The whole of my collection of Algæ, or Sea-weeds, as contained in a set of portfolios, together with said portfolios.

"*Third.* All my rough material for microscopic research, as contained in small boxes, paper, vials, and larger boxes, containing large masses marked with chalk, Richmond, Petersburg, Georgia, Florida, &c.

"*Fourth.* I request said Society to retain the first and second of the foregoing bequests as a part of their collections, as long as said Society shall exist, making such uses as they please of the rough material in the third bequest."

Also, in a codicil, dated February 24, 1857: "A volume containing rough sketches, &c., of microscopic forms, and marked with title, 'Microscopic Memoranda.'"

Also, "All my other microscopic drawings, sketches, or microscopic memoranda, to be kept or destroyed, in any part, at the option of the Society."

Also, "Such of the following books as are not possessed by the Society, viz: Ehrenberg's Microgeologie, and all my other German Scientific Books; also, all my books, pamphlets, &c., relating to Algæ, Diatomaceæ, Microscopic Botany, and Histology; also, Lindley and Hutton's Fossil Flora, and all my other Botanical Books."

Also, "My 'Scientific Letters,' in packages so marked, with the privilege of destroying such as are of no value to the Society, as autographs, &c."

"I desire that my Executor shall stipulate with the Boston Society of Natural History, to which I have made valuable bequests, that such bequests shall be placed in a case or cases by themselves, and that my sons, who may be at college at Cambridge, may have such access to such case or cases, for the purpose of study or examination, as may be consistent with the rules of said Society."

Dr. Gould, after remarking upon the great value of this bequest to the Society, upon its importance to science in the study of microscopic recent and fossil forms, offered the following resolutions, which were unanimously adopted: —

Resolved, That while acknowledging the receipt of the bequest of the late Prof. Bailey, the Society would express its gratification at having been made the depository of collections containing original and authentic specimens of microscopic forms and Algæ, which must ever remain the ultimate and standard objects of reference, in this country, in the study of those subjects; pledging itself to secure, as far as practicable, their preservation, and to make them as extensively useful as possible.

Resolved, That a Committee be appointed to receive and report upon the bequest, and also to execute the expressed wish of Prof. Bailey, that his "bequests shall be placed in a case or cases by themselves."

Resolved, That the request of W. P. Blake, Esq., be granted, desiring that such papers as may be found relating to a Report on the Infusoria of California, may be given up to him for publication, as originally intended.

Resolved, That the thanks of the Society be presented to W. M. Bailey, Esq., for the prompt and complete manner in which he has executed the will of his brother, so far as concerns this Society.

Dr. A. A. Gould, Prof. John Bacon, and Dr. Silas Durkee were appointed the committee referred to in the second resolution.

The following communication was read from Mr. Charles J. Sprague, on the Botanical Position of the Chinese Sugar Cane:—

The plant was called *Holcus saccharatus* by Linnæus; but when this genus underwent a subdivision by subsequent botanists, this species was placed by some in that of *Andropogon*, by others in that of *Sorghum*. These two genera are closely allied. Some of the best authorities consider the differences so slight as to warrant their union into one. Steudel arranges *Andropogon*, *Sorghum*, and *Trachypogon* all under one head—*Andropogon*. Lindley italicises *Sorghum* in the last edition of his "Vegetable Kingdom," and places it beneath *Trachypogon*, evidently considering them equivalent. Dr. Gray retains *Sorghum* for our only native species (*S. nutans*) in his last edition of the Manual, considering the genus a good one.

It is between *Andropogon* and *Sorghum*, therefore, that we must choose in reference to this particular species.

The differences between them are these—

Andropogon.	*Sorghum.*
Inflorescence spicate.	Inflorescence paniculate.
Spikelets in pairs, only one being fertile.	Spikelets in twos or threes, central one only being fertile.
Glumes herbaceous or membranaceous.	Glumes hard, coriaceous or indurated.
Rachis hairy.	Rachis smooth.

If these differences shall eventually render the genera sufficiently distinct to establish a universally recognized separation, then this plant must be placed under that of *Sorghum.*

The specific name is a matter of some doubt. Both *S. vulgare* and *S. saccharatum* are recorded as distinct species; but there is frequently a query appended to the latter. Some of our best authorities incline to the opinion that these two are identical, the differences between them being due to the long cultivation which the plant has undergone. We know that some of the grasses have sported into numerous varieties; and it is very probable that the Broom Corn, Doura or Guinea Corn, and the Chinese Sugar Cane are all descended from one and the same stock.

If we accept this as a fact, then the plant should be called, SORGHUM VULGARE, Pers., *var. saccharatum,* L.; but as the latter name is so extensively known, and as there is still some doubt as to the identity, it may be as well to continue the name *Sorghum saccharatum.*

The true Sugar Cane, *Saccharum officinarum,* belongs to the same tribe of grasses, differing in the ample inflorescence, which is paniculate, and drooping with downy pedicels and florets.

A letter was read from Robert Kennicott, Esq., of Illinois, accompanying a donation of Mammalia, Birds, and Shells. With reference to the Mammalia, Mr. Kennicott says: —

"The *Arvicola austerus* is a prairie animal, and will interest any one studying mammals; the *A. riparius* is pronounced a true species by Prof. Baird. The *Hesperomys Bairdii* is a new species, which will be described by Dr. Hoy and myself soon. It comes near Audubon's and Bachman's *Mus Michiganiensis,* but it is readily distinguished upon comparing the two. I have sent your Society specimens of this species (*Bairdii*) already, under the name of *Mus Michiganiensis*; it is strictly a prairie animal. Dr. Hoy has found *M. Michiganiensis* near Racine, Wisconsin."

Mr. N. H. Bishop presented the following list of Plants, most commonly met with during a pedestrian tour across the continent of South America, from Rosario, on the Parana, to Valparaiso, Chili:—

Bolax, an umbelliferous plant, above the snow on mountains, collected 10,000 feet above level of sea. *Capsicum*, Red Pepper (aji,) very common in the northern parts of the Republic. *Prosopis Algaroba*, White Algaroba, order Leguminosæ; also Black Algaroba is very common. *Portulaca; Verbena*, several varieties; *Loasa, Tropæolum, Alstræmeria, Chenopodium,. Schizanthus pinnatus, Geranium, Lathyrus pubescens, Argemone Mexicana, Œnothera, Lippia, Acicarpha, Quinchamalium, Salpiglossis;* valleys and base of the Andes. *Maloastrum, Supinus;* deserts at the eastern foot of the Andes. *Medicago sativa*, Alfafa, cultivated for cattle; *M. maculata*, weed refused by cattle, the common weed of clover fields. *Scirpus, Solanum;* Lagoon near San Juan, on the desert. *Tessaria absinthoides;* border of lagoon, San Juan, Argentine Republic, October. *Strombocarpa strombulifera*, Screw plant; Traversia, San Luis to the Andes. *Larrea divaricata;* common; Traversia between Mendoza, and San Juan.

Dr. C. T. Jackson gave an account of the Copper Mine, so called, at Elk Run, Fauquier County, Virginia.

The copper is found in strata of the Triassic Age, in trap-dykes coming through Sandstone, containing a little of the yellow and gray sulphuret, and the carbonate of copper, azurite, chrysocolla, and malachite in thin films. Had quartz or carbonate of lime been the gangue-stone, he should have supposed the locality to have been of some economic value. He advised the company not to work it, and afterwards learned that an old mine, in which a shaft had been sunk 150 feet, situated near that place, had been abandoned many years before as unprofitable.

Dr. Jackson made some further remarks in illustration of the view that the rock, through which the trap-dyke comes, exerts an influence upon its metallic contents, and referred to a previous communication to the Society upon this subject. (See report of the Excursion Meeting, printed Proceedings, Vol. VI. p. 24.)

Prof. H. D. Rogers said that Geology was in a state of great confusion as to the nomenclature of the superposition of strata. He had felt the necessity of introducing some new terms, and he proposed the following, viz: —

1. Conformable Continuous.
2. Conformable Interrupted.
3. Unconformable Continuous.
4. Unconformable Interrupted.

He illustrated the application of the terms by the aid of a diagram, representing three strata—Limestone below, Shale intermediate, and Sandstone the uppermost, designating them by A, B, and C respectively. If we find a partial blending of organic remains, and partial intermingling of materials, with evidence of continuity in time of deposition, this condition may be expressed by the first term. If the strata A and C are together in superposition, without physical sign of break, and yet with abrupt omission in types of life, it should be designated in the second category. If the sequence of the strata is uninterrupted, and yet a displacement exists from some physical disturbance, the third term is applicable. The fourth term would designate C, unconformably upon A, and at the same time an exclusion of B.

The recognition of such distinctive terms would much tend to promote the science of Geology.

Dr. Jackson observed, that amongst other examples of the interrupted series, there is a fine illustration in the superposition of the Sandstones of the Connecticut River, upon the Gneiss, Granites, and Mica-Slate of New Hampshire, at Northfield, Mass.; where the whole Palæozoic Series is wanting.

Dr. Jackson expressed himself in favor of the nomenclature of Prof. Rogers, because it was both explicit and succinct.

The Chairman announced the death of Prof. Michael Tuomey, of Alabama, one of the Corresponding Members of the Society, and requested Prof. W. B. Rogers to propose a resolution suitable to the occasion.

Prof. Rogers, in doing so, said that he had listened with painful surprise to the announcement just made of the death of our associate, Prof. Tuomey. Last summer, when attending the Scientific Association in Albany, his apparently vigorous frame and look of quiet enthusiasm, gave promise of many more seasons of productive geological toil. Of the early life of Michael Tuomey, Prof. Rogers said he knew nothing, farther than that he was, he believed, a native of Ireland, and coming to this country quite young, became first a resident of the State of New York. As a cultivator of science, he early attracted notice by his study of the Tertiary deposits of the neighborhood of Petersburg, in Virginia, where for some years he resided in the capacity of a teacher. After this he was appointed to conduct the Geological Survey of South Carolina, and having completed the work as far as practicable with the means at his command, published, in 1848, a Report on the Geology of the State, which proved highly acceptable to geologists as well as useful to the community for whose practical benefit it was designed.

Soon after this, Prof. Tuomey was elected to the Chair of Geology and Natural History in the University of Alabama, and placed at the head of the State Geological Survey then organizing; in which truly interesting field he has ever since been steadily and actively employed. His paleontological studies in the Tertiary and Cretaceous deposits of the Southern Atlantic States proved a valuable introduction to the examination of those groups of formations as they are developed in middle and southern Alabama; and we cannot doubt that had he lived to complete the survey, his additions to this branch of our geology, as well as his investigation of the structure and paleontology of the older rocks overspreading the northern part of the State, would have formed an important contribution to our knowledge of that rich and varied portion of our great geological field. His partial Reports of the Survey, of which two or three have been published, although intended mainly to indicate the progress of the work, contain many valuable details; but of the nearness of the survey to its completion, and of the extent and character of the materials in reserve for a final Report, Prof. Rogers was without the means of judging. He could only say, that from the great richness of this part of the geological field, and the known industry and ability of Prof. Tuomey, we had reason to anticipate from it much interesting matter, especially in the department of Paleontology.

Besides his occasional descriptions of fossils from the Tertiary deposits, Prof. Tuomey had of late, in conjunction with Prof. Holmes of South Carolina, been engaged in publishing in quarto numbers a work on the "Fossils of South Carolina," which for the excellence of its material, and the faithfulness and beauty of its illustrations, may very favorably compare with any similar work published in this country.

Prof. Rogers then offered the following resolutions, which were unanimously adopted: —

Resolved, That we have heard with unfeigned regret of the death of Prof. Tuomey, of Alabama, an event which deprives the geologists and naturalists of our country of a zealous and active associate, whose labors had already won for him an honorable place among our scientific explorers, and whose knowledge and experience, in connection with the important survey in which he was engaged, gave earnest of still more extensive and valuable contributions.

Resolved, further, that we offer to the family and friends of the deceased an expression of our sincere regret and sympathy.

Prof. William B. Rogers having asked permission to make a few remarks in relation to the scientific services of the late William C. Redfield, proceeded as follows: —

Since the opening of the present year, the cultivators of science have been called on to lament the loss of two of their distinguished co-laborers, on this side the Atlantic, William C. Redfield, of New York, and Prof. Bailey, of West Point, the former eminent for his researches on the subject of storms, the latter for his microscopical discoveries. Our Society, claiming Prof. Bailey as one of its most valued members, has already accorded an appropriate memorial to his genius, labors, and virtues. We have also had the satisfaction of numbering Mr. Redfield among our associates, and we are all familiar with his reputation as a man of science, and some of us have known him as a friend. Feeling, therefore, the loss which the community of science, especially in this country, have sustained in his death, we may not inappropriately claim a share in the general and deeply felt regret occasioned by this event, by placing on our records a brief tribute to the scientific worth and manly excellences which marked his career.

Mr. Redfield, it is stated, was but little favored in early life by opportunities of education. Even after his removal from his native State, Connecticut, to the city of New York, while yet a young man, he became immersed in business occupations such as are commonly thought incompatible with purely intellectual pursuits, and which in most cases leave but little leisure and still less disposition for the studies and investigations of science. But his strong inclination for scientific inquiries was not to be repressed by these discouragements, and he early enrolled himself among the active students of Meteorology, Physical Geography, and Geology.

In the first of these departments, which it is well known was the principal field of his investigations, his patience and sagacity in observing facts, and in collating and comparing the observations made by others, bore their rich fruit in that remarkable generalization which, under the title of the *Rotary Theory of Storms*, is so commonly associated with his name. His earliest recognition of this law appears to have been suggested by the phenomena of the violent storm which, in the year 1821, swept over New England; and it is not a little remarkable that it was a storm occurring the same year in Central Europe which led the German Meteorologists into a similar train of inquiry, and conducted Prof. Dové, of Berlin, to a theory founded like that of Mr. Redfield on the union of a progressive with a rotary movement of the disturbed column of air.

It must not, however, be supposed that the fact of a revolving motion in some of the more violent storms had hitherto entirely escaped observation. Long before these systematic inquiries were thought of, navigators had recognized such a movement in some of the storms within the Tropics. As far back as 1680, Capt. Langford, in a paper on West Indian hurricanes, printed in the Philosophical Transactions, described them as progressive whirlwinds; and at the beginning of the present century, Col. Capper, Mr. Horsburg, and a French writer, Romme, speak of the hurricanes or typhoons of the India and China seas as revolving storms. But these early observations and suggestions, pointing chiefly to local phenomena, and involving no clear conception of a general law, attracted little notice at the time of their publication, and were almost, if not entirely forgotten when Redfield and Dové, without a knowledge of each other's labors, framed the great generalization of the progressive-rotary character of these atmospheric movements. Without detracting from Prof. Dové's share in the investigation, it must, I think, be admitted, that to Mr. Redfield is preëminently due the credit of having first given to this law a truly inductive character; and I need hardly add that his analysis, year after year, of the data diligently collected by him, was a work involving no small amount of detailed labor, as well as of sagacity and skill.

Although his investigations were directed principally to the storms of the Atlantic north of the Equator, he was early led on theoretical grounds to announce the proposition that in the southern hemisphere the motion of storms is the reverse of that presented by them in the northern one, both as regards progression and rotation. This statement was soon after confirmed by Col. Reid, the author of the well-known work on the Law of Storms, in an elaborate investigation of those of the Southern Indian Ocean.

These important generalizations in the discovery and development of which Mr. Redfield so largely shared, although not universally accepted either at home or abroad, have been adopted by most of those who have devoted themselves to the practical study of the subject, and in particular have been advocated with much ability by Col. Reid, already named, and by Mr. Piddington, author of the "Sailor's Horn-book for Storms," to both of whom we are indebted for extensive researches in this branch of Meteorology. Through the treatises of these gentlemen, and the numerous memoirs of Mr. Redfield, this theory is rapidly becoming familiar to the minds of navigators, many of whom have not only accepted but practically applied it. Even the general public have learned its language and its leading features, from the accounts of cyclones or revolving storms, so often repeated in the current news. It is but proper to add that the evidence in favor of this law has lately received an important accession from the publication by Mr. Poey of Havana, of a tabular description of the gales of the West Indies and Atlantic, in which their progressive rotary character, and the opposite directions of the movement on different sides of the equator is shown by an investigation of between three and four hundred distinct storms, extending over a period of about the same number of years.

How far these laws are applicable to other than ocean storms, and what new laws or modifications of the rotary principle may obtain in the interior of continents, are questions which do not seem at present capable of a satisfactory answer. But however they may be decided by future investigations, we cannot, I think, fail to recognize in the generalizations of Redfield and his co-workers a valuable contribution to positive knowledge, and an induction which, even should it be found strictly applicable only to the oceans and their coasts, is fraught with great practical good as well as scientific interest.

In saying thus much, I would not be considered as accepting the theoretical views which Mr. Redfield from time to time suggested in explanation of the origin of the revolving and progressive motion which he labored to demonstrate. These speculations rarely put forth, and never very strenuously urged, appear to have had but little interest for him in comparison with the establishment of the *law of the phenomena*. Indeed, they were so briefly, and I must in candor add, so indistinctly presented, as to attract but little attention from the scientific world. At the same time it should be considered that even had Mr. Redfield possessed a philosophical inventiveness and a command of the exact sciences beyond what we would claim, or his own modest self-appreciation would admit as his, we could hardly have hoped that, in the present stage of investigation, he could have furnished a really satisfactory solution of the complex problem of the dynamics of storms. His labors, together with the concurring or the conflicting views of other Meteorologists at home and abroad, mark a great and beneficent progress in this difficult inquiry, and encourage the hope that, along with a knowledge of the laws of the winds, we shall hereafter be able to grasp in our thoughts the mode of their origin and the physical forces by which they are produced.

While giving his chief attention to the development of the Law of Storms, Mr. Redfield found time for many useful observations in geology, especially in relation to the fossil fishes of the so-called New Red Sandstone belt of New Jersey and Connecticut, as well as those of the coal rocks of Eastern Virginia. In this inquiry, he had the valuable assistance of his son, Mr. John H. Redfield, to whom we are indebted for descriptions and figures of several of these interesting fossils, as well as for important suggestions, founded on zoölogical affinities, as to the age of the belt of rocks in which they are entombed.

The continuation of this work had long, I believe, been a favorite plan with Mr. Redfield, and seems to have been one of the last subjects connected with scientific pursuits which engaged his attention; for on his visit to Boston in the autumn, he spoke with much interest of having resumed the task of preparing, with the help, I think, of Prof. Agassiz, a comprehensive monograph of the fossil fishes of this group of strata. But alas, on the 12th of February, he was called on to relinquish this and all other labors. He died at the ripe age of 68 years, but with faculties unimpaired, leaving us to regret that he could not have lived to continue his useful career, and yet giving us, in what he had done, cause to rejoice that he was permitted to work so long and so successfully in extending science and promoting the interests of mankind.

Such is a slight notice of the scientific labors of Mr. Redfield. The esteem in which they are held is best proved by the honorable rank to which they raised him among the cultivators of positive science. Of his character as a gentleman, whether in society, or presiding at a meeting of the American Association of Science, I would gladly speak were it in my power to depict the gentleness and modesty of his discourse, and that union of amiable and manly qualities which won the affection and respect of so many of his associates in scientific pursuits. But I must leave such a tribute to other and more competent hands, and will now bring my remarks to a close by asking the Society to adopt the following resolutions: —

Resolved, That the late William C. Redfield, by his sagacity and patience in philosophical researches, and by the importance of the conclusions which he assisted in demonstrating, has reflected honor upon the progressive science of our country, and earned a title to the lasting recollection of his scientific brethren, and, *Resolved*, further, that, in recording this mark of our regard for his memory, we would tender to his family and friends an expression of our deeply felt regret and sympathy.

The resolutions were unanimously adopted.

The Chairman announced that the next meeting would be the regular Annual Meeting for the election of Officers, and Reports of Curators, and other business.

Dr. A. A. Gould, Mr. James M. Barnard, and Dr. J. B. S. Jackson were appointed a committee to nominate officers for the ensuing year.

ANNUAL MEETING.

May 6, 1857.

Dr. C. T. Jackson, Vice-President, in the Chair.

The records of the last meeting and of the last annual meeting were read and approved.

The Treasurer, Librarian, and the several Curators presented their Annual Reports, which were read and accepted.

Messrs. James M. Barnard and Charles J. Sprague were appointed to audit the accounts of the Treasurer.

The Committee appointed to nominate officers for the ensuing year, reported a list of candidates, and the report was accepted. The following gentlemen were duly elected officers, viz: —

PRESIDENT,

Jeffries Wyman, M. D.

VICE-PRESIDENTS,

Chas. T. Jackson, M. D. D. H. Storer, M. D.

CORRESPONDING SECRETARY,

Samuel L. Abbot, M. D.

RECORDING SECRETARY,

Benj. Shurtleff Shaw, M. D.

TREASURER,

Nathaniel B. Shurtleff, M. D.

LIBRARIAN,

Charles K. Dillaway.

CURATORS,

Thomas T. Bouvé,	*Of Geology.*
John Bacon, M. D.	*Mineralogy.*
Charles J. Sprague,	*Botany.*
Thomas M. Brewer, M. D.	*Oölogy.*
Henry Bryant, M. D.	*Ornithology.*
Thomas J. Whittemore,	*Conchology.*
J. Nelson Borland, M. D.	*Herpetology.*
Silas Durkee, M. D.	*Entomology.*
Nathaniel E. Atwood,	*Ichthyology.*
Theodore Lyman,	*Crustacea and Radiata.*
John Green,	*Comparative Anatomy.*

CABINET KEEPER,

Charles Stodder.

Dr. J. N. Borland presented the following list of Reptiles collected in California, by Mr. E. Samuels, viz: —

CHELONIANS. Family—ELODITES.

Emys marmorata. Baird and Girard, Proc. Ac. Nat. Sci. Philad. Oct. 1852, vol. 6, p. 177.

OPHIDIANS. Family—CROTALIDÆ.

Crotalus lucifer. Baird and Girard, Proc. Ac. Nat. Sci. Philad. Oct. 1852, vol. 6, p. 177.

Family—COLUBRIDÆ.

Eutainia ordinoides,	B. & S.	Cat. N.	Am. Rep.	Pt. 1.	p. 33, 1853
Bascanion vetustus,	do.	do.	do.	do.	97, do.
Contia mitis,	do.	do.	do.	do.	110, do.
Ophibolus Boylii,	do.	do.	do.	do.	82, do.
Diadophis amabilis,	do.	do.	do.	do.	113, do.
Pituophis Wilkesii,	do.	do.	do.	do.	71, do.

SAURIANS. Sub-family—CHALCIDIEN.

Gerrhonotus multicarinatus, Blainville, Nouv. Ann. du musèe d'histoire naturelle, tome 4, 1835, Pl. 25, fig. 2.

Sub-family—LEPIDOSAURIEN.

Plestiodon Skiltonianum, B. & G., Stansbury's Report to Congress of Exploring Expedition to Utah, p. 349, Pl. 4, fig. 4–6.

Sub-family—EUNOTES.

Sceloporus occidentalis, B. & G. Proc. Ac. Nat. Sci. Phil. vol. 6, p. 175, 1852.

BATRACHIANS. Sub-order—ANOURES.

Rana longipes described as *nigricans*, Hallowell, Proc. Ac. Nat. Sci. Phil. vol. 8, p. 96, 1854.

Hyla regilla, B. & G. Proc. Ac. Nat. Sci. Phil. vol. 6, p. 174, 1852.

Sub-order—Urodela.

Taricha torosa, Gray, Cat. Rept. in British Museum.

Taricha larvis, B. & G. Proc. Ac. Nat. Sci. Phil. vol. 6, p. 302, 1853.

Aneides lugubris, B. & G. Proc. Ac. Nat. Sci. Phil. vol. 4, p. 126.

Heredia Oregonensis, Ch. Girard, Proc. Acad. Nat. Sci. Phil. vol. 8, p. 235, 1856.

Batrachoseps attenuata, S. F. Baird, Journ. Acad. Nat. Sci. Phil. vol. 1, p. 288, 1849.

Ambystonia Californica, Gray, Cat. Rept. in Brit. Mus.

Dr. A. A. Gould, in behalf of the committee appointed to receive and report upon the Bequest of Professor Bailey, submitted the following report, which was accepted.

The Committee appointed to receive and report upon the Bequest of the late Prof. Bailey, have attended to their duty, and state the following results:—

The examination of the Books, Drawings, and Correspondence was submitted to the Chairman—the Microscopical Collection to Dr. Bacon—the Algæ and preparations of organic tissues to Dr. Durkee.

In presenting the Report, the order in which the several bequests are specified will be followed.

I. The Microscopical Collection. Dr. Bacon's Report, (A.)

The *Microscopic Collection*, which comprises the most valuable portion of the specimens mounted for the microscope, is contained in twenty-four boxes in the shape of octavo volumes.

Five of the boxes contain specimens of Diatoms, &c. from the Atlantic Soundings, including two boxes from Lieut. Berryman's Soundings between America and Ireland in 1856.

Three boxes contain specimens from Soundings in the Arctic and Pacific oceans, Gulf of Mexico, and Para River, &c. in S. America.

In four boxes are American and Foreign Diatoms; Diatoms in Guano; and Fossil Polycistins and Diatoms from Barbadoes.

In three boxes are Fossil Diatoms from Virginia and Maryland; Bermuda; Monterey, California; Suisun Bay, &c.

Nearly all the specimens in the above boxes were mounted by Prof. Bailey; and they are accompanied by manuscript catalogues, or by memoranda on slips of paper, in which the positions of more than three thousand individual objects on the slides are noted with reference to Bailey's Universal Indicator for Microscopes; thus enabling the actual specimens described by him to be readily found and identified at any future time. A part of the Collection is also accompanied by an alphabetic catalogue of species, with references to the slides on which specimens may be found.

Two boxes contain recent and fossil Vegetable Tissues; and two others Test Objects and miscellaneous Organic Bodies, and a micrometer scale on a glass slide.

The number of glass slides in these twenty-one boxes is five hundred and fifty.

In addition to the selected specimens in the *Microscopic Collection*, there are more than eight hundred specimens mounted on glass slides, comprising many duplicates of those in the Collection, and a variety of miscellaneous microscopic objects.

There are also two hundred specimens of Polythalamia mounted as opake objects and labelled. These are not duplicates of the Polythalamia in the *Microscopic Collection*, which are in Canada balsam.

A very valuable portion of the bequest consists of the original specimens of microscopic material, collected by various scientific and exploring expeditions, and an extensive series of specimens received from European correspondents, including Ehrenberg and other distinguished microscopists.

Among the miscellaneous objects are three microscopic daguerreotypes, seven photographs on paper, nineteen drawings of microscopic objects, and two micrometer scales on small slips of glass.

II. The ALGÆ, &c. Dr. Durkee's Report, (B.)

These are contained in thirty-two portfolios. They are from almost every part of the globe. They are arranged and named in a manner to afford great assistance to the student, who may be interested in the study of Marine Botany. In most instances, specimens of the same kind, but collected at different seasons of the year, or brought from different localities, and presenting different appearances to the naked eye, are placed side by side, upon the same sheet or within the same envelope, so that the work of comparing one specimen with another, and of ascertaining the names of doubtful ones, which the student may possess, is rendered easy. And the fact, that very many of the specimens are those originally described, and that nearly every plant in the collection has attached to it the name of some distinguished algologist, as Bailey, Harvey, Binder, or Jolit, stamps upon it an important value. It makes it a type specimen.

Upon the cover of each volume is an index of what is contained within; that is, a synopsis of the series, sub-series, order or family, to which the enclosed specimens belong; and even the individual names of the plants are written on the outside.

The family of Florideæ are the most numerous, and embrace nearly one half of the whole collection. They are contained in fifteen portfolios.

The Diatomaceæ are in one volume, and amount to four hundred and twenty-five.

The whole number in the collection is about four thousand five hundred. Of this number about two hundred varieties belong to the Florideæ.

The Committee have not had time to enter into further particulars respecting this magnificent collection of Algæ. Its value is beyond all price. It raises the department of Marine Botany to a prëeminent position in our Cabinet. We hazard nothing in saying that no collection of the kind in the country is equal to it, and but few in Europe superior to it.

The animal tissues are contained in the boxes or Nos. marked 4, 5, 6.

No. 4, contains the tissues of some of the Vertebrata.

No. 5, the tissues of some of the Articulata.

No. 6, the tissues of some of the Mollusca and Radiata.

The whole number in the three boxes is sixty-nine; all in good order excepting one. The slide containing this specimen is broken.

III. The Books. The whole number of bound volumes is eighty-four, besides one hundred and fifty unbound volumes and pamphlets, and these latter are not the least valuable portion of the Library, consisting as they do of important monographs, a form in which much that has been done in Algology and Microscopy is as yet only to be found. Among the works are the splendid Microgeologie of Ehrenberg, the works of Kützing, Queckett, Ralfs, Hassall, Smith, Agardh, Harvey, Lindley, and Hutton. Indeed, nearly every thing of importance relating to his favorite studies is here; and they are rendered additionally valuable by important notes of his own.

IV. The volume containing rough sketches of microscopic forms and marked "Microscopic Memoranda," is a most interesting volume. It consists of letter-sheets of sketches made by means of the camera lucida, under the microscope, or of more finished drawings on glazed cards and arranged on sheets. At the end is an alphabetical catalogue of the several objects delineated. There are four hundred and fifty sheets, and seven hundred different objects named in the catalogue. Of most of these, numerous attitudes are given, so that the whole number of sketches is probably not less than three thousand, and they are highly valuable as an illustrative accompaniment to the microscopical collection. They are all characteristic and instructive, and many of them exquisitely done. They date as far back as 1838—twenty years ago—and being chronologically arranged, afford a graphic diary of the train of Prof. Bailey's investigations, as well as of his own wanderings; for wherever he went his microscope or his collecting boxes and bottles went with him. From Quebec to Florida we trace out all his abiding-places during his vacations.

This collection is curious as it shows how he was gradually led into the study of microscopic organic forms. His first observations were of vegetable structure—then we have an Echinorhynchus—the ovipositor of an ephemera, &c. In January, 1839, in examining some aquatic plants he perceived a curious body, the nature of which he could not make out; it afterwards proved to be a Gomphonema. This excited his curiosity in that direction, and his sketches of common Diatomaceæ soon became frequent. March 11, 1839, he sketched an organism which Ehrenberg subsequently named Stauronema Bayleyi. In 1843, his observations had become so numerous that, at the meeting of the Association of Geologists and Naturalists in Boston, he communicated his paper entitled, "Sketch of the Infusoria of the family Bacillariæ, found recent or fossil in the United States," extending to fifty pages and illustrated by figures; a paper which attracted much attention everywhere, and placed him at once in the highest rank as an investigator of microscopic forms.

The volume is also instructive in showing how much industry and enthusiasm—what a patient and gradual accumulation of numberless facts—how many trials, and doubts, and difficulties a man must always surmount in arriving at solid fame and true eminence.

V. The Scientific Letters, which he submitted to the Society to retain such as might be deemed desirable for autographs or otherwise, and destroy the remainder at discretion, your Committee have found very interesting, and consider that, with very few exceptions, they ought to be preserved. In addition to every man of scientific note in this country, he numbered among his correspondents all the most noted Microscopists and Algologists in Europe, such as Ehrenberg, Kützing, Queckett, Harvey, Greville, Smith, Williamson, Ralfs, Agardh, De Brébisson, Montagne, Le Normand, and very many others. Their letters contain many interesting facts and discussions, and even now many of them contain drawings and specimens as they were sent, and which the Committee think should be transferred to their appropriate places. The history of Microscopy and Microscopists in this country, can never be so well learned elsewhere as from these letters. Indeed, time always renders the correspondence of original investigators of curious interest and of real value. As an index of the varied acquirements and world-wide reputation of our departed benefactor, we think they should be preserved. The thousand and one inquiries which were made of him respecting Microscopes—the little packages sent him by hundreds from beginners that they might be named, "if it would not be taxing him too much," show how much of his time he must have sacrificed, as every man of mark in science is called upon to do, to good nature, and to tasks that were profitless and vexatious so far as his own advancement is concerned.

The Committee would recommend that a selection should be made of such as contain valuable scientific facts, and that these be arranged alphabetically and bound; the remainder to be kept in bundles, as they now are.

In conclusion, the Committee would congratulate the Society in having been made the recipients of scientific treasures so rich and so rare. It becomes us to insure their preservation, and to make them profitable. In bestowing them here, he no doubt expected a better use would be made of them here than elsewhere. He was of too practical a turn to be satisfied with mere storage. He anticipated that some one would take up the subject where he left it, make himself familiar with the collection, be able to refer to the individual objects of it, and to answer such inquiries as other investigators might seek to have settled from it. What a glorious opportunity for one or more young men of leisure and scientific tastes. Every thing which has been collected in this country relating to the Algæ and to Microscopic forms is here embodied, together with all the books necessary for the study and further pursuit of those branches. Whoever shall make himself master of them must be the ultimate authority for America. Such an opportunity for distinction even Ehrenberg never had. Who shall be the man?

We would not close without one word of tribute to the memory of our benefactor. We knew him to be a man of conscience, amiable in his whole character, and of the highest order among men of science. But the revision of his labors has tended to raise him still higher in our admiration. He is an eminent example of what may be accomplished by constant application, and of the confidence which one may inspire in his fellow-men by unwavering truthfulness. In the very prime of life, with all the necessary outlays and appliances for extensive and rapid strides in knowledge, it seems too great a loss to be submissively acquiesced in. We cannot refrain from quoting, as expressive of our own estimate of his worth and position, from the letter of one who could appreciate him justly.

"I had seen that you are President of the Montreal meeting (Association for Science) next year. I am sure every one acquainted with what you have done for the advancement of science, American science and American scientific character, will say, that no appointment at the present time could be more appropriate or just. My dear sir, I hope the great Disposer of events, whose minute works you have done so much to place before our eyes in all their exquisite beauty of form, of workmanship, and of adaptation, will give you yet many years to enjoy the honors you have so honestly acquired, and to add many more discoveries to those you have already secured."

At the last meeting, no distinct Resolution having been passed touching one of the stipulations accompanying the bequest of Prof. Bailey, the following was offered and unanimously adopted.

Resolved, That the sons of Prof. Bailey have access to the books and specimens bequeathed by him, and be allowed to use them at their own pleasure; that they also have the same use of the library and cabinet of the Society as members; and, that in consideration of his priceless contributions, their names be placed on the list of Patrons.

Dr. A. A. Hayes read a paper upon the kind of sugar developed in the Sorghum saccharatum, or Chinese Sugar-Cane, as follows:—

The introduction of this interesting plant has led to many somewhat extravagant suggestions, in relation to its future bearing on the agriculture and commerce of our country, particularly in relation to its produce of sugar. I have therefore deemed it a subject worthy of chemical observation and experiments, to determine its claims as a sugar producer; and have also chosen it to illustrate a uniformity of vegetable secretion, according with well-known natural laws. In order to give scientific precision to the remarks which follow, it is necessary that a brief definition of the term sugar, should be given. So rapidly has chemical science progressed of late, that this well-known term has now become a generic name for a class of bodies, individually presenting us with the most marked diversities of sensible characters and composition. We have sugars which are sweet, others which are slightly sweet, and some destitute of sweetness: some are fermentable, others do not undergo this change: some are fluid, more are solid.

In connection with the present subject, adopting cane sugar as the most important kind commercially, and as an article of food from certain inherent qualities, if we examine into its sources, we find them abundant, but not numerous. So far as observation has extended, its production by a plant is definite; a change of locality, even when accompanied by a marked change in the habit of the plant, does not alter essentially the nature of the sugar it produces. Thus the cane of Louisiana rarely matures and is an annual, while in the soil and climate of Cuba, it enjoys a life of thirty, or even sixty years. The juice of our southern plant always contains more soluble alkaline and earthy salts than is found in the cane of Cuba, but its sugar is secreted as cane sugar. The juice of the sugar beet, of watermelons, and a large number of tropical fruits, the sap of the maple and date palm, afford cane sugar. In these juices and saps, when concentrated by desiccation in the cells of the plants, it always appears in regular, brilliant crystals, of a prismatic form, clear and colorless; distinctly indicating a vital force in the plant, separating it from other proximate principles and leaving it in its assigned place pure.

The class of sugars next in importance, includes under the general term Glucose, a number of sugars having varied characters, which should be separately grouped. Among them are the sugars of fruits, seeds, and grasses: those produced in the animal system, and the artificial sugars made from starch, grains, and sawdust. The varieties of glucose are both solid and semifluid. When solid they present aggregates of sub-crystalline form, in which the organic tendency to rounded surfaces, is generally seen. The semifluid forms often manifest a disposition to become solid on exposure to air, and they then experience a molecular change, which produces crystals having new relations to polarized light and different physical and chemical characters.

It is unnecessary to enter more minutely at this time, into a description of each variety of glucose, for the individuals of the class are easily distinguished from each other, and most clearly and remarkably from cane sugar. The plants producing the natural glucose sugars, mature their cells as perfectly as those producing cane sugar, and the secretion can be found as distinctly isolated from other principles as cane sugar is; even when the glucose is semifluid. Hence we are able to determine by microscopical observations, aided by chemical tests, the presence and kind of sugar in the tissues, or sap of a plant, often without incurring the risk of change of properties through the chemical means adopted for withdrawing the sugar.

We have the authority of our associate, Mr. Sprague, for the conclusion, that the *Sorghum vulgare*, or saccharatum, belongs to the tribe including grasses, and we should therefore expect to find its saccharine matter the variety of glucose called sugar of grasses or fruit sugar. The unsuccessful attempts made to crystallize sugar from the juice of the Sorghum, produced in different climates of our country last year, indicated that it contained no cane sugar, or that the presence of some detrimental matter in the expressed juice, destroyed the crystallizable character of cane sugar, as can be artificially done. My observations commenced after I had obtained several specimens of the Sorghum, and have been continued on the semifluid sugar, likewise from different parts of the United States, with uniform results.

When a recent shaving of the partially dried pith of the matured stalks of the Sorghum, is examined by the microscope, we observe the sugar cells filled with semifluid sugar. After exposure to air it is often possible to distinguish some crystalline forms in the fluid sugar. These grains, after being washed, cease to present a clear crystalline character, and have the hardness and general appearance, *of dry fruit sugar*. By withdrawing the sugar without the aid of water, it is possible to obtain it colorless and neutral, as a semifluid glucose or fruit sugar, and no traces of crystals or crystalline forms can be seen. The glucose thus obtained, freely exposed to air, soon undergoes the molecular change which is exhibited by sugar of grapes, and we thus observe another character associating the whole product, with the sugar of grasses and fruits. Leaving the physical observations, and substituting the more exact processes of the laboratory, I found that the semifluid sugar of the Sorghum did not blacken in sulphuric acid, but was sensitive to the action of alkalies, and reduced the alkaline solution of tartrate of copper, thus conforming to the well-known characters of glucose. The most careful trials I could make, failed in detecting cane sugar in any samples of the Sorghum stalks, or in the samples of sugar, including one made by Col. Peters in Georgia, prepared under the most careful management. I must therefore conclude, *that the Sorghum cultivated in this country does not secrete cane sugar or true sugar; its saccharine matter being purely glucose in a semifluid form.*

As a matter of science this result is interesting, in showing the integrity of character pertaining to the genus in which this plant is botanically placed; the sweet grasses yielding fruit sugar, while the maize produces cane sugar only.

In its economical bearings we might wish that the sorghum secreted cane sugar, for the values of cane sugar and glucose are very different. From the best authorities we learn that the power of imparting sweetness in cane sugar, is between two and one half and three times as great as that of dry glucose, and the semifluid sugar of the Sorghum containing water, nearly four pounds of this will be required, to equal one pound of sugar in ordinary use. As a raw material for the production of spirit, for which it seems well adapted, the glucose of the Sorghum may prove valuable, and as an addition to a forage crop, the plant may be found to possess a high agricultural importance.

Dr. John Bacon made a statement confirmatory of the results arrived at by Dr. Hayes. He was unable to obtain any crystals of cane sugar.

The Chairman, Dr. Jackson, said he had obtained crystals by evaporation of the syrup over sulphuric acid: whether they were of cane or grape sugar he could not say. Cane sugar had been found in the plant by European chemists. He had made extensive investigations into its chemical properties and economic value, for the United States Government, which would be published in the Patent-Office Report.

Mr. N. H. Bishop exhibited some of the seed of the Chinese Sugar-cane, and remarked that it was imported from France and not China, as might be supposed. It was estimated by seedsmen that ten tons would be sold in Boston this season for planting, and that one pound would plant an acre.

Mr. N. H. Bishop presented a male and a female Burrowing Owl, (*Athene cunicularia*,) from South America, and read the following paper upon this bird :—

THE BURROWING OWL OF SOUTH AMERICA. (*Athene cunicularia.* MOLINA.)

I first met with this bird on the banks of the River San Juan, in the Banda Oriental, one hundred and twenty miles west of Montevideo, where a few pairs were observed devouring mice and insects during the daytime. From the river, travelling westward thirty miles, I did not meet a single individual, but after crossing the Las Vacas, and coming upon a sandy waste covered with scattered trees and low bushes, I again met with several.

Upon the pampas of the Argentine Republic they are found in great numbers, from a few miles west of Rosario, on the Parana, lat. 32 deg. 56 min. south, to the vicinity of San Luis, where the pampas end and a travesia or saline desert commences.

On these immense plains of grass it lives in company with the bizcacha, (*Lagostomus trichodactylus*, Brookes,) an animal that bears resemblance to the rabbit and agouti, and undermines a great extent of country with its burrows. The habits of this owl are said to be the same as those of the species that inhabits the holes of the marmots upon the prairies of western North America, and one writer speaking of the latter bird remarks, "We have no evidence that the owl and marmot habitually resort to one burrow ;" and Say adds, "that they were either common though unfriendly residents of the same habitation, or that our owl was the sole occupant of a burrow acquired by the right of conquest." In this respect they differ from their South American relatives, who live in perfect harmony with the bizcacha, and during the day while the latter is sleeping, a pair of these birds stand a few inches within the main entrance of the burrow, and at the first sound, be it near or distant, they leave their station and remain outside of the hole, or upon the mound that forms the roof of the domicile. When man approaches, both birds mount above him in the air and keep up the alarm note, with irides dilated, until he passes, when they quietly settle down in the grass, or return to their former place.

While on the pampas I did not observe these birds taking prey during the daytime, but at sunset the bizcachas and owls leave their holes and search for food, the young of the former playing about the birds, as they alighted near them. They do not associate in companies, there being but one pair to each hole, and at night do not stray far from their homes.

In speaking of the North American burrowing owl, a writer says that the species suddenly disappears in the early part of August, and also that it is strictly diurnal. The *Athene cunicularia* has not these habits; it does not disappear during any part of the year, and it is both diurnal and nocturnal, for though I did not observe it preying by day on the pampas, I noticed that it fed at all hours of the day and night on the north shore of the Plata, in the Banda Oriental.

At long. 66 degs. west, our caravan struck the great saline desert that stretches to the Andes, and during fourteen days' travel on foot, I did not see a dozen of these birds. While residing outside the town of San Juan, at the eastern base of the Andes, I had an opportunity to watch their habits in a locality differing materially from the pampas.

The months of September and October are the conjugal ones, and during the middle of the former month I obtained a male bird with a broken wing. It lived in confinement two days, refusing to eat, and died from the effects of the wound. A few days later a boy brought me a female owl, with five eggs, that had been taken from her nest, five feet from the mouth of a burrow that wound among the roots of a tree. The female bird was fierce in her cage, and fought with her wings and beak, uttering all the while a shrill prolonged note, resembling the sound produced by drawing a file across the teeth of a saw. I supplied her with eleven full-grown mice, which were devoured during the first thirty-six hours of confinement.

My object was to discover if this bird burrowed its own habitation, and my observations of eight months failed to impress me with that belief. I have conversed with intelligent persons who have been familiar with their habits, and never did I meet one that believed this bird to be its own workman. It places a small nest of feathers at the end of some deserted or inhabited burrow, as necessity demands, in which are deposited from two to five white eggs, little larger than the domestic pigeon's. In the Banda Oriental, where the country is as fine, and the favorite food of the owl more plentifully distributed than upon the pampas, this bird is not common compared with the latter locality. The reason is obvious. The bizcacha does not exist in the Banda Oriental, and consequently these birds have a poor chance for finding habitations.

On the pampas, where thousands upon thousands of bizcachas undermine the soil, there, in their true locality, the traveller finds thousands of owls. Again, along the bases of the Andes, where the bizcacha is rarely met with, we find only a few pairs. Does the hole from which this specimen was obtained, dug among the roots of a tree, appear to be the work of a bird or quadruped? The several works that I have consulted do not in one instance give personal observations relative to the burrowing propensities of this owl, from which fact it will be inferred that it never has been caught in the act of burrowing.

Dr. Hayes presented, in the name of R. H. Eddy, Esq., some specimens of Native Borate of Lime from South America. They varied in size, were of a dirty appearance externally, but internally beautifully white and silky, and exhibited a tendency to crystallization. The thanks of the Society were voted for the gift.

It was voted that during the summer months the meetings should commence at 8 o'clock P. M.

May 20, 1857.

Dr. C. T. Jackson, Vice-President, in the Chair.

In the absence of the Secretary, Mr. C. C. Sheafe was chosen Secretary *pro. tem.*

Dr. Silas Durkee read a paper on the method by which the common Earth Worm (*Lumbricus terrestris*) finds its way into vessels, such as tubs, barrels, pails, &c., and about the eaves and gutters of houses and sheds, which subject has occasionally been a topic of discussion at the meetings of this Society.

It is well known that after a shower of rain, upon a warm summer's day, the lumbricus is frequently found in the places above named; but by what means they arrive there is the question. Dr. Durkee had recently had an opportunity of watching some earth worms which were placed in glass jars standing in his office. At first there was a small quantity of water in the bottom of the jar, which seemed to prevent them from ascending any great distance; but upon removing this they were repeatedly seen mounting along the sides of the vessel. The progression was at a more moderate rate, and by shorter strides or stages, when they attempted to climb in a vertical direction, than when their course was more inclined. In some instances they reached the top of the vessel, a distance of eighteen inches in eight minutes. Generally their wanderings were quite irregular and circuitous, and they continued on the sides of the glass sometimes for the space of two hours, a part of the time in motion and a part of the time at rest. The worms drag themselves along by a few of their segments at a time, and the number of segments in motion at any one moment is less in their ascending course than when a horizontal or downward direction is taken. The abundant glutinous secretion with which they are covered, together with their numerous setæ and segments, seems well adapted to aid them in their various motions.

The following paper on the Zonda Wind, was read by Mr. N. H. Bishop:—

At a former meeting of the Society, I offered some remarks relative to this peculiar wind. (See Proceedings, vol. vi. p. 126.) I now request the favor of offering some additional observations upon this peculiar wind. In searching through the works of the very few authors who have visited the interior of the Argentine States, (all but one or two of whom are Europeans,) I find that one only mentions the existence of the above phenomenon, and he did not probably visit the town where my observations were made, which locality is considered by the natives the northern limit of the zondas.

John Miers, author of an interesting work on the provinces of La Plata and Chili, remained a short time in Mendoza, a town nearly one hundred and fifty miles south of San Juan, and capital of the province of Mendoza. He states that this southern locality is annoyed by winds that blow during the summer months from the valley of Zonda, and notes the fact that two dark clouds came from the northwest and hovered over the town during the greater part of the night, and in the morning every thing exposed to the air was covered with fine sand, which was of a light-gray color, and slightly magnetic. It was Miers's opinion that "a *souffriere,* or active volcano," existed to the northward of San Juan, from which the hurricanes and showers of sand originated. Had Mr. Miers visited San Juan, his view of the position of the souffriere, or volcano, would undoubtedly have been changed; for though the zondas sometimes reach Mendoza to the south, the direction of the wind when it strikes that place, differs from the line it follows when it rushes with violence upon the northern town. At San Juan, it comes due west from the Andes; hence the starting-point of the zonda cannot be to the north of the town, as Miers conjectured. According to the account of the natives, the zonda of San Juan does not cover a broader space than ten or fifteen miles after it leaves the Sierra of Zonda. Taking this into consideration, in connection with Miers's statement that the Mendoza zonda comes from the northwest, differing as it will be seen four points from the northern town, we may infer that the Mendoza and San Juan zondas do not blow at the same time. If this be true, it is an interesting fact, showing that this peculiar wind does not always follow the same track.

I remained but a short time in Mendoza, and not being conversant with the language of the inhabitants at that time, could not have collected information relative to the zonda, as it affects that locality, even had I then been aware of its existence.

Miers states that these are summer winds in Mendoza. From personal observation and reliable accounts of educated San Juaninos, I found that they are more particularly the winter winds —at least they are more frequent during that season. Invalids suffering from pulmonary diseases, and complaints affecting the heart and liver, anticipate the month of August (midwinter) with consternation; and their anxiety is not quieted until they have passed through the dreaded ordeal.

While passing the winter in San Juan, I noted the courses of upwards of twenty zondas. Some were of short duration; others lasted eighteen or twenty hours.

During the latter part of August, 1855, while standing upon the saline desert, a few miles east of San Juan, my attention was attracted to a cloud of dust that appeared to roll through the air as it approached me. I started for a shelter, and had hardly reached it, when the zonda swept past, filling the air with fine yellow sand. The temperature of the previously sultry atmosphere suddenly rose many degrees, and the occupants of the neighboring huts were affected with severe headaches. I noted with a compass the course of the wind, and found it to be west. All night, and through the following day and night, it continued blowing with undiminished force. Each hour the vane beside the hut was consulted, and the same course as at first was always observed. A few hours before the wind ceased the sand showers were exhausted. The greatest heat was during the first few hours: and this is always the case, whether the zonda commences during the daytime or night. After continuing for thirty-six hours, the change came. It was instantaneous. The hot wind seemed cut off at right angles by a cold wind from the south. The change could not have occupied more than forty seconds. The south wind lasted twenty hours, and was as violent as the hot zonda. In speaking of the Mendoza zondas, Miers does not mention the succession of the south wind. It is easy to comprehend that after so large a space has become filled with heated air, the effect will be felt in the cooler regions of the south, and a strong current from that direction will rush in to restore the atmospheric equilibrium. Hence the cause of the south wind succeeding the zonda.

Miers believed that the origin of the zondas was volcanic, and for a precedent, I will state, upon the authority of Sir Woodbine Parish, that the volcano Penquenes, which is situated about one hundred miles southwest from Mendoza, and reaches an altitude of nearly fifteen thousand feet above the level of the sea, emits clouds of ashes and pumice-dust. This dust is carried by the winds as far as Mendoza. but these clouds do not strike the town with the force of a San Juan zonda. The pumice-dust is borne along by variable winds. From this fact we may infer that the fine sand of the zondas comes from a similar source. The most important question is, "Where originates the hot and parching wind that always accompanies, and is peculiar to the zondas?" The old guides, who are familiar with the valleys of the Andes, inform me that these winds blow from off the main snow-clad ridge of that great chain of mountains, and express their surprise at the fact, "that from a cold region comes a burning wind."

Strong and steady winds generally follow a direct line. This fact is peculiar to the zondas. If Miers's conjecture be true regarding the origin of these winds, the position of the volcano or souffriere might be found by observing the following suggestion, bearing in mind that the Mendoza wind comes from the northwest, and the San Juan zonda from the west. That point where two lines—one running west from the northern town, the other northwest from the southern town—will intersect, is the starting-point of the sand clouds, if not of the accompanying hot wind.

Looking upon the map of South America, we find in the Cordillera of the Andes, between the latitudes of San Juan and Mendoza, four peaks marked as doubtful volcanoes,—Limari, directly west of San Juan; Chuapu, thirty miles further south; and near the half-way point of the two towns, Ligua. To the north of west of Mendoza, stands prominent the lofty Aconcagua, that has been estimated by two English captains to have an elevation of 23,900 feet. The point of intersection of the west and northwest zonda lines is in the vicinity of Limari and Chuapu, and if not either of these, the zonda volcano is a near neighbor to them.

Mr. Sprague exhibited specimens of a fungus which he had found upon young pear-trees, (*Capnodium elongatum*,) and which had been recently found in great quantities on the stems and leaves of young white pines growing in Hingham, by Mr. T. T. Bouvé. He also exhibited a drawing of the plant, showing the different forms of the peridia, some being merely rounded half-spheres, while others had extended themselves into elongated and forked points. This fungus does not form in the tissues of the plants upon which it is parasitic, but is merely an incrusting growth, spreading over and entirely covering the surface of the stem and leaf. This compact envelope is highly injurious to the infested plant, as it prevents the access of air and light to its tissues. On removing a portion from the pine leaves, the normal green was found to have changed to a dull yellow, similar to that of the decaying leaves.

Dr. A. A. Hayes exhibited some specimens, resembling Trachyte rock so closely, that most observers would have mistaken them for Trachyte.

The specimens consisted of hand specimens, having the uneven fracture of trachyte, full of capillary passages, with some cavities; there were fractured planes of brown and flesh-colored minerals, resembling feldspar, and some small red, brown-colored and black granules; but the most characteristic mark was the occurrence of angular fragments and grains of yellowish green color, hardly distinguishable from *epidote* by the eye. The external surface was brown and uneven, like that of a weathered basalt, or trap. The island from which these specimens came has been examined by a geologist, and from the prevalence of this rock, it is said that he pronounced the island to be of volcanic origin. A mass was sent to Dr. Hayes, and he found it had structural planes, the divisions producing trapezoidal masses, their surfaces and the lines marked by darker colors, and, so far as could be determined, there was evidence of the mass being part of a rock formation of some extent.

The chemical composition discloses the remarkable fact that this rock is composed essentially of fish bones and altered shells, which have passed through the alimentary canals of sea fowls. Referring to communications before made, Dr. Hayes stated that the organic matter of fish bones in the droppings of fowl, reacts on the bone phosphate of lime, to eliminate acid salts of phosphoric acid, and these cement other portions, or decompose shells, which are composed of carbonate of lime and animal tissues.

The feldspar-like granules are generally compact, colored portions of converted shells, having a crystalline form, and there are aggregates of ferruginous and aluminous phosphates, arising from the same kind of action on ferruginous matter, which, in the form of a fine clay, or volcanic ash, has been brought within the sphere of the action of the acid phosphates. The cavities sometimes present minute crystalline facets of phosphate of lime crystals, while the capillary channels and pores, which give the trachyte-like character, are really the passages through which the carbonic acid and other gases escaped, during the transformation of the organic matter, precisely as they occur in basalt and trap, where igneous action has been supposed to have been influential.

This rock is covered more or less by Atlantic guano rock, presenting the variety which consists of compact, light-colored phosphate of lime, containing about twenty parts in one hundred of carbonate of lime, and in some parts is a consolidated shell-bank; the recent shells and coral fragments being visible. Where, through time and favorable exposure, the bone remains have thoroughly decomposed the shells, hand specimens would be mistaken for the flesh-colored, massive phosphate of lime of New Jersey. These more or less well-cemented and altered rocks are also connected with still more recent deposits, retaining even the odorous animal remains of oily acids; and the whole formation, above that of the trachytic form of rock, contains the remains of infusoria.

Thus a small island of the Atlantic, lying about eighteen degrees north of the equator, presents us with an epitomized succession of rock strata, formed from materials which, once endowed with life, have served to nourish other living systems, and then given rise to chemical changes, resulting in the production of various mineral solids which remain.

The trachyte-like rock forming the basis rock of this island, theoretically, may have received its geological and chemical characters in ocean water. A subsidence of the land, after its surface had been deeply covered with organic remains, would allow of that aqueous action of decomposition and cementation which we notice, and the subsequent desiccation would explain the natural divisions by rents. The formation of silicates of iron, manganese, and alumina from phosphates of lime, is a mineralizing process which can take place in ocean water by infiltration, volcanic ashes, or divided materials of plastic rocks being present, as analysis shows them to be. The rock is hydrous, losing nearly ten per cent. of its weight by ignition, or

Water with a little organic matter - - - -	10.00
Bone Phosphate of Lime, - - - - - - - -	85.20
Carbonate of Lime, - - - - - - - - - -	3.00
Oxides Iron, Manganese and Alumina, - - -	5.22
Silicic Acid and Sand, - - - - - - - - -	1.78
	105.20

The excess of weight being due to the estimation of the phosphoric acid united to lime as bone phosphate of lime, while truly part of it, with a portion of silica, is united to the oxides present.

Dr. John Bacon exhibited some Calculi, six or seven hundred in number, taken from the bladder of an ox. They were amorphous, presenting no crystalline formation, and containing only a small quantity of organic matter. This is one of the rarest forms of urinary stones.

On motion of Mr. Charles Stodder, it was voted to appoint a Committee to take into consideration and report upon the subject of establishing a Microscopic Department of the Society.

Messrs. Durkee, Jackson, Bacon, Shaw, Sprague, Andrews, and Barnard, were appointed this Committee.

George Duncan Gibb, M. D., of London, was elected a Corresponding Member.

June 3, 1857.

Prof. Wm. B. Rogers, in the Chair.

DEPARTMENT OF MICROSCOPY.

The following report was read and adopted:—

The Committee to whom was referred the subject of establishing a new department for the investigation of microscopic nature, beg leave to offer as a report the following Preamble and Resolutions.

Whereas, The recent acquisition of the invaluable cabinet and library of the late Professor Bailey has awakened the Society to the necessity of giving a new impetus to the progress of microscopic science; to the great usefulness which a special department for the development, record, and publication of observations on the minute structure of organic and inorganic bodies, would possess:

Resolved, That this Society do hereby establish a department for microscopic investigation to be known as the

DEPARTMENT OF MICROSCOPY;

to consist of members of the Society, specially interested in microscopic studies, who may desire to join it. No individuals, who are not members of this Society, shall be members of this department.

Resolved, That a Curator of this department shall be chosen yearly at the Annual Meeting, whose duty shall be to take charge of all specimens and preparations belonging to the department, and to preside at its meetings. The department may appoint sub-committees upon the different branches of the science, to whom shall be referred specimens for examination and report. The Recording Secretary of the Society shall be, *ex officio,* Secretary of this department.

Resolved, That at the first regular meeting of the Society in each month, at the hour of nine o'clock, the presiding officer shall call for microscopic reports, papers, remarks, or exhibitions, in the order here named; and such reports, papers, remarks, or exhibitions shall be in order during the continuance of the meeting, provided that no business matter properly belonging to the Annual Meeting of the Society shall be thus superseded at the regular or adjourned Annual Meetings.

Resolved, That this department shall have the use of the Library Room of the Society for its meetings when desired.

Resolved, That the proceedings of this department shall be published in the Journal and Proceedings of this Society, subject to the decision of the Publishing Committee of the Society.

A Committee, appointed to nominate a candidate for the office of Curator of the Department of Microscopy, reported the name of Dr. Silas Durkee, and he was accordingly chosen Curator of the Department.

Prof. John Bacon exhibited a package of BAILEY'S UNIVERSAL INDICATORS, received from Mr. Gavitt, of Albany, and intended for the use of the Society. Observers, making use of Prof. Bailey's mounted specimens, and being in possession of one of these indicators, may easily find any special object upon the slide which had been referred to or described by Prof. B.

Mr. C. J. Sprague announced the Donation by BENJAMIN D. GREENE, ESQ., the first President of the Society, of his very extensive and valuable HERBARIUM. A Committee, consisting of Messrs. Sprague and Durkee, was appointed to draw up a series of resolutions, expressive of the gratitude of the Society for the donation, and of its proper estimation of its value.

The Curator of Crustacea and Radiata, Mr. Theodore Lyman, was empowered to loan Mr. Bowerbank of London, certain specimens of sponges, to aid him in the publication of a work upon this subject.

The Corresponding Secretary read the following list of letters recently received:—

Elliott Society of Natural History, Charleston, S. C.; Ethnological Society, London, January 31, 1857; K. Bayerische Akademie der Wissenschaften, February 4, 1857; Imperial Mineralogical Society of St. Petersburg, November 30, 1856; Verein für Vaterländische Naturkunde in Wurtemberg, January 20, 1857; Accademia, &c., di Bologna, May 29, 1856; Royal Geographical Society, London, November 29, 1856, acknowledging the receipt of the Society's publications; also from the last five above-named institutions, presenting various publications, as well as from the Naturforschende Gesellschaft zu Emden, October 2, 1856.

Messrs. Archelaus Wilson of Boston, and R. H. Barnwell of the Scientific School, were elected Resident Members.

June 17, 1857.

Dr. D. H. Storer, Vice-President, in the Chair.

The Committee appointed to prepare Resolutions, expressive of the sentiments of the Society in recognition of the donation by Benjamin D. Greene, Esq., of his Botanical Collection, submitted the following, which were unanimously adopted: —

Resolved, That this Society is deeply sensible of the active sympathy which has ever been exhibited in its welfare by its first President, Benjamin D. Greene, Esq.,—a sympathy which has led him to bestow upon the Society his extensive and valuable Herbarium, the fruit of a long lifetime devoted to the cultivation of botanical science, to a diligent accumulation of the world's vegetable productions, and a critical study of our native flora, which his own frequent discoveries have enriched.

Resolved, That the proffer of this rare collection of plants is gratefully and cordially accepted; and the Corresponding Secretary is instructed to inform Mr. Greene of this acceptance, transmitting a copy of these resolutions.

Mr. Sprague stated that the Herbarium is particularly rich in specimens collected by various Exploring Expeditions, both of this country and of Europe; reports of some of which have not as yet been published. Very many of the plants are new to the Society's cabinet, and the collection altogether is very extensive and exceedingly valuable.

Prof. Wm. B. Rogers made some remarks upon a peculiar geological condition which he had noticed in the Slate Rocks of Governor's Island, in Boston Harbor, and of which he had never seen any notice.

At the landing near the fort, where the slate is exposed, he had observed a series of ledges of dark grayish-blue slate, in which is exposed a species of *fault* known as *horizontal heave*. There are two lines of direction in the beds, and these are at right angles with each other. This phenomenon of horizontal heave, combined with the system of cross cleavage which is at right angles with the planes of bedding, creates some obscurity in some spots as to which are the original planes of bedding. In other localities, and especially in the Quincy and Braintree siliceous slate in which trilobites have been recently found, the same difficulty exists; rendering it impracticable to obtain perfect specimens of that fossil in any amount, since the rock splits off in an opposite direction to that in which the animal was deposited.

This system of horizontal heave has been extensively studied in Europe, and has elicited much discussion from geologists and physicists upon the theory of the phenomena engaged in its production. It is supposed that a great pressure has been applied to the rocky mass, either before or after it had reached a complete state of solidity, and that this pressure has produced such a structural arrangement as to develop particular planes of cleavage where the adhesion was the slightest. This supposition has been sustained by experiment, recently instituted in England, in which it has been demonstrated that scales of mica and other material of flattened form, intermingled with plastic clay and submitted to continuous and energetic pressure, assume approximate parallelism, and impart to the mass a laminar structure. Where cleavage shows itself in limestone containing mica scales and flattened particles of silica, the microscope has detected an approximate degree of parallelism between these substances and the cleavage planes.

Dr. S. Kneeland, Jr., exhibited two specimens of Siredon, taken in Portage Lake, Michigan, which were described by him in the Proceedings of February, 1857, and which he had succeeded in keeping alive. These animals are very hardy, the water in which they were contained having been frozen and thawed many times in succession during the last winter, when their only food was such minute matter as they might have found in the lake water. They have maxillary and palatal teeth, and though they are very much feared by the Indians, on account of the supposed poisonous nature of their bite, yet Dr. Kneeland has not known them to attack each other; and he himself handles them very freely, without any attempt of the animal to bite. The heads of the two specimens are of different shape, and possibly they are of different sexes. Since they have been in Boston, they have been fed upon live worms by Dr. Durkee, of which they will consume several every day. Near the gills upon the surface of the body are a number of parasitic worms, rough drawings of which were exhibited by Dr. Durkee.

Dr. H. R. Storer said he had been informed that an Albino of the Common Striped Squirrel of Massachusetts (*Sciurus striatus*) had been taken at South Framingham. It was perfectly white, with pink eyes, and a note like that of the common striped squirrel.

The Secretary, at the request of Dr. T. M. Brewer, exhibited specimens of a Gum from California, which was said to resemble in its properties Gum Arabic, and of a bark which was stated to have the mucilaginous character of Slippery Elm Bark. The specimens were samples of some presented to the California Society of Natural History by Dr. Thomas Payne, of Mariposa, Cal., and forwarded to Dr. Brewer by Dr. Holden; they were referred to Dr. Hayes for analysis.

Mr. Thomas Hollis (after a moment's examination of it) stated that the bark bore considerable resemblance to the Wild Cherry Bark. It had a similar odor, but it was not so astringent. The mucilage from this is not immediately extracted in the mouth, but, as is the case with the Wild Cherry Bark, it may be developed after some hours maceration in cold water. The wild cherry likewise exudes a gum similar to this.

Dr. A. A. Gould presented, in the name of William M. Bailey, Esq., of Providence, a Photograph of his brother, the late Prof. Bailey of West Point. The thanks of the Society were voted for the gift.

Messrs. Theodore Metcalf, George N. Davis, and Thomas D. Morris were elected Resident Members.

ADDITIONS TO THE MUSEUM.

April 15, 1857. Bequest of the late Prof. Jacob W. Bailey, consisting of his complete Microscopical Collection, Algæ, &c., an inventory of which will be found in the Report of the Committee on page 194. A collection of Shells, Crustacea, and Corals; presented by N. E. Atwood. A Trumpet Fish (*Centriscus scolopax*); by Dr. D. H. Storer, the first known to have been taken on this coast. A collection of Algæ; by J. C. Parkinson. A Double-collared Arracari (*Pteroglossus bitorquatus*); a Field Fare (*Turdus pilaris*); a Woodlark (*Anthus arboreus*); by Dr. F. J. Bumstead. A Robin (*Turdus migratorius*); by E. Samuels. A specimen of *Dipsas plicata*, from the East Indies, with images encrusted by the nacre upon its internal surface; by Lieut. G. H. Preble, U. S. Navy; a Female Snow-Goose and a Shoveller Duck from Virginia; by Wm. Sohier. A Song Sparrow and a Robin; by E. Samuels.

May 20. Burrowing Owls (*Athene cunicularia*) male and female, from South America; by N. H. Bishop. Native Borate of Lime from South America; by R. H. Eddy. Fossils and Acorns; by Theodore Parker. Vitreous Copper Ore from South Carolina; by Dr. C. T. Jackson. Saw of a Saw Fish; by Geo. S. Wheelwright.

June 3. The extensive and valuable Herbarium of Benjamin D. Greene, Esq., the first President of the Society. Shells and Crustacea from Hiltonhead, S. C.; by J. S. Fay, Esq. Sponges from Singapore, and Corals; by S. Durkee. Cast of the Brain of Spurzheim; by Theodore Parker.

June 17. A Photograph of the late Prof. J. W. Bailey, presented by his brother W. M. Bailey, Esq., of Providence; *Arvicola austerus*, two specimens, *A. riparius*, *Hesperomys Bairdii*, *Vireo solitarius*, *Trichas Philadelphica*, *Vermivora chrysoptera*, *V. peregrina*, *Rallus elegans*, and a collection of Shells, all from Illinois; by Thomas Kennicott.

BOOKS RECEIVED DURING THE QUARTER ENDING JUNE 30, 1857.

Description of New Fossil Crinoidea from the Palæozoic Rocks of Western and Southern Portions of the United States. By B. F. Shumard, M. D. 8vo. Pamph. Philadelphia, 1857. *From the Author.*

Synopsis Avium Tanagrinarum. By P. L. Sclater. 8vo. Pamph. London. *From the Author.*

Archiv für Naturgeschichte, gegründet von A. F. A. Wiegmann. Fortgesetzt von W. F. Erichson. Sechstes Heft pp. 1–486. 8vo. 3 nos. Berlin, 1855. *From Dr. F. H. Froschel.*

Annual Report of the Trustees of the New York State Library. 8vo. Pamph. Albany, 1457. *From the Trustees.*

Seventeenth Annual Report of the Regents of the University of New York. 8vo. Pamph. Albany, 1857. *From the Regents.*

Fourth Annual Report of the Secretary of the Massachusetts Board of Agriculture. 8vo. Boston, 1857. *From J. L. Flint, Esq., Secretary.*

Report of the Commissioners on the Artificial Propagation of Fish. Massachusetts Legislative Document. 8vo. Pamph. Boston, 1857. *From N. E. Atwood, Esq.*

Proceedings of the American Association for the Advancement of Science. Tenth Meeting, Albany, N. Y., 1856. 8vo. Pamph. Cambridge. *From the Association.*

Laws of Structure of the more disturbed Zones of the Earth's Crust. By Prof. H. D. Rogers. 4to. Pamph. Edinburgh, 1856.

Geology and Physical Geography of North America. By the same. 8vo. Pamph. London, 1856.

Edinburgh New Philosophical Journal. New Series. Nos. 6, 8, 9. 8vo. 1856–7. *From Prof. H. D. Rogers.*

Rapport spécial sur les mesures qui ont été adopté pour l'Etablissement d' une École Normale. 12mo. Pamph. Montreal, 1847.

Regles et Reglements de l'Assemblée Legislative. 18mo. Pamph. Toronto, 1856.

Listes des Rapports ou Etats de la Legislature du Canada. Long 4to. Pamph. Toronto, 1856.

Assemblée Legislative, 1856, Liste des Lois Expirantes. 4to. Pamph. Toronto.

Sommaires des Deliberations de l'Assemblée Legislative du Canada. Long 4to. Pamph. Toronto, 1856.

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Journal de l'Instruction Publique. Vol. I. No. 3. 4to. Pamph. Montreal, 1857.

Farmers Journal. 4to. Pamph. Vol. IV. No. 12. Montreal, 1857.

Second Rapport sur l'Exploration des Lacs Supérieur et Huron. Par le Compte de Rottermund. 8vo. Pamph. Toronto, 1857.

Tables of Trade and Navigation of Canada for 1856. 8vo. Pamph. Toronto, 1857.

Reports of Commissioners of Crown Lands of Canada for 1856. 8vo. Pamph. Toronto, 1857. *From L. A. Huguet Latour.*

Transactions of the Academy of Science at St. Louis. No. 1. Vol. I. 8vo. Pamph. St. Louis, 1857.

Silliman's American Journal of Science and Arts. No. 69, for May, 1857. 8vo. New Haven.

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Natural History Review. Nos. 9, 10, 11. 8vo. London, 1856.

Proceedings of the Royal Geographical Society of London. Nos. 6, 7. 8vo. Pamph. 1857.

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Canadian Naturalist. Vol. II. No. 2. May, 1857. 8vo. Pamph. Montreal.

Conchological Miscellany. By S. Hanley. Nos. 2, 3. 4to. Pamph. London.

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Beitrage zur Kenntniss der Landplanarien nach Mittheilungen des Dr. Fritz Müller in Brasilien und nach eigenen Untersuchungen von Dr. Max Schultze. 4to. Pamph. Halle, 1857.

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Wurttembergische Naturwissenschaftliche Jahreshefte. Zehnter Jahrgang Drittes Heft. Zwölfter Jahrgang; Drittes Heft. Dreizehnter Jahrgang; Erstes Heft. Stuttgart. 8vo. 1856–7.

Die Gewitten des Jahres 1855. Ein Beitrag zur Physiologie der Atmosphäre von Dr. M. A. F. Prestel. 8vo. Pamph. Emden.

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Gelehrte Anzeigen der K. Bayer. Akad. der Wissenschaften. Band 42, 43. 4to. München, 1856.

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Bemerkungen über den Zusammenhang zwischen dem Bildungs gesetze eines Kettenbruches. Von L. Seidel. 4to. Pamph. München, 1855.

Beitrage zu Einens Wissenschaftlichen Begründung der Lehre von Mienenspiel. Von Prof. Dr. E. Harless. 4to. Pamph. München, 1855.

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Memorie della Accademia delle Scienze dell' Istituto di Bologna. Tome VI. 4to. 1855.

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My Last Cruise. By A. W. Habersham. 8vo. Philadelphia, 1857.

Essays Biographical and Critical. By H. T. Tuckerman. 8vo. Boston, 1857.

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Life of George Washington. By Washington Irving. Vol. IV. 8vo. New York, 1857. *Deposited by the Republican Association.*

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Agardh, Jacobus G. Algæ Maris Mediterranei et Adriatici. Observationes in diagnosin Specierum et dispositionem Generum. 8vo. Paris, 1842.

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Braun, Alexander. Algarum Unicellularium Genera nova et minus cognita, præmissis Observationibus de Algis Unicellularibus in Genere. 4to. Lipsiæ, 1855.

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Ehrenberg, C. G. Verbreitung und Einfluss des Mikroscopischen Lebens in Sud und Nord Amerika. Fol. Berlin, 1843.

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———— The Vegetable Kingdom. 8vo. London, 1856.

Mandl, L. Traité Pratique du Microscope et de son Emploi dans l'Etude des Corps Organisés. 8vo. Paris, 1839.

Mohl, Hugo von. Principles of the Anatomy and Physiology of the Vegetable Cell. 8vo. London, 1852.

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Müller, Johann. Ueber die Larven und die Metamorphose der Holothurien und Asterien. 4to. Berlini, 1850.

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Roemer, F. Kriedebildungen von Texas und ihre organischen Einschlüsse. Roy. 4to. Bonn, 1852.

Schacht, H. Das Mikroscop und seine Anwendung, insbesondere für Pflanzen-Anatomie und Physiologie. 8vo. Berlin, 1851.

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Morton, S. G. Catalogue of Skulls of Man and the inferior Animals in his Collection. 8vo. Pamph. 3d ed. Philadelphia, 1849.

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Williamson, W. C. On the Structure of the Shell and Soft Animal of Polystomella crispa, &c. Pamph. Manchester, 1848.

The Ocean, and its Meaning in Nature. 8vo. Pamph.

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——————— On the Microscopic Structure of the Scales and Dermal Teeth of some Ganoid and Placoid Fish. 4to. Pamph. London, 1849.

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Mirbel et Spach. Notes pour servir à l'Histoire de l'Embryogenie Végétale. 4to. Pamph. 1839.

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Translation of "Beitrage zur Lehre von der Befruchtung der Pflanzen." By A. J. C. Corda. 8vo. Pamph. New York, 1836.

Gray, Asa. Remarks on Structure and Affinities of the Order Ceratophyllæ. 8vo. Pamph. New York, 1837.

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Agardh, C. A. Icones Algarum ineditæ: fasciculi qui extant duo. 4to. Pamph. Lund. 1846.

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Arnott, G. A. W. On the Genus Torreya. 8vo. Pamph.

Bowerbank, J. S. On a New Variety of Vascular Tissue. 8vo. Pamph. London, 1840.

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Emerson, G. B. Notice of Prof. A. P. de Candolle. 8vo. Pamph. Boston, 1841.

Gray, Asa. Notice of the Botanical Writings of the late C. S. Rafinesque. 8vo. Pamph.

Southwick, E. W. Notes of a Tour to the White Hills. 8vo. Pamph. 1841.

July 1, 1857.

Dr. Chas. T. Jackson, Vice-President, in the Chair.

The Report of the Committee appointed to audit the Treasurer's Annual Account was read and accepted.

Dr. A. A. Hayes reported that a specimen of Gum from California, referred to him at the last meeting, had been examined chemically. It proved to be pure Arabine, or the colorless constituent of gums, which is soluble in cold water and forms a clear gum solution, without the character of emulsion. This gum is commercially valuable, the quality being fully equal to any imported.

A specimen of Bark from California, also referred to him, was found to contain mucilage, analogous to that of the bark of the *Ulmus fulva*, (Slippery Elm.) It was not, however, so abundant, and it was less soluble in water. Besides mucilage, a small portion of one of the varieties of tannin gives astringency when the bark is chewed. These are not substances of value, and there is no reason for supposing that this bark will prove specially important.

Dr. A. A. Hayes exhibited a specimen of Octohedral Tin Ore rom the gold washings of Owen's River, on the way from Melbourne to Sydney, Australia. The ore is accompanied by titaniferous and chromiferous iron ores, garnets, and yellow quartz. In this connection, he stated that he had examined the black sands of many of the gold washings of California, in which, besides garnets and topazes, cinnabar is generally found, without detecting tin ore. Some of the titaniferous iron crystals yield the slight traces of oxide of tin, often found in the ore, but no crystals of pure oxide of tin have been found. Although, in general, a resemblance exists between the sands of Australia and those of California, the heavy ores found are not the same in both.

Mr. F. H. Storer exhibited specimens of Lithium, Strontium, and Calcium, and described the process of their preparation.

Dr. Jackson presented a specimen of Sugar obtained by Mr. Wray from the *Sorghum saccharatum*, or Chinese Sugar Cane, which was raised in Algeria. He likewise presented some of the dried juice of the Sorghum, which he had prepared from samples of the plant raised in Massachusetts.

Dr. Hayes stated that the plant, when raised in Algeria, contained Cane Sugar, but that, when raised in this climate, it had been satisfactorily determined, by both microscopical and chemical examinations of the juice in the cells, that only Grape Sugar is produced. The specimens were referred to the Microscopical Department.

MICROSCOPICAL DEPARTMENT.

The Curator of the department announced the donation, by Dr. John Bacon, of a handsome portable double Argand Gas Burner, together with the accompanying apparatus for connection with the gas pipes of the building. These burners were used for the microscopical demonstrations of the evening, and found very convenient and effective.

Dr. Durkee exhibited some living specimens of *Vorticella crateriformis*, Ehrenberg. He stated that this infusorial animalcule first made its appearance upon a *Gordius aquaticus*, one of the so-called horse-hair worms, so commonly found in pools of water, which he had alive at his office, and that the Vorticella afterwards was propagated upon the skin of a Salamander, and upon a piece of cork, kept in the same glass vessel with the worm. The animalcule surmounts a flexible stem or pedicle, it is transparent, and its mouth is surrounded by numerous cilia, which are constantly in motion, and serve to keep the water in circulation and to bring food near it. The Vorticellæ, assuming a great variety of elegant forms, with their pedicles at times partially coiled in a spiral form, and at other times elongated, and with the cilia in motion, producing a current carrying with it small particles of water into the alimentary sack, were beautifully seen upon the stand of the microscope.

Dr. Bacon exhibited some very large and fine specimens of Cystine, from the spontaneous deposit of the urinary excretion of a person who has passed several Cystine Calculi within a few months. This substance is of extremely rare occurrence here.

Dr. Bacon also exhibited some Crystals of the Sulphate of Iodo-Quinine, a substance remarkable for its polarizing action, and some Zeolitic Crystals of Carbonate of Lime, from the urine of the horse.

Dr. Durkee exhibited specimens of *Vallisneria spiralis*, an aquatic plant, growing in great abundance in Fresh Pond and other waters. The circulatory fluid of the plant, running in channels around the cells of which it is composed, was plainly demonstrated by the microscope.

Mr. Sprague exhibited specimens of an Alga which he found in a sulphur spring near Portland, Me. It grew in abundance, investing the neighboring grass, sticks, leaves, &c., with a soft flaccid, snow-white fringe. It was found to consist, under the microscope, of excessively slender, pellucid filaments, about a line or more long, filled with minute granules, arranged in no particular order. The filaments were simple, and attached firmly to the object on which they grew. Mr. Sprague supposed that it might be the *Calothrix nivea*, Ag.

He also exhibited some of the minute fungi of the order *Coniomycetes*—*Sporidesmium concinnum* and *Sporidesmium epiphyllum*.

Messrs. John S. Martin and Edwin Manley were elected Resident Members.

July 8, 1857.

MICROSCOPICAL DEPARTMENT.

Dr. Silas Durkee, Curator, in the Chair.

It was voted to appoint sub-committees, to whom should be referred specimens for microscopic examination; and the following were appointed, viz: —

Anatomy.—Jeffries Wyman, Silas Durkee, A. A. Gould, O. W. Holmes, H. I. Bowditch, J. N. Borland, D. F. Weinland.

Geology and Mineralogy.—A. A. Hayes, C. T. Jackson, W. B. Rogers, H. D. Rogers, Louis Agassiz, T. T. Bouvé.

Botany.—C. J. Sprague, S. Durkee, C. L. Andrews.

Pathology.—D. S. Shaw, Calvin Ellis, H. J. Bigelow, C. D. Homans.

Chemistry.—John Bacon, C. T. Jackson, A. A. Hayes, J. P. Cooke, F. H. Storer.

Messrs. Bacon, Cooke, and Shaw were appointed a committee to examine the specimens of *Sorghum saccharatum* referred to the department at the previous meeting of the Society.

July 15, 1857.

Dr. C. T. Jackson, Vice-President, in the Chair.

The Committee of the Council to whom was referred the consideration of the expediency of raising the Annual

Assessment from three to five dollars, presented a report, which was read and accepted. The Committee concluded their report with the recommendation that the Annual Assessment be five instead of three dollars. The consideration of this recommendation was postponed to the next meeting.

The Chairman read a letter from Townend Glover, of Washington, returning thanks to the Society for his election as Corresponding Member, and accepting the same. Mr. Glover likewise wrote that he intended soon to send to the Society a number of plates of Insects Injurious to Vegetation, which he was preparing for publication.

Mr. T. J. Whittemore read a letter from a gentleman in Germany, proposing to exchange a collection of Fossil Shells of Austria for those of North America, or a rare and costly work on fossils for the same. The letter was referred to the Curator of Geology.

Dr. S. Kneeland, Jr., read the following paper: —

ON THE BIRDS OF KEWEENAW POINT, LAKE SUPERIOR.

BY S. KNEELAND, JR., M. D., BOSTON.

Most of the birds mentioned in the following list were seen by me during a residence of nearly a year at Portage Lake, from August, 1856, to June, 1857. A few have been introduced on the authority of competent eye-witnesses. When there is any doubt concerning the occurrence of a bird, it is so indicated. In Keweenaw Point, I include that portion of the Upper Peninsula of Michigan which extends up into Lake Superior, embracing not only the Point proper, but the western portion as far as Ontonagon, the region of Portage Lake and Entry, and the Anse of Keweenaw Bay—all of which localities I have visited.

This region lies between 47° and 48° north latitude, and between 88° and 90° longitude west from Greenwich, being the so-called "Copper Region" of Lake Superior.

It is probable that many birds, especially among the warblers and migratory species, will be added to this list hereafter; and it is almost certain that many others inhabit the adjacent country, which has been very little explored. This, therefore, is only an approximation to a complete list of the birds of Upper Michigan.

This district is, for the most part, heavily wooded with pines, spruces, firs, balsams, cedars, maples, and birches, and would be naturally supposed to be the favorite retreats of many more birds than are found in it. The stillness of the dark and virgin forests is most remarkable; and it is only during the few warmer months that the woods lose this dismal character. Snow begins to fall about the middle of November, from which date to the middle of March, scarcely a day passes without a fall of snow some time during the twenty-four hours—hence only the hardier birds remain during the winter. The numerous small lakes and water-courses are the favorite resorts of many water-birds, some of whom breed here.

Of mammals, the small fur-bearing animals alone are common; such as the fox, beaver, otter, fisher, marten, mink, and musk-rat —wolves are quite unknown; deer scarce, and bears few. Porcupines and squirrels are numerous.

FALCONIDÆ.

1. Golden Eagle. *Aquila fulvus*, Linn. This bird I have not seen, neither have I met with any one who has seen it beyond a doubt; though, from the reports of hunters and Indians, I am inclined to think it is found here.

2. Bald Eagle. *Haliætus leucocephalus*, Linn. Breeds on the Point and near Portage Lake.

3. Fish Hawk. *Pandion haliætus*, Linn.

4. Gyr-Falcon. *Falco Islandicus*, Brünn. I have heard of a white falcon, of large size, (measuring about five feet in the spread of his wings,) which was shot on the Point; this, I think, must have been the gyr-falcon.

5. Great-footed Hawk. *Falco peregrinus*, Linn.

6. Pigeon Hawk. *Hypotriorchis columbarius*, Linn.

7. Sparrow Hawk. *Tinnunculus sparverius*, Linn.

8. Common Buzzard. *Buteo vulgaris*, Bechst.

9. Red-shouldered Hawk. *Buteo lineatus*, Gmel.

10. Red-tailed Buzzard. *Buteo borealis*, Gmel.

11. Rough-legged Buzzard. *Archibuteo lagopus*, Brun.
12. Goshawk, (doubtful.) *Astur palumbarius*, Linn.
13. Cooper's Hawk, (doubtful.) *Accipiter Cooperi*, Pr. Bonap.
14. Sharp-shinned Hawk. *Accipiter fuscus*, Gmel.
15. Common Harrier. *Circus cyaneus*, Linn.

STRIGIDÆ.

16. Hawk Owl. *Surnia funerea*, Gmel. This owl is common in the neighborhood of Eagle River and Harbor; it is not found at Portage Lake.
17. Snowy Owl. *Nyctea nivea*, Thunb.
18. Acadian Owl. *Athene Acadica*, Temm.
19. Cinereous Owl. *Syrnium cinereum*, Gmel.
20. Barred Owl. *Syrnium nebulosum*, Gmel.
21. Great Horned Owl. *Bubo Virginianus*, Gmel.
22. Mottled Owl. *Ephialtes asio*, Linn.

CAPRIMULGIDÆ.

23. Whip-poor-will. *Caprimulgus vociferus*, Wils.
24. Night-Hawk. *Chordeiles Virginianus*, Briss.

HIRUNDINIDÆ.

25. Barn Swallow. *Hirundo rufa*, Vieill.
26. White-bellied Swallow. *Hirundo bicolor*, Vieill.

ALCEDINIDÆ.

27. Belted Kingfisher. *Ceryle alcyon*, Linn.

CERTHIDÆ.

28. Red-bellied Nuthatch. *Sitta Canadensis*, Lath.
29. Winter Wren. *Troglodytes hyemalis*, Vieill.

LUSCINIDÆ.

30. Blue Bird. *Sialia Wilsoni*, Swains.
31. Arctic Blue Bird. *Sialia arctica*, Swains.
32. Water Thrush. *Enicocichla Noveboracensis*, Gmel.
33. Black-capped Tit. *Parus atricapillus*, Wils.
34. Hudson's Bay Tit. *Parus Hudsonicus*, Mill.

35. Yellow-poll Warbler. *Mniotilta æstiva*, Gmel.

36. Canada Warbler. *Mniotilta Canadensis*, Linn.

37. Yellow-rumped Warbler. *Mniotilta coronata*, Linn.

38. Black-poll Warbler. *Mniotilta striata*, Gmel.

39. Black and Yellow Warbler. *Mniotilta maculosa*, Gmel.

40. Black-throated Green Warbler. *Mniotilta virens*, Gmel. (Doubtful.) It is probable that many other warblers are found here; and it is said that some are, on more or less good authority; but where there is so little certainty, I prefer to leave the list of warblers to be filled up hereafter.

41. Wagtail. *Anthus Ludovicianus*, Gmel.

TURDIDÆ.

42. American Robin. *Turdus migratorius*, Linn. This bird appears in the latter part of April, a month before the snow leaves the ground.

43. Wood Thrush. *Turdus mustelinus*, Gmel.

44. Rufous-backed Thrush. *Turdus fuscescens?* Shaw.

45. Olive-backed Thrush. *Turdus solitarius?* Wils.

46. Cat-Bird. *Mimus Carolinensis*, Linn. This bird is not found at Portage Lake, though it is said to occur in the more settled parts of the country. As this is one of the species which follow the course of agriculture, it is quite likely that it will soon become a general summer resident.

MUSCICAPIDÆ.

47. King Bird. *Tyrannus intrepidus*, Vieill.

48. Pewit Flycatcher. *Myiobius nunciola*, Wils.

49. Wood Pewee. *Myiobius virens*, Linn.

50. Redstart. *Setophaga ruticilla*, Gmel.

51. Red-eyed Vireo. *Vireo olivaceus*, Linn.

52. White-eyed Vireo. *Vireo Noveboracensis*, Gmel.

AMPELIDÆ.

53. Bohemian Wax-wing. *Ampelis garrulus*, Linn.

54. Cedar Bird. *Ampelis cedrorum*, Vieill.

LANIIDÆ.

55. Great American Shrike. *Lanius septentrionalis*, Gmel.

CORVIDÆ.

56. Canada Jay. *Perisoreus Canadensis*, Linn. This bird is common in the winter, and a great pest to the trappers, from its propensity to steal their poisoned baits. Like the raven, it often falls a victim to its greediness, by devouring meat containing strychnine set for foxes and the fur-bearing animals.

57. Blue Jay. *Cyanocorax cristatus*, Linn. Not common on Portage Lake.

58. American Magpie. *Pica Hudsonica*, Sabine. I have seen a few specimens obtained near Eagle River.

59. American Raven. *Corvus cacalotl*, Wagl. Very common at Portage Lake; in the winter almost, if not entirely, to the exclusion of the crow.

60. American Crow. *Corvus Americanus*, Aud. Rare at Portage Lake, but common on the Point and in the Ontonagon district.

STURNIDÆ.

61. Rusty Grakle. *Scolecophagus ferrugineus*, Wils. Early in the spring these birds arrive in immense flocks, and exceedingly fat; they remain till about the last of September.

62. Cow Blackbird. *Molothrus pecoris*, Gmel.

63. Red-winged Blackbird. *Agelaius phœniceus*, Linn.

64. Bob-o'-link, (doubtful.) *Dolichonyx oryzivorus*, Linn.

FRINGILLIDÆ.

65. Rose-breasted Grosbeak. *Guiraca ludoviciana*, Linn.

66. American Goldfinch. *Fringilla tristis*, Linn.

67. Lesser Red-poll. *Fringilla linaria*, Linn. These birds are seen in flocks of twenty or thirty all through the winter, in the woods near the lake and in the beaten roads, in company frequently with the snow-birds. They show a singular propensity to pick in snow stained by human urine; though the roads be full of the dung of cattle containing oats and pieces of corn, the linnets I have always seen in crowds about the spots in the snow discolored from the above cause; whether this habit was from a desire to obtain fluid at a season when the snow does not melt even at mid-day, or some of the elements of this secretion,

I cannot say. Similar congregations of bees and wasps are often noticed about public urinals in the country.

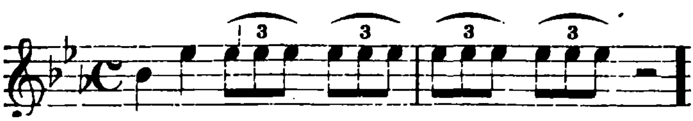
68. Snow Bird. *Fringilla hyemalis*, Linn.

69.* Pine Finch. *Fringilla pinus*, Wils.

70. Fox-colored Sparrow. *Zonotrichia iliaca*, Merr.

71. Song Sparrow. *Zonotrichia melodia*, Wils.

72. White-throated Sparrow. *Zonotrichia albicollis*, Gmel. This bird is very abundant. Its beautiful and plaintive notes may be musically represented as follows:—



as to interval and time in a flat key; this should be written two octaves above, and the fourth interval (E flat) should be what is called a "flat fourth;" sometimes the first two notes only are heard, at others, from one to the four triplets in addition; instead of the triplets, an equivalent single note is often given for one or more of them. I have heard its sweet song at all hours of the day and night in the spring and summer.

73. White-crowned Sparrow. *Zonotrichia leucophrys*, Forst.

74. Bay-winged Sparrow. *Zonotrichia graminea*, Gmel.

75. Chipping Sparrow. *Zonotrichia socialis*, Wils.

76. Tree Sparrow. *Zonotrichia monticola*, Gmel.

77. Snow Bunting. *Plectrophanes nivalis*, Linn.

78. Lapland Lark Bunting. *Plectrophanes lapponicus*, Linn.

79. Shore Lark, (doubtful.) *Otocoris alpestris*, Linn.

80. Purple Finch. *Carpodacus purpureus*, Gmel.

81. Pine Grosbeak. *Strobilophaga enucleator*, Linn.

82. Common Crossbill. *Loxia Americana*, Wils.

83. White-winged Crossbill. *Loxia leucoptera*, Gmel. The former of these crossbills occurs in large flocks during most of the winter, hopping about the houses with the familiarity of chipping sparrows. The white-winged species I have not seen; but I am confident it is found here.

PICIDÆ.

84. Arctic Woodpecker. *Picoides arcticus*, Rich. and Sw.

85. Three-toed Woodpecker. *Picoides hirsutus*, Vieill. The first of these species is common during the whole of the severe winters of Lake Superior.

86. Hairy Woodpecker. *Picus villosus*, Linn.

87. Downy Woodpecker. *Picus pubescens*, Linn.

88. Canada Woodpecker. *Picus leucomelas*, Bodd.

89. Pileated Woodpecker. *Dryocopus pileatus*, Linn.

90. Red-headed Woodpecker. *Melanerpes erythrocephalus*, Linn.

91. Golden-winged Woodpecker. *Colaptes auratus*, Linn.

COLUMBIDÆ.

92. Passenger Pigeon. *Ectopistes migratorius*, Linn. I have seen them at Portage Lake as early as May 4.

TETRAONIDÆ.

93. Common Quail. *Ortyx Virginianus*, Linn. This is another of the birds that follow man in his agricultural movements. A few years since quails were unknown in the Upper Peninsula; now they are not uncommon on the Point; as yet they have not been seen on Portage Lake. As more attention is paid to agriculture for the support of the mining population, the quail will doubtless be common in the fields.

94. Canada Grouse. *Tetrao Canadensis*, Linn.

95. Ruffed Grouse. *Bonasa umbellus*, Linn. The first species is comparatively rare; I have never heard of one being seen on Portage Lake. The latter species is very common in the woods at all seasons of the year.

96. White Ptarmigan. *Lagopus mutus?* Leach. There is a white grouse in this region, but whether it is the *L. mutus*, *albus*, or *leucurus*, I cannot positively say.

CHARADRIADÆ.

97. Black-bellied Plover. *Squatarola Helvetica*, Linn.

98. Golden Plover. *Charadrius pluvialis*, Linn.

99. American Ring Plover. *Charadrius semipalmatus*, Kaup.

ARDEIDÆ.

100. Sandhill Crane. *Grus Americana*, Linn.

101. Green Heron. *Ardea virescens*, Linn.

102. American Bittern. *Botaurus lentiginosus*, Mont.

SCOLOPACIDÆ.

103. Yellow-shanks Tatler. *Totanus flavipes*, Gmel.

104. Tell-tale Tatler. *Totanus melanoleucus*, Gmel.

105. Solitary Tatler. *Totanus chloropygius*, Vieill.

106. Semipalmated Tatler, (doubtful.) *Totanus semipalmatus*, Gmel.

107. Spotted Tatler. *Tringoides macularia*, Linn.

108. Long-legged Sandpiper, *Hemipalma multistriata*, Licht.

109. Schinz's Sandpiper. *Tringa Schinzii*, Brehm.

110. Peep. *Tringa pusilla*, Wils.

111. Red-breasted Snipe. *Macroramphus griseus*, Gmel.

112. Common Snipe. *Gallinago Wilsonii*, Temm.

113. Woodcock. *Philohela minor*, Gmel.

114. Wilson's Phalarope. *Phalaropus Wilsonii*, Sab.

RALLIDÆ.

115. Sora Rail. *Ortygometra Carolina*, Linn. This is not uncommon at Portage Lake in September and October.

116. American Coot. *Fulica Americana*, Gmel. The tatlers, sandpipers, snipes, coots, geese, ducks, and loons, begin to arrive at Portage Lake about the last of April, when only the small streams opening into the lake are free from ice; from this time till the last of May, when the ice disappears, they are very numerous, and are shot in great numbers.

ANATIDÆ.

117. White-fronted Goose. *Anser erythropus*, Linn.

118. Snow Goose. *Anser hyperboreus*, Pall. These are rare, compared with the Canada Goose.

119. Canada Goose. *Bernicla Canadensis*, Linn. Quite common at Portage Lake in the spring.

120. Swan. *Cygnus Americanus*, Sharpless. These birds have been seen flying over, but I have never known of one alighting or being shot in this region.

121. Summer or Wood Duck. *Aix sponsa*, Linn.

122. American Widgeon. *Mareca Americana*, Gmel.
123. Pintail Duck. *Dafila acuta*, Linn.
124. Mallard. *Anas boschas*, Linn.
125. Dusky Duck. *Anas obscura*, Gmel.
126. Green-winged Teal. *Querquedula Carolinensis*, Gmel.
127. Blue-winged Teal. *Pterocyanea discors*, Linn.
128. Gadwall Duck. *Chaulelasmus strepera*, Linn.
129. Shoveller Duck. *Spatula clypeata*, Linn.
130. Ring-necked Duck. *Fuligula collaris*, Don.
131. Scaup Duck. *Fuligula marila*, Linn.
132. Canvas-back Duck. *Nyroca valisneria*, Wils. This duck is occasionally seen here during its migrations, but I could not ascertain that any had ever been shot.

133. Red-headed Duck. *Nyroca Americana*, Pr. Bonap. This species I have often seen and eaten at Portage Lake.

134. Golden-eye Duck. *Clangula Americana*, Pr. Bonap.
135. Buffel-headed Duck. *Clangula albeola*, Linn.
136. Goosander. *Mergus castor*, Linn.
137. Red-breasted Merganser. *Mergus serrator*, Linn.
138. Hooded Merganser. *Mergus cucullatus*, Linn. I have been told by hunters here that there is at some seasons of the year, a nearly white merganser, or "saw-bill," as they call it, in the lakes of this vicinity. From the alleged improbability of the occurrence of the *smew* (*Mergellus albellus*, Linn.) except as a very rare visitor from Arctic Europe, I have not included this bird in my list, though its occurrence is firmly maintained by the Indians and hunters, who ought to know. The bird seen by them may be some white-plumaged duck; though I must say I am inclined to believe that Audubon is wrong in excluding the smew from the American continent, and that Wilson is right in making it not an uncommon bird here.

COLYMBIDÆ.

139. Common Loon. *Colymbus glacialis*, Linn. This is a very common species at Portage Lake, in the spring and summer, and is here possessed of all the shyness peculiar to it in more populous localities. The only way the gunner can approach it in the open lake, where it delights to sport and feed, is to conceal the bow of his boat or canoe with branches of evergreen, and

surmount the leafy covering with a bright flag; behind this screen he can paddle easily towards the bird, whose natural curiosity prompts him to swim towards it to see what the strange object is. By keeping up a shrill whistle at the same time, it is not difficult to get within gun-shot. They are hunted considerably for their skins, of which the natives make bags, pouches, and knife-sheaths.

140. Red-throated Diver. *Colymbus septentrionalis*, Linn.

141. Black-throated Diver. *Colymbus arcticus*, Linn.

142. Crested Grebe. *Podiceps cristatus*, Linn.

143. Horned Grebe. *Podiceps cornutus*, Gmel.

144. Pied-bill Dobchick. *Podilymbus Carolinensis*, Lath.

LARIDÆ.

145. Herring Gull. *Larus argentatus*, Brün. This bird is very common on the Great Lakes, following in the wake of steamers and vessels, and is not uncommon on Portage Lake. There is said to be a smaller black-headed gull there, but I have never seen it above the Saut St. Marie. This is undoubtedly the *Larus Bonapartei*, Rich. & Sw.

146. Common Tern. *Sterna Wilsoni*, Pr. Bonap. There are doubtless other species of terns here.

PELECANIDÆ.

147. White Pelican. *Pelecanus trachyrhynchus*, Lath. One of these birds was seen and shot at on the Point a few years since.

Synopsis of number of Species in the several Families.— Falconidæ, 15; Strigidæ, 7; Caprimulgidæ, 2; Hirundinidæ, 2; Alcedinidæ, 1; Certhidæ, 2; Luscinidæ, 12; Turdidæ, 5; Muscicapidæ, 6; Ampelidæ, 2; Laniidæ, 1; Corvidæ, 5; Sturnidæ, 4; Fringillidæ, 19; Picidæ, 8; Columbidæ, 1; Tetraonidæ, 4; Charadriadæ, 3; Ardeidæ, 3; Scolopacidæ, 12; Rallidæ, 2; Anatidæ, 22; Colymbidæ, 6; Laridæ, 2; Pelecanidæ, 1.

In all, 147 species; of which 96 are land birds, and 51 are water birds. The birds of prey are numerous, and consequently the warblers, flycatchers, and finches are in the proportion necessary to supply them with food. The crow and woodpecker families preserve the usual ratio of cold climates; while the ducks, divers, and beach birds are what we should naturally expect to find in the neighborhood of the largest and finest sheet of fresh water in the world.

Dr. Silas Durkee exhibited two specimens of the Common Glowworm, (*Lampyris noctiluca*,) which were found in Dedham, Mass. He remarked that the Glowworm is not the larva of an insect, but the perfect female of a winged beetle, from which it is so different that nothing but actual observation would lead one to infer that they are different sexes of the same insect.

The specimens exhibited have a small flat head, furnished with antennæ about half a line in length, and when examined with a common pocket magnifier, are seen to consist of two colors, white and chestnut, alternating. They do not appear to have the power of producing or extinguishing the light at will. Their brilliancy is less than that of the *Elater noctilucus*, two specimens of which Dr. D. exhibited several months since. Dr. Durkee said that he had watched these glowworms during an interval of about nine hours, commencing at eight o'clock in the evening. The peculiar faculty of producing light began to show itself between the segments of the body and at the large spiracles or stigmata, which may be seen in connection with the rings; there being two of these spiracula to each segment, and twenty-four in all. From about eight o'clock to midnight, the light along the rings and at the spiracles was much more brilliant than it was through the segments themselves. But during the latter part of the night, the light was equally diffused throughout the entire length of the worm. This was the case in both specimens. And during this distribution of the luminous power, or property, nothing could be seen of the spiracula, or of the segments or joints. The worms appeared as if they were two fused masses of beautiful phosphorescent light; sometimes at rest, sometimes assuming a variety of shapes, according to their slow and graceful movements. The luminous properties were displayed at first through a few of the spiracula and a few of the joints, while all the rest were in a condition like that which is maintained during the day; that is, they yielded no light. This partial illumination. however, soon gave place to the most charming diffusion of light along the whole length of the body, and the latter condition was preserved unbroken until the light of day broke the charm, and these fairy little creatures were transformed into mere worms.

It is said that the light in the female is most brilliant in the season when the sexes are destined to meet. In some species the light is emitted only during the period for propagation.

The Curator of Crustacea and Radiata asked to be excused from the care of the Crustacea, or to have the department divided. He thought there was sufficient labor for two curators, and he could properly take charge of the Radiata only. The subject was referred to a committee, consisting of Messrs. Abbot, Gould, and Whittemore.

James H. Slawson, of Houghton, Michigan, was elected a Corresponding Member.

Messrs. Chas. V. Bemis, M. D., of Medford, and Oliver W. Peabody, of Boston, were elected Resident Members.

August 5, 1857.

Dr. Chas. T. Jackson, Vice-President, in the Chair.

A communication was read from the Georgic Association of Cattaraugus County, N. Y., requesting donations of Publications, Specimens, &c. Referred to the Publishing Committee.

Mr. W. G. Dix, by invitation, read a paper upon Ecuador and its natural productions.

Dr. Head, of the U. S. Army, exhibited a large Hairball, so called, six inches in diameter, taken from the stomach of a healthy ox, on the banks of the Nueces, in Texas. Its surface was smooth, hard, and apparently calcareous.

Dr. D. H. Storer remarked that balls of this character were occasionally found here; not, however, so large as this. Quite a large one from the stomach of a hog, composed of bristles, was sent recently to the Society for Medical Improvement. The hairs are introduced into the stomach in the process of licking the skin.

Dr. H. R. Storer presented specimens of a Smelt from Squam Lake, N. H., remarking on its peculiar interest, as affording an instance of a species originally migrating to fresh water from salt water, and now permanently resident in the former.

Dr. Storer said that he had learned of its existence several years since, but had, until now, been unable to obtain it. When full grown the lake smelt seldom exceeds six inches in length and is extremely attenuated, but a careful examination leaves little doubt of its identity with our marine *Osmerus viridescens*. It is found throughout the year, in both Squam Lake and Winnipiseogee, though more rarely in the latter. The modifications in shape referred to, would probably be found to exist also in the smelt of Jamaica Pond, near Boston, specimens of which had already been presented to the Society; the conditions of life being much the same in both, the latter having been imprisoned artificially, while the former had become a permanent resident in fresh water from natural causes alone.

It was once supposed that the salt water Cusk was found in the New Hampshire lakes, but Dr. D. H. Storer had proved, in the Journal of this Society, that the fishes in question were not only specifically but generically distinct.

Dr. Storer also presented two species of Leuciscus, one of them probably undescribed, from the same locality.

MARYLAND MARBLES AND IRON ORES.

Dr. C. T. Jackson stated that he had recently examined the marble and limestone quarries of Texas, Maryland, for Mr. William Robinson, of Baltimore, and at the same time had visited the quarries in the same town where the marbles now employed in the extension of the General Post-Office and Patent-Office at Washington, were obtained. The marbles at Mr. Robinson's quarries are identical in character with those from the United States quarries above mentioned.

The Dolomite, which is the finer-grained marble, similar to that used in the Post-Office extension, has a density of 2.851, hence a cubic foot of it will weigh 178.187 pounds avoirdupois.

On chemical analysis this stone is found to consist of

Carbonate of lime - - - - - - - - -	59.4
Carbonate of Magnesia - - - - - - -	38.5
Carbonate of Manganese and Iron - - -	1.4
Insoluble siliceous matter - - - - - - -	0.7
	100.0

The strength of a stone of the neighboring quarry, tested at Washington, was found to be equal to a resistance of 18,061 pounds per square inch. This marble is suitable both for monumental purposes and for architecture. The broken fragments of it make, when burned, a hot magnesian lime, which, when mixed with sand, forms a mortar with some hydraulic properties, so that it is very permanent, and resists the action of water after it is once hardened or set.

The other marble is a coarse-grained white limestone, called by the quarrymen Alum Stone, on account of the large size of its crystals, and their great purity. A stone identical with this is employed in the extension of the Patent-Office buildings. This marble has a density of 2.697, and a cubic foot of it weighs 168.562 pounds. Its strength is equal to a resistance of 8.057 pounds per square inch, according to the experiments made at Washington on a stone identical with this which was taken from a neighboring quarry.

This stone is largely burned for making lime, and furnishes the best quality of pure white lime for mortar and for plastering ceilings. The marble is also employed in building, though it is far inferior in strength to the dolomitic variety before described. On chemical analysis this limestone was found to consist of

Carbonate of lime, - - - - - - - - - -	97.9
Carbonate of Manganese and Iron, - - -	1.8
Insoluble Silica, - - - - - - - - - -	0.3
	100.0

It does not contain any magnesia, a remarkable fact, considering its close contiguity to the Dolomite.

Dr. Jackson stated he had on this same excursion examined a remarkable locality of Iron Ore, near Whitehall station on the Northern Central Railroad, about 20 miles north of Baltimore.

This locality presented some interesting geological and mineralogical phenomena. The rocks were Talcose rock or soapstone, chlorite slate, and masses of crystallized garnets so closely packed together in chlorite as to resemble a pudding stone in general appearance. The garnets are regular rhombic dodecahedrons, and are generally of the size of grape shot, though some of them are as large as a turkey's egg. The chlorite slate is filled with an impurity of crystals of octahedral magnetic iron ore, and with veins of the granular ore of the same kind. The soapstone generally underlies the iron ore, though it alternates with the chlorite slate in one instance at this mine. The iron ore with the chlorite slate and garnet rock are mined together, and the ore sells at a neighboring anthracite furnace at $3 per ton. Dr. Jackson said that no one would, on looking at the heaps of this ore, conceive it worth any thing for furnace purposes, but on analysis he found that an average sample of the ore yielded 41 per cent. of the per oxide of iron, which is equal to 28$\frac{7}{10}$ per cent of metallic iron.

A certain proportion of garnets aids the smelting of the iron ore by their ready fusion and by preventing the absorption of any oxide of iron by the slag even if the garnet itself does not yield, as it probably does, a certain proportion of iron in the smelting furnace.

Dr. C. T. Jackson presented, in the name of W. E. S. Whitman, Esq., of Gardiner, Me., specimens of the shells, (*Alasmodonta arcuata*) which are opened for pearls in that State.

Dr. J. A. Lamson was elected a Resident Member.

The names of Professors W. B. and H. D. Rogers were added to the list of Resident Members.

DEPARTMENT OF MICROSCOPY.

An extract from a letter of C. A. Spencer, of Canastota, N. Y., to Dr. Durkee, was read to the Society.

Mr. Spencer says that he is "manufacturing a new lens, which he calls the 'Orthoscopic Eyepiece.' It is more perfectly achromatized than the old negative form, has a perfectly flat field, and is more luminous. Its cost, he says, is high, (fifteen dollars;) still, he is satisfied it will meet a want long felt by microscopists."

Alluding to some recent examinations of animal tissues with his lenses, in connection with Mr. Clark, Prof. Agassiz's assistant, Mr. Spencer says, "one result of large angles of aperture in such investigations was a gratifying and complete answer to the objections made by some to such lenses. In studying tissues made up of several laminæ or layers, varying, perhaps, *inter se*, in their textures, small angles of aperture give a confused mixture of all the layers at once, and the specific characters of none. We found the large angles of aperture to insulate these beautifully and perfectly,—an effect of course valuable in the highest degree."

Dr. John Bacon exhibited specimens of Foraminifera, from South Carolina, and Polycistina from Barbadoes, belonging to the Bailey collection.

These fossils belong to the same group, and agree in some of their essential characters. The calcareous carapaces of the former are perforated with numerous openings through which the animal protrudes thread-like processes of its body for nourishment. In the latter, the carapaces are siliceous, and, with the exception of these, there are no organisms having siliceous coverings, which have been positively determined to be animal. They have been placed in the animal kingdom from their structure and the albuminous character of their substance, (sarcode,) from their motion, and from the manner of obtaining nutriment, distinct from that of vegetables.

Dr. Bacon also exhibited specimens of Foraminifera and Polycistina found in deep soundings of the Atlantic Ocean.

Mr. C. L. Andrews exhibited specimens of Algæ.

Mr. Chas. K. Stevens, of Lawrence, exhibited one of Spencer's microscopes, to which were adapted a second set of lenses made by Nachet of Paris, and embodying some recent improvements.

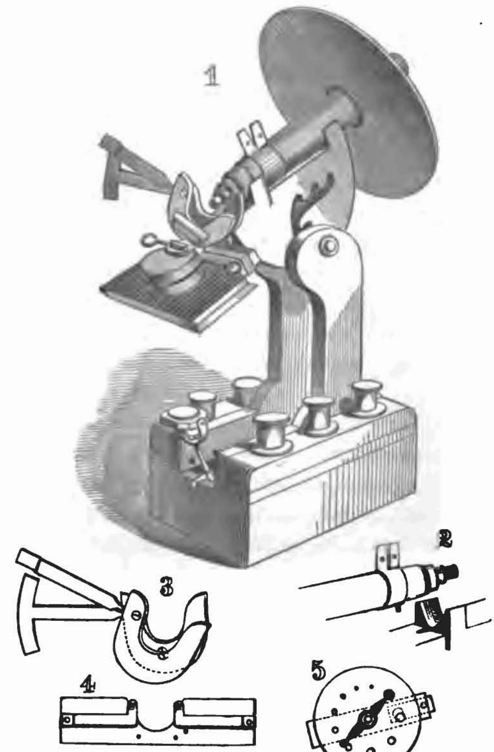
A description of a new stand for the compound microscope was given, and the instrument exhibited by Dr. Oliver Wendell Holmes, as follows:—

The more especial object of this mechanical arrangement is to facilitate the use of the *direct light* of a lamp placed close to the object. Many of our microscopists must have seen Mr. Spencer use a lamp in this way, holding it in his hand and varying the distance and obliquity so as to produce the particular effect desired. The advantages of direct light are its easy management, its brilliant effects, and the more perfect definition it gives of delicate objects. But, inasmuch as the heat and smoke of the lamp ascend, this method of illumination can only be used with the microscope-tube (or *compound body*) in the horizontal or moderately inclined position, unless the lamp be so far removed as to lose its peculiar advantages. It is evident that the lamp cannot be used at all with the tube vertical and directly over it.

If an instrument is to be employed in the horizontal or slightly inclined position, it will require a *stage movement;* otherwise both hands will be needed to move the object, and will even then find it awkward to do so, as the object must be secured to prevent its sliding. Again, if the stage is inclined, and the lamp close to it, it is evident that the broader the stage the more it overhangs the lamp, and the more it is exposed to its smoke and heat. By making the stage open at top, like a horseshoe, we get rid of this difficulty entirely.

An instrument that answers this *special* object alone, namely, the use of direct light, can be made, on the general plan of the one I show the Society, with great ease, and at small expense.

But as it is sometimes necessary or convenient that the object should be placed horizontally and the microscope-tube vertically,—as in examining fluids with low powers, or opaque bodies,—certain additions have been made to this model to render it capable of being so used; reflected light, or the use of the condensing lens being substituted for the mode of illumination for which it is specially adapted. This, of course, involves the expense of a mirror and lens with their adjustments, which is, however, trifling, if the plan here shown is followed.



The instrument is represented in working order in figure 1.

The base of the whole is a box made of black walnut, three quarters of an inch thick, having two uprights, of the same material and thickness, firmly screwed to the inner edges of the strips which partly cover it. On each side of the uprights, over these partial covers, are screwed two thick pieces of black walnut, with holes for the eye-glasses on one side and the objectives on the other.

This box is open at one end to receive a flat-iron or other weight, if required, and to admit the other parts when the instrument is packed.

Between the uprights is received the *bearing semicircle*, made of three pieces of black walnut glued together, the inner one having the grain directed lengthwise, the two outer ones vertically. This is provided with a "slot" partly vertical, partly horizontal, and several notches. A binding screw holds it at any angle and at various heights between the uprights.

The microscope-tube, made heavy by a leaden tube inside, is laid upon two V-shaped supports cut out of the wood, being held solely by its weight when used in the horizontal or inclined position.

The microscope-tube has a ring an inch wide, fitting tight, but becoming loose on pressing its handles, and having a little projection, or spur on the side opposite its handles, as shown in figure 2.

The anterior V-shaped support is also shown in this figure. It has a piece of brass let into the wood for the spur on the ring to play against. As the posterior surface of this support is slanted about one sixteenth of an inch, it is evident that in turning the tube through a semicircle it will advance or recede that distance. This turning of the tube is performed by means of the black pasteboard disk clasped to the tube near the eye-piece, which makes a sufficiently delicate fine adjustment.

The horseshoe stage consists of two pieces of brass, cast and planed, 4 inches across at the widest part, and 3 inches in height. The first, nearest the observer, turns on a screw at the centre of its semi-circumference against a brass plate screwed to the bearing semicircle. The second turns on a screw which unites one of its arms—the right—to the corresponding arm of the first horseshoe. The first horseshoe therefore carries the other with it; the second *turning very easily*, is moved independently of the first. The handles are flat, the one with the cross next the observer, the other projecting three quarters of an inch beyond it, so that a slight change of the thumb determines whether one alone shall move, and the object be carried up and down, or both, and the object move from side to side. Figure 3 shows the principle of arrangement, and figure 4 the object-holder with its springs, which is held against the horseshoe by a piece of brass plate screwed upon the latter, as shown in figure 1—the object-holder sliding between the two. The tray that holds the lamp is of sheet-iron, 5 inches by 3, with a ledge of half an inch in width at its remote edge. On this tray rests a thin piece of wood of the same size, covered with velvet. The lamp having its base covered with velvet also, cannot slide off, even when the microscope is much inclined,—but the lamp, with the piece of wood on which it rests, is easily slid from side to side.

Fig. 5 represents the diaphragm with the achromatic condenser. This is arranged in place by sliding its foot under a spring upon the same piece of wood to which the tray for the lamp is fastened.

The dimensions of various parts not yet given are as follows: *Inside* dimensions of the box, length 8 inches; width 5; height 2; from bottom of inside of box to binding screw, 11 inches. Distance between uprights $1\frac{5}{8}$ inch. Bearing semicircle same thickness. Radius of this semicircle $3\frac{1}{4}$ inches. Object-holder $7+2$. Diaphragm 3 inches in diameter.

If desired to use the microscope in the vertical position, the tube must be held firmly against the supports, the tray removed, and the mirror represented in figure 1 brought into its place. A loose ring of plate brass capable of being made fast to the bearing semicircle serves to fix the tube. The mirror is a plane one, set in an open frame. If a plano-convex lens is placed over it, it acts like a concave mirror; if the mirror is removed the same lens may be used as a condenser.

In packing this instrument, the tray and diaphragm go at the bottom of the box, the bearing semicircle is held by the binding-screw between the uprights, and the pasteboard disk is held at the side of one of the uprights. The lamp and other accessions go into the box.

The leading peculiarities and novelties of the instrument will now be indicated.

1. Union of stability and portability. The base gives a suffi-

cient degree of steadiness for common purposes. But by sliding a common *flat-iron* into its interior it becomes as firm as the most ponderous instruments of Ross, which are too heavy to be carried about with comfort.

2. The facility with which the *height* of the compound body, as well as its inclination, may be varied by means of the "slots" and notches in the bearing semicircle.

3. The mode of focal adjustment by rotation of the tube, or compound body. This has a movable ring upon it with a projecting spur, which bears against the slightly inclined posterior surface of the anterior V-shaped support of the tube. The disk which protects the eyes is used as a lever, and thus a very smooth and uniform motion without the smallest amount of "lost time" or "back lash" is obtained without rack and pinion, spring or screw.

4. The open horseshoe stage, with the movable object-holder received upon its remote (anterior or inferior) surface, the glass object-slide being itself pressed by springs against the remote surface of the object-holder. It follows from this arrangement, 1st. That if one object is in focus, all others mounted in a similar manner are in focus, or very nearly so; 2d. That the thickness of the stage becomes practically reduced to nothing, as the glass slide is next the lamp, and behind, or below, every thing except the springs that press it forward against the remote face of the object-holder.

5. The double *radial* stage-movement. The horseshoe piece next the observer turns from side to side on a screw passing through the lower or middle portion of its arc. The other horseshoe piece turns on a screw fixing it to one arm of the first, so that it moves up and down. The arcs they follow form so small a part of a circle that the eye cannot distinguish their movement from a rectilinear one. The *bolt and crossbow* flat handles, working singly or together, make the management of the stage movement very convenient.

6. The flat-wicked lamp, so mounted as to move freely without the possibility of slipping, at whatever angle the apparatus may be inclined.

7. The combination of mirror and lens in an open frame, so as, by slight alterations, to serve a triple purpose; that of plane mirror, of a condenser, and of a substitute for the concave mirror.

8. The simple and effective mounting of the achromatic condenser and the diaphragm attached to it.

It remains for others to determine if any or all of these innovations are improvements.

August 19, 1857.

Dr. Chas. T. Jackson, Vice-President, in the Chair.

Dr. D. F. Weinland read a paper entitled—Some Points in the Zoology of Hayti,—as follows:—

A few weeks since I returned from nearly half a year's sojourn on the southwestern neck of that beautiful mountain-island, (this is the meaning of the Indian name Hayti,) and I wish to communicate to my scientific friends some of my impressions and observations,[1] whilst they are fresh in my mind, even if they should yet lack the stamp of elaboration.

I shall speak first of the organic life of the sea-shore, and since this depends upon the geological formation of the coast, and upon the nature of the sea, these subjects will first be introduced.

I. THE SEA-SHORE.

The northern shore of the southwestern neck of Hayti is mostly *côte de fer*, that is, an iron-bound coast. There are but few small sandy bays, which serve as landing-places for the fishing boats, and near them are generally found huts of fishermen, or a small village.

The rock which bounds all the rest of the coast is a hard brittle limestone, formed very generally of a conglomeration of madrepores and other corals, as Astrææ, Mæandrinæ, Milleporæ, etc. and of various kinds of shells, cemented with a mass of smaller and formless lime-particles, the powdered particles of the same corals and shells. This rock is full of pores and roundish cavi-

[1] Most of these observations were made in company with my friend Mr. Edward Habich of Boston, a member of our Society, on our daily walks along the sea-shore, or during our excursions up the rivers or back in the forests of the interior.

ties with sharp edges, perhaps the places where softer shells or fragments of corals have been washed out by the erosion or attrition of the water, or knocked out by corals, thrown up in the stormy winter season of the furious north wind. The species of corals and shells which enter into the composition of this rock, I found nearly all alive in the adjoining sea. Some of them, however, have disappeared from among the living; others are dying out, and are now very rarely found, though common in the earlier portions of the present period; for they exist in great quantities in the rock at the depth of a few feet. Such animal remains enclosed in rock, yet belonging to species now living, or to species now extinct, but which lived in the earlier ages of this period, together with species now living, we are accustomed to call modern fossils. They are the more interesting because they show how, without any remarkable revolution of our globe, certain species of animals gradually die out.

The same rock, composed of modern fossils and their detritus, I found in the interior mountain regions of the island, about thirty miles from the sea-shore, and at a height, as I should judge, of at least one thousand feet above the present level of the sea. Indeed, the whole first, that is, northernmost, ridge of mountains which runs along that northern sea-shore of Hayti, from east to west, is crowned with large layers or broken masses of this same kind of rock, which being, as stated above, a formation of the present geological period, goes far to show that this whole ridge has been raised in this present period. Thus the existence of the greater part, and the configuration of the whole of the southwestern neck of the island of Hayti is of a comparatively recent origin.

Two questions at once suggest themselves here, *whether the formation of the same rock, and whether the elevation of the land, are going on at the present time.* That the former, the formation of the same limestone rock, is really in progress at the present day, seems to be evident in some places, where the whole bottom of the sea near the shore, at a depth of from one to five and six feet below low-water mark, is, as it were, a flat pavement of the same kind of rock. Crust-building corals, as Porites, Mæandrinas, Siderastræas, etc. live upon it, and in the interstices of these are thrown up from below dead shells, broken Millepores, Madrepores, and

Astræans. By the powerful action of the waves on the shallow bottom, these remains are broken and ground upon each other, and their form is lost.

The lime powder which results from this pulverizing action furnishes the cement which fills the shells and unites the pieces into one solid mass, *Maçonnerie bon Dieu* (God's Masonry) as the negroes of the French colonies call it. In consideration of these facts the first part of our question may be answered in the affirmative..

But whether the whole coast is constantly and gradually rising, (as we know is the case with the coast of Sweden,[1]) or whether those different layers of that submarine pavement have been thrown up at various periods, by sudden volcanic agencies, I am at a loss to decide from my own observations. I will only state that the layers which lie now just above low-water mark, are (for instance, in some places in the neighborhood of Jeremie) quite undisturbed banks, running in a plain parallel to the level of the sea. This seems rather to favor the idea of a gradual rising than of a sudden upheaving, and the latter would be more likely to fracture the layers and to change their original horizontal position into an angle towards the horizon.

I conclude, from the information afforded me, that this limestone formation must extend over the whole northern part of Hayti, from its western cape (Tibouron) to the neighborhood of Port-au-Prince. Further, the rocky part of the sea-shore of Barbadoes, Maria Galante, of Grand-terre in Guadaloupe, of Antigua, St. Bartholomè, St. Martin, Arguilla, and Santa Cruz, seems to be of the same composition and age. I should judge so, also, from an account of William Maclure, published just forty years ago in the Journal of the Academy of Natural Sciences of Philadelphia, vol. i. p. 134, *et seq.* Further also, the honeycomb limestone of Jamaica is the same rock, according to a communication of my friend Dr. Hyde,[2] who lived in that island for many years.

[1] According to the observations of Leopold von Buch, Hallstroem, and Lyell, the whole northern coast of Sweden and that of Finland is continually rising at the rate of four feet in a century. See also Humboldt's Kosmos, I. p. 315 and p. 472, *et seq.*

[2] Dr. J. S. Hyde, of New England, a zealous and experienced conchologist, by whom were collected many of the Jamaica land-shells, which were described by

I have not yet had an opportunity to look for other geological reports of the Antilles. I suppose, however, that this is the same limestone formation, which the negroes in Guadaloupe very appropriately call "God's masonry," and which is so evidently a formation of modern time, since it encloses instruments made by man, and even those once celebrated, supposed fossil human skeletons.

If we want a name for the Haytian limestone described above, we might call it the modern "Coral-rag," for if it had not been for the difference in the fossil remains, I should have recognized it as exactly the same limestone, which forms those steep, porous rocks of the so-called rough Alps of Southern Germany, between the Danube and Rhine. Indeed, it was not a slight pleasure for me to see here clearly, how those old rocks of my home must have been formed in their time, millions of years ago, when Southern Germany was yet an island not much larger than Hayti, having a warm climate, and surrounded by a warm ocean; and presenting, all along the coast, the same banks of corals; and in the cavities of these rocks the cidarites, which abounded then, and of which I found one species alive in Hayti. But this also is so scarce as to show that its days have passed.

II. THE SEA OF NORTHERN HAYTI.

Beyond the formation of the coast there are some features connected with the sea, which borders upon the northern side of that island, which are of the greatest importance to its animal and vegetable life.

1. The great respiration of the ocean, the ebbing and flowing of the tide, hardly touches that coast. Neither the native fishermen along the coast, nor the American captains in the harbor speak of high and low water there. The great tide wave is not only broken by the wall of islands in front of the Mexican Gulf, but, perhaps, is even neutralized by a continual current, which runs from east to west all along the northern shore of Hayti.

the late Prof. Adams, tells me that he found this limestone, particularly in the northern part of that island. He noticed it for its peculiar richness in Cyclostomas, which live in the cavities.

[2] See Humboldt's Kosmos, I. p. 260.

2. All the motion of the sea on that shore depends upon the wind. Its agencies are twofold; first, *the daily change of sea and land wind*, the former beginning to blow in the morning about eight o'clock, the latter in the evening between six and nine. The latter is much more constant, and being also more powerful, it depresses, every evening, the level of the sea all along the coast from one to two feet. But there is, secondly, another, a *yearly change of the winds*, viz: a prevailing northerly wind in winter, particularly in December, January, and February, and a prevailing southerly wind in summer. This great change produces this effect, that in the season of the North, as they call it there, the level of the sea is constantly, on the average, eight feet higher than in summer.

How much this change bears, also, upon the organic life of the sea-coast, is evident. I will only state that during the last week of May and the first of June, in one place not larger than an acre, more than a hundred Actineæ and Holothuriæ died, because left upon dry land; not to speak of the thousands of other animals, fishes, echini, etc., and of sea-plants which died in those natural basins near the sea, where the water, cut off from the refreshing ocean, was overheated by the nearly perpendicular rays of the tropical sun. The rising of the land from the waves, the same that we know took place repeatedly in the great epochs of the history of our globe, and which, as Dr. J. D. Dana once said, brought death among the sea tribes in one universal desolation,—the same we see now on the northern shore of this island, repeated annually with the change of the winds; and though on a smaller scale, yet destroying hosts of living organisms. Moreover, in that stormy season of the North, the whole bottom of the ocean, all along the shore, at more than five fathoms depth, is swept, and not only all the dead remains but many living shell-fishes, and large blocks of corals, are dashed against the iron-bound coast and thrown up on dry land. This is the season dreaded equally by the Haytian coasters and the merchant vessel in the harbor. The former, when overcome by a dark, stormy night, without a compass, an instrument unknown to them, are driven helpless along the shore, and their small boats frequently thrown against the rocks. The latter, the merchant vessel, drags its anchors on the moving bottom of the sea (called *radė marée*) and runs ashore.[1]

Besides the motion of the sea, there is one circumstance more worthy of notice, as bearing upon the organic life of this sea-shore. It is the *chemical composition of the sea-water.* The sea-water contains, at this distance (about eighteen degrees) from the equator, the greatest amount of salt in solution; more than the water near New England, and a good deal more than the sea immediately under the equator. This remarkable fact has been shown by Linz, a German scientific traveller, on his voyage round the world.[2] The rivers of the northern shore of Hayti are not large enough to exert an extensive influence upon the composition of the sea-water, even in the immediate neighborhood of their mouths, and, moreover, they are generally barred up by sand-banks during a great part of the dry season. These sand-bars prevent again a large pouring in of sea-water into the river, and thus the river water is quite fresh and sweet in the immediate neighborhood of the sea, so much so that vessels take in their drinking water there. But notwithstanding this, (and it is an interesting physiological fact,) I found relatively more sea-fishes going up annually from the sea into these rivers, than ascend the German rivers; showing how flexible their nature must be to bear the sudden change in the saltness and density of the water, when passing from that deeply saline ocean into fresh water. The case is different with those sea-fishes of New England and Germany which enter rivers; they have always to pass through brackish water, and thus the change is effected gradually.

(*To be continued.*)

Dr. C. T. Jackson said that he had found in analyses of sea-water from coral regions a greater amount of carbonate of lime than is found in water from other parts of the ocean. He supposed it to be derived from the decom-

[1] In the harbor of Jeremie, which is not protected against this north wind, two vessels ran ashore at one time during one of the last winters. This occurs nearly every year.

[2] See Humboldt's Kosmos, I. p. 320, where we find also the reason for this remarkable phenomenon.

posed corals, rather than a natural ingredient of the water and the source of coralline growth.

Dr. Jackson exhibited the shells (*Alasmodonta arcuata*) which were presented at the last meeting by W. E. S. Whitman, Esq., of Gardiner, Me. This species is found in the rivers of Kennebec county, and being lined with a pearly secretion, the shells have been sought for in that neighborhood for pearls. The thanks of the Society were voted for the gift.

Dr. Weinland called attention to the fact that the outer surface of the shells, near the hinge, was considerably eroded, and he referred to a communication of Dr. James Lewis, of Mohawk, N. Y., read to the Society February 18, 1857, in which the presence of saline alkalis is assigned as the cause of erosion by that gentleman, contrary to an opinion expressed by himself in a paper read to the Society October 15, 1856. He disagreed with Dr. Lewis upon this point, for he believed that the animal absorbs from the water only such substances as are suited to its nature.

Dr. A. A. Hayes stated that where the composition of the water is changed at different seasons of the year, there is great liability to erosion. He attributed the effect to the presence of organic acids, as humic and ulmic acids or mixtures of the two, which he said were at certain times sufficiently strong to attack the epidermis of the shell. He referred to changes in the Connecticut, Concord, and Schuylkill rivers, the last two of which have been so much altered in their composition by impurities introduced in mining operations or otherwise, as to render them more or less destructive to animal life.

Dr. Weinland remarked that he could not believe any waters to be so strongly acid as to be capable of destroying the epidermis. In his paper referred to above, which he had read to the Society, he had maintained that the first step of the erosive process was the destruction of the epidermis by a worm.

Dr. Jackson thought from the appearance of the smallest perforations that the destruction of the shell originally commenced with a worm.

Mr. T. J. Whittemore observed that the shells in Fresh Pond

Cambridge, are eroded, whilst those in a stream near the pond are unaffected except in certain portions of it where there is a clay bottom. In the Middlesex Canal they are free from erosions, but in Concord River the opposite is the case.

Dr. Weinland said that the observation of Mr. Whittemore sustained his view of the question. The worms which infest the shells do not live in sandy bottoms, and he had generally noticed the erosion of the shells to extend just so far only as they are imbedded in the clay.

Mr. C. J. Sprague called attention to the fact that the corroded surfaces are in some instances covered with epidermis, which may have been a new growth from the neighborhood of the hinge.

Dr. Jackson said that he had frequently seen the animal taken out of the shell by the mink or musk-rat, the sun having previously killed the animal and expanded the shell.

Mr. Whittemore said that the common belief, that the musk-rat brings out the mollusk from the water, and leaves it upon the shore in the heat of the sun for this object, is probably true.

Mr. F. H. Storer exhibited crystals of Sulphide of Lead obtained by sublimation; one of the accidental products of a smelting furnace in Germany.

He remarked upon the exceedingly great volatility of this compound of lead, and upon the influence which its presence in the atmosphere, even at a great distance from the furnace, exerts upon the vegetation of the region. It has been shown by analysis that large spruce trees, six or eight inches in diameter, contain lead, even in their innermost parts, which had evidently been taken up by the roots.

Dr. C. T. Jackson gave an account of the Sand-Sharks which are caught near Nantucket. While upon the island recently, he had seen some brought to the shore eight or nine feet in length. From the liver is extracted on an average a gallon of oil, which is used by curriers, and worth seventy-five cents a gallon. The body is used for manure.

Dr. Jackson presented, in the name of Amos Otis, Esq., a brick of peculiar shape, and apparently imperfectly made, which was found at Monamet, near Sandwich. It came from a locality, interesting in a historical point of view, as having been the spot where the Pilgrims built a trading-house in the year 1627. The thanks of the Society were voted for the gift.

Mr. C. K. Dillaway exhibited the tooth of a Narwhal, (*Monodon monoceros*, Lin.) It was about seven feet in length, and a very beautiful and perfect specimen.

Messrs. Thomas R. Sullivan and Joseph Willard, Jr., were elected Resident Members.

September 2, 1857.

The President in the Chair.

Mr. Theodore Lyman read the following paper on a new species of Coral :—

In October, 1848, and April, 1849, Milne Edwards and Jules Haime published two monographs on the Astreidæ, (Annales des Sciences Nat. 3ème Série, tom. 10 et 11.) Under this name they included only a part of the Astræans of previous authors, namely, such only as had platforms or dissepiments between the lamellæ, and these they call *traverses*. They further divided the family into two sub-families, Eusmilinæ and Astreinæ ; the former comprising those with smooth-edged lamellæ ; the latter, those whose lamellæ bore teeth. Descending to genera, they subdivided these to a very great extent. Dana's Genus Euphyllia is separated into nine groups ; Lamarck's Genus Astræa, as understood by Dana, is multiplied to nearly twenty ; and, in addition, there are added to the family some forty or fifty quite new genera, many of them comprising only fossils. To sum up ; the family to which Dana, in 1847, apportioned *thirteen* genera, appeared, the year after, under the auspices of Edwards and Haime, with about *eighty*. The comparison, philosophically conducted, of these two classifications, would be of the highest interest, but I speak of them now only in connection with a new species of Astræan, recently fallen upon, in arranging the cabinet of this Society. Its discovery furnishes one more proof of the absolute necessity of some laws, plain and sure, by which classification may be determined. A description of the coral will show the difficulties under which a naturalist must, in such a case, labor.

ASTRÆA DECACTIS, Lyman.

Polyps *short* and budding from the upper edge; consequently the corallum takes the form of a thin plate, which, in this case, is somewhat wavy, and has a few swellings on its surface. A ground surface shows the corallum, between the calicles, to be solid, with a few very small pits, or vesicles; this is generally the case, but, where the calicles are a good deal crowded, the intervening corallum is made up of a double row of vesicles. The calicles, when not crowded, are nearly round, but each is surrounded by a fence of grains, which takes the form of a more or less regular hexagon. These grains cannot be seen without a lens; there are generally about five on a side, (in all about thirty,) and the fence, which they form, is situated midway between each calicle and its neighbors. The calicles are from one half to three quarters of a line in diameter, and are remarkable, not only for their small size, but also from the fact of their having only *ten* stout lamellæ. These lamellæ are sensibly smooth on their sides and edges, (and the species would thus come under the Sub-Family Eusmilinæ of Edwards,) they are considerably exsert, and extend outward a little beyond the edge of the calicle; inwards, they run to a point nearly half-way to the centre, when they pitch suddenly downwards and become thinner; at the centre they all join a solid columella, which has an oval form, and projects above the level of the lamellæ, at their point of juncture with it. On examining a calicle with a strong lens, there may sometimes be seen, on the edge of the calicle and midway between the lamellæ, fine points, or grains, whose size does not exceed that of the grains of the *fence*. Although these bear no sort of proportion, compared with the ten strong lamellæ, still, for reasons that it would take some time to tell, I am inclined to look on them as true lamellæ, in a rudimentary stage. In some calicles they cannot be discovered at all; in others there are two, and, in rare instances, there are as many as ten, or one between each pair of large lamellæ. A vertical section of a calicle shows the characteristic dissepiments (*traverses*, Edw.) of a true Astræan, and a styliform columella, which continues nearly, or quite, to the bottom, though with a diminished size towards its lower extremity. In this species the columella gives the same indication of a bilateral symmetry that is shown in the elongated mouth of Actinia, and, among the Halcyonoids, in that of Renilla, &c. In a line with the longest diameter of the columella there are, almost always, two lamellæ, and, on each side of the axis thus formed, four lamellæ symmetrically arranged; and it is to be further observed, that the calicle itself has a tendency to elongate itself in the direction of this axis. The corallum is covered underneath with a thin, slightly folded epitheca; and above it has a rough look, under a lens, by reason of its crowded calicles, and stout, exsert lamellæ.

Now, as regards the place this species should occupy among Astreidæ, if we go by the system of Dana, it would come under the Genus Astræa, and would be among the species of the Sub-Genus Orbicella, from which it differs only in the less numerous rays. If, on the other hand, we refer to Edwards and Haime, we find that it agrees with no living genus, but is very near to, if not identical with, the Genus Astrocœnia, which is entirely fossil, and, with the exception of one species, does not rise higher than the chalk. With this genus it agrees in growing in a plate; in having an epitheca a little folded; in marginal budding; in polyps soldered by their walls; in a solid, styliform columella; in having thick lamellæ, and in having small calicles. If the genera of Edwards are really to be admitted, it would be curious to see this old *habitué* of the chalk once more among the living. A description of the genus will be found in the Annales des Scien. Nat. 3ème Série, tome x. page 296, and figures in the Paleontographical Society Monograph on British Fossil Corals, 1850, Part I. Plate 5; and in Denkschriften der Akademie zu Wien, vol. 7. Reuss über Kreideschichten, Plates 8 and 14. Of these, the *A. magnifica*, figured by Reuss, resembles most the present species. Considering, however, that the genera of Edwards have been looked on with some misgiving, by more than one good authority, and particularly in respect to the characters taken from the teeth of lamellæ, and the so-called columella, I deemed it safer to leave this species, for the present, among the members of the Genus Astræa, as received by Dana; though, at the same time, I feel pretty sure it will have to be removed therefrom, as soon as the classification of polyps is better understood.

The specimen from which this description was taken was growing on a sponge. The plate was about 2½ inches long, 1½ inches broad, and 3 lines thick, at the thickest part. The edges of the plate were in some places very thin. Dr. A. A. Gould thinks the sponge a West Indian species, and this, combined with the fact that it was in the same case with Mr. Bartlett's Florida collection, makes it very probable that this species inhabits Florida.

The President gave a brief account of some facts noticed during a recent visit to Surinam.

The committee appointed to consider the expediency of dividing the Department of Crustacea and Radiata, reported in favor of the project, and the report was adopted.

H. R. Storer, M. D., was elected Curator of Crustacea.

Messrs. James H. Weeks and George N. Faxon were elected Resident Members.

DEPARTMENT OF MICROSCOPY.

Dr. John Bacon exhibited three different forms of oxalate of lime, occurring as a deposit in the urinary secretion, remarking that they were interesting in a pathological point of view, as well as from their chemical relations. They were, first, the ordinary, apparently octohœdral form; secondly, the rare dumb-bell form;

and, thirdly, crystals which he had now seen for the first time, six-sided tables, often very thin and transparent, and resembling cystine in appearance. They were accompanied in the specimen by thicker rhombic tables, more or less modified, and he considered them all modifications of rhombohœdrons.

He also exhibited crystals of oxalate of lime from the vegetable kingdom. Prof. Bailey called attention some time since to the large amount of oxalate of lime existing in the bark of certain trees, the principal ingredient of the ashes of which was carbonate of lime, a salt arising from the decomposition of the oxalate and other organic salts of lime. This excretion from the human body Dr. Bacon has noticed to be quite common in Boston, but it cannot be due to the use of water containing lime salts, for the Cochituate water is now almost universally used, and this, it is well known, is one of the purest of pond waters. He would not even consider a small amount of oxalate of lime deposited from the urine as a morbid indication, for this salt is so insoluble that a precipitation of it in a certain quantity may be regarded as not inconsistent with health.

An ingenious instrument, in brass and steel, for making fine sections of wood and other articles for microscopic examination, was presented by Edward C. Cabot, Esq., and the thanks of the Society voted for the donation.

September 16, 1857.

The President in the Chair.

Mr. Charles Stodder read a paper on the vibrations caused by the falling of the water over the dam at Hadley Falls, as follows:—

A paper was read at the Montreal Meeting of the American Association for the Advancement of Science, on the vibration caused by the falling of the water over the dam at Hadley Falls. The same matter has been the subject of discussion in this

Society, by Messrs. Briggs and Desor in 1850, (Proc. vol. 3, p. 287,) and by Mr. Briggs in 1852, (vol. 4, p. 185.)

The only cause for the phenomenon that I have seen assigned is the agitation of the air, behind the falling sheet of water. This theory is effectually disproved—if there were no other reasons against it—by the fact cited by Mr. Briggs, of the dam at Lewiston, where the water falls over an inclined plane, leaving no space for air under it; yet the vibrations are very decided.

The case of Hadley Falls seems to have attracted more attention than elsewhere, as probably the vibrations are more powerful, and have been noticed at greater distances than in other places. I expect to show that the causes of the vibrations are there found nearer a maximum, and the intensity and force of the vibrations, as well as the distance at which they are felt, ought to be greater there than at any of the other places which have been referred to.

The dam at Hadley is 1,000 feet long, at nearly right angles to the current of the river, and causes a vertical fall of thirty or thirty two feet. The water does *not* fall in an even stream from the summit of the dam to the surface of the water below, but the upper surface in section presents to the eye a waved or curved outline. This appearance I have noticed at Hadley, Nashua, Lawrence, and at every other vertical fall which I have ever seen, when under the proper conditions to exhibit it. If we could see the under side of the sheet, we should find, undoubtedly, corresponding appearances on that side. This phenomenon is caused by the property of falling fluids, by which they assume the globular form, which may be seen in the Kauterskill Falls, on the Catskill Mountains, where the whole body of falling water is broken into spray and drops—in the fall of water from the jet of a fountain, and in water flowing from a vessel. In all cases, if the water falls a certain distance, proportioned to its mass, the whole will assume the globular form, and become drops. Applying this principle to the fall over an artificial dam, the water at the very commencement of its descent begins to assume that form, and the further it descends, the nearer it approaches it. In passing over an artificial dam, like that at Hadley, the water presents a uniform depth throughout the whole length of the dam; and if we imagine the current of water to be an infinitude of small streams, of uniform depth, in contact with each other, each having the same tendency, the result must be to produce swellings and contractions throughout the whole extent of the dam. Now, when each of these waves strikes the bottom, it gives a blow proportioned in force to the body of water falling from the height of the dam. A certain depth of water running over the top of the dam must fall a certain distance before it would be entirely separated into globules. The smaller the quantity of water, the less distance is required; consequently every variation in the depth of the water causes a variation in the size and distance of the waves, or tumors; each of these causes a concussion proportionate in intensity to the weight of water in it, and proportionate in rapidity to their distance apart.

These effects of falling water should be expected, in general, only in artificial falls, such as mill-dams. In natural falls, it is rare that a vertical face is presented for the water to fall over; and even if such a fall is presented, it is usually formed of angular rocks, causing various depths of water; and as every variation of depth alters the conditions, the space required to form the tumors in, there would be no coincidence among the tumors formed in different parts of the falling stream; so that the waves of one part would strike the bottom, in the intervals of those of another part, and thus the concussion of one neutralize the other. Again, to produce the vibrations, the stream should fall from an equal height throughout its width. If one part falls thirty feet, and another twenty-five feet, the same result is produced as by different depths of water. For this reason I conclude that vibrations are not conspicuous at Lawrence. There the dam is diagonal to the stream, and there is considerable difference in the height of the fall, at the two ends of the dam. At Hadley the conditions for causing vibrations are, if we cannot say at the maximum, at least the most favorable of any we know. The height of the fall is considerable—great for an artificial work—and so is the width of the stream. The height is uniform from side to side. The dam is one right line from bank to bank, the bed of the river is solid rock, an almost level floor, free from loose or piled up masses. The top of the dam is perfectly level. Consequently there is an uniform depth of water passing over the whole length, falling an uniform distance. The waves or tumors of the falling water are uniform, and strike the bottom with synchronous concussion from one end of the dam to the other. It is not surprising that the earth should be felt to vibrate in Springfield, seven miles in one direction, and in Amherst, fourteen miles in another.

Another interesting line of inquiry arises here. Hadley Falls, Springfield, and Amherst, are all situated on the red sandstone of the Connecticut valley. I will venture to say that the vibrations have not been felt beyond the boundaries of that rock on either side of the valley. Further between Amherst and Hadley we have the intruded trap, forming Mount Holyoke. This trap is said by Prof. Hitchcock not to be a dyke, crossing the strata of sandstone, but to be interposed between the beds of sandstone. This of course is the interpretation of such parts of the trap as can be examined, but the trap might have cut through the strata of sandstone at some great depth, and only be interposed between the strata near the surface. I believe the fact that these vibrations have been felt beyond the trap rock, indicates that it does not cut off the strata of sandstone at any great depth—that, if it did so, it would cut off the vibrations. Now if the trap lies entirely between strata of sandstone, it may not have been injected, but it may have been poured over the surface of the underlying stratum when that was the uppermost.

Dr. C. T. Jackson, instancing the vibrations noticed at the Dam at Nashua, stated, that, in that place, the vibrations only take place when the wind is in such a direction as to break the fall, and permit of the escape of air, which is evidently confined behind the sheet of water.

Mr. Theodore Lyman read an extract from a letter of Mr. Bowerbank of London, acknowledging the reception of some sponges sent him by the Society, and promising to send a collection of sponges in return. Mr. B. is desirous of obtaining specimens of a spongilla which he says he learns is common in the Cochituate water-pipes of Boston.

Dr. Gould said that he had frequently seen a species of spongilla in these pipes.

Dr. C. T. Jackson said that specimens could be obtained at the Brookline reservoir gates. They are of a yellowish green color.

Dr. J. B. S. Jackson said that he had met with small specimens in the pipes of his house, perhaps two or three lines in diameter, and seven or eight in length.

Dr. A. A. Gould said he had received a letter from Prof. Dawson of Montreal, stating that there had recently been a slide in the neighborhood of that city, by which many new species of tertiary fossils were exposed, and amongst them some spiculæ of sponges.

Dr. J. B. S. Jackson exhibited specimens of Dermestes and a block of wood, forming the support for an anatomical preparation, into which wood the insect had eaten. He was not aware before that this animal attacked wood.

Dr. C. T. Jackson presented, in the name of Samuel Swan, Esq., some specimens of the common Water Lily, (*Nymphæa odorata.*) They were procured from a pond in Yarmouth, Mass., and were peculiar in this respect, that the flowers were of a delicate pink color, instead of being, as ordinarily, white. Dr. J. had noticed, several years since, in Mossy Pond, in Lancaster, this same lily with flowers of a deep red color. He suggested that they were probably only varieties of the same species produced by ferruginous or other modifications of the soil in which they grew.

The President exhibited some species of fishes from the Surinam River, and mentioned some conditions, heretofore unnoticed, under which the eggs are developed.

In a species of Bagré, called by the negroes "Ningi-ningi," the eggs are carried during the whole period of development in the mouth. During the month of June, the females have their mouths filled with eggs, and the young may be seen in all stages of formation, if a large number of individuals is examined. There are at least four species of Siluroids which have this habit.

The Aspredos, or "trompettis," likewise have a peculiar mode of gestation, analogous to that found in Syngnathus. In Aspredo the eggs are attached, by means of pedicles surmounted by cups, to the under side of the abdomen, as far forwards sometimes as the mouth, on the sides to the pectoral and ventral fins which they sometimes cover, and as far back as the middle of the tail. Valenciennes describes the appendages which support the eggs of Trompetti, but nowhere expresses the opinion that they were destined to carry eggs. After the eggs are hatched the pedicles are absorbed.

A specimen of *Hylodes lineatus* was also exhibited, showing the manner in which the young are carried upon the back of the parent. In Hylodes, we have one extreme of a series which commences with Pipa, where each egg is carried in a separate pouch in the back of the female; in Notodelphis, as shown by Dr. Weinland, all the eggs are carried in one dorsal pouch; in Alytes, the eggs in strings are wound round the legs, and finally, in Hylodes, the tadpoles adhere to the back of the parent without any protection. Though having all the organization of a tadpole, viz: gills and a tail adapted to swimming, they are found in the woods on the back of the parent at a distance from water. The early stages of development are unknown.

The habits of Hylodes, as well as those of the fishes above referred to, are well known to the negroes of Guiana.

DONATIONS TO THE MUSEUM.

July 1, 1857. Nest and Eggs of Baltimore Oriole, *Yphantes Baltimore;* Bobolink, *Dolichonyx orizivorus;* Maryland Yellow-throat, *Trichas Marilandicus;* Barn Swallow, *Hirundo rustica;* Cedar Bird, *Ampelis garrulus;* Lesser Pewit Flycatcher, *Muscicapa fusca;* Wilson's Thrush, *Turdus fuscescens;* Blue Jay, *Cy-*

anocorax cristatus; Eggs of Spotted Tatler, *Totanus macularius;* Passenger Pigeon, *Ectopistes migratorius;* Nest of Chimney Swallow, *Cypselus pelasgius;* by Francis S. Williams, Esq. Scarlet Ibis, *Ibis rubra;* by Mrs. Curtis B. Raymond. Petrified Wood and Bone; by S. A. Green, M. D. Geological Map of the United States; by Jules Marcou. Shells from the Cape de Verde Islands, Cuba, and the Western Coast of Africa, and Volcanic Matter from the Cape de Verdes; by Mr. N. H. Bishop. A Crawfish from North Carolina, Vitreous Copper Ore, and Argentiferous and Auriferous Galena from the same State; by Dr. C. T. Jackson.

July 15. Ripple Marks in Sandstone, Algæ, and Parasitic Shells; by Dr. S. Kneeland, Jr. A Horned Toad from Texas; by Mr. Ainsworth.

August 5. Specimens of the shell, *Alasmodonta arcuata,* which is opened for pearls in Maine; by W. E. S. Whitman, Esq. Specimens of a Smelt, *Osmerus viridescens,* taken in Squam Lake, New Hampshire, and of two species of Leuciscus, one probably undescribed, from the same locality; by Dr. H. R. Storer.

August 19. A Brick, interesting in a historical point of view, having been taken from the ruins of a trading house, built by the Pilgrims near Sandwich, in the year 1627; by Amos Otis, Esq. Samples of the Soils of Michigan, Missouri, Indiana, Minnesota, Wisconsin, and Iowa; by Dr. S. Kneeland, Jr.

September 2. A brass instrument for making fine sections of wood and other articles; by Edward C. Cabot, Esq. A collection of one hundred and forty Bird Skins forwarded by the Government National Museum of Melbourne, to the Boston Society of Natural History, viz:—*Menura superba,* Lyre Bird; *Podiceps Australis,* Australian Grebe; *Cacatua Leadbeaterii,* Leadbeater's Cockatoo; *Ptilonorhynchus holosericeus,* Bower Bird; *Platycercus Barnars,* Barnars Parrakeet; *Grus Australasianus,* Australian Crane; *Cereopsis Novæ Hollandiæ,* Cereopsis Goose; *Pedronomus torquatus,* Plain Wanderer; *Hemipodius pyrrhothorax,* Chestnut-breasted Hemipode, three specimens; *Limosa melanuroides,* Godwit; *Entomophila picta,* Painted Honey-Eater; *Recurvirostris rubricollis,* Red-necked Avocet; *Psophodes crepitans,* Coach-whip Bird; *Platycercus Pennantii,* Pennant's Parrakeet; *Fulica Australis,* Australian Coot; *Phalacrocorax carboides,* Australian Cormorant; *Athene strenua,* Powerful Owl; *Casarca tadornoides,* Mountain Duck; *Porphyrio melanosus,* Black-backed Porphyrio; *Artamus superciliosus,* White eyebrowed Wood-Swallow, two specimens; *Gymnorhina organicum,* Tasmanian Crow-Shrike; *Anas punctata,* Chestnut-breasted Duck; *Nycticorax Caledonicus,* Nankeen Night-Heron; *Podiceps popicephalus,* Grey-hooded Grebe, two specimens; *Spheniscus minor,* Little Penguin; *Lobevanellus lobatus,* Spur-winged Plover; *Sterna melanauchen,* Black-naped Tern; *Cacatua Eos,* Rose-breasted Cockatoo; *Biziura lobata,* Musk Duck; *Cinclosoma punctatum,* Spotted Ground-Thrush; *Campephaga Jardinii,* Jardines Campephaga, two specimens; *Artamus personatus,* Masked Wood-Swallow; *Petroica Goodenovii,* Red-capped Robin; *Melithreptus melanocephalus,* Black-headed Honey Eater, two specimens; *Rhipidura rufifrons,* Rufous-fronted Fantail, two specimens; *Hemipodius velox,* Swift-flying Hemipode, two specimens: *Himantopus leucocephalus,* White-headed Stilt; *Estrelda temporalis,* Red-eyebrowed Finch, two specimens; *Amadina Lathamii,* Spotted-sided Finch, two specimens; *Hiaticula bicincta,* Double-banded Dottrel; *Anthochæra mellivora,* Brush Wattle-Bird, two specimens; *Climacteris picumnus,* White-throated Tree-Creeper, two specimens; *Acrocephalus Australis,* Reed Warbler; *Cysticola lineocapilla,* Black-striated Warbler, two specimens; *Pardalotus striatus,* Striated Pardalote, two specimens; *Zosterops dorsalis,* Grey-backed Zosterops, two specimens; *Dicæum hirundinaceum,* Swallow Dicæum, four specimens; *Glottis glottoides*, Green-Shank; *Sericornis humilis*, Sombre-colored Sericornis, two specimens; *Malurus cyaneus*, Blue Wren, two specimens; *Meliphaga Australasiana*, Tasmanian Honey-Eater; *Meliphaga mystacalis*, Moustached Honey-Eater, three specimens; *Collocalia arborea*, Tree Martin, two specimens; *Chrysoccryx lucidus*, Bronze-wing Cuckoo, two specimens; *Trichoglossus rubritorques*, Stringy-bark Parrakeet, two specimens; *Lathamus discolor*, Swift Parrakeet, three specimens ; *Acanthiza chrysorrhœa*, Yellow-rumped Acanthiza; *Erythrodryas rhodinogaster*, Flame-breasted Robin, two specimens; *Acanthiza uropygialis*, Chestnut-rumped Acanthiza, two specimens; *Cincloramphus rufescens*, Rufous-tinted Cincloramphus, two specimens; *Acanthiza lineata*, Striated Acanthiza, four specimens; *Epthianura albifrons*, White-fronted Epthianura, two specimens ; *Calamanthus fuliginosus*. Reed Lark, two specimens; *Falcunculus frontatus*, Tit Shrike; *Eopsaltria Australis*, Yellow-breasted Robin, two specimens ; *Acanthorhynchus tenuirostris*, Slender-billed Spine-Bill, two specimens; *Pachycephala pectoralis*, Banded Thick-Head, two specimens; *Petroica multicolor*, Scarlet-breasted Robin, two specimens; *Sericornis osculans*, Allied Sericornis, two specimens; *Halcyon sanctus*, Sacred Kingfisher, two specimens; *Alcyone azurea*, Azure Kingfisher ; *Rhipidura motacilloides*, Black Fan-tailed Flycatcher, two specimens; *Strepera anaphonensis*, Grey Crow-Shrike ; *Corcorax leucopterus*, White-winged Chough, two specimens ; *Campephaga Jardinii*, Jardine's Campephaga ; *Schœniclus magnus*, Great Sandpiper, two specimens; *Philotis flava*, Yellow Honey-Eater, two specimens; *Myiagra plumbea*, Plumbeous Flycatcher, two specimens; *Anthus Australis*, Australian Pipit; *Sittela chrysoptera*, Orange-winged Sittela, two specimens; *Pachycephala*, ——; Four Specimens of Acanthiza, of two different species; *Smicornis brevirostris*, Short-billed Smicornis; Two Species of Honey Eater; *Cisticola magna*, Great Warbler; *Hiaticula ruficapilla*, Red-capped Dottrel; *Schœniclus albescens*, Little Sandpiper; *Schœniclus subarquatus*, Curlew Sandpiper.

The following birds, etc., obtained at Lake Superior in 1857, prepared and presented by Dr. S. Kneeland, Jr.; Male and female Sharp-shinned Hawk, *Accipiter fuscus*, Gmel. ; Male Sparrow-Hawk, *Tinnunculus sparverius*, Linn. ; Hawk Owl, *Surnia funerea*, Gmel. ; Acadian Owl, male, *Athene Acadica*, Temm.; Male and female Kingfisher, *Ceryle alcyon*, Linn. ; Pileated Woodpecker (young), *Dryocopus pileatus*, Linn.; Three-toed Woodpecker, male, *Picoides arcticus*, Rich & Sw.; Hairy Woodpecker, female, *Picus villosus*, Linn.; Male and female Downy Woodpecker, *Picus pubescens*, Linn.; Golden-winged Woodpecker, male, *Colaptes auratus*, Linn.; American Raven, *Corvus cacalotl*, Wagl.; Blue Jay, *Cyanocorax cristatus*, Linn.; Canada Jay, two females, *Perisoreus Canadensis*, Linn.; Rusty Grakle, male and female, *Scolecophagus ferrugineus*, Wils.; Pine Grosbeak, female, *Strobilophaga enucleator*. Linn.; Snow Bird, two specimens, *Plectrophanes nivalis*, Linn.; Snow Finch, *Fringilla hyemalis*, Linn.; Red-poll Linnet, two specimens, *Fringilla linaria*, Linn.; Cross-bill, *Loxia Americana*, Wils.; Purple Finch, *Carpodacus purpureus*, Gmel.; White-throated Sparrow, *Zonotrichia albicollis*, Gmel.; Fox-colored Sparrow, two females, *Zonotrichia iliaca*, Merr.; Olive Hermit Thrush, male and female, *Turdus solitarius?* Wils.; Brown Hermit Thrush, male and female, *Turdus fuscescens?* Shaw; Summer Duck, male, *Aix sponsa*, Linn.; Dusky Duck, female, *Anas obscura*, Gmel.; Common Snipe, female, *Gallinago Wilsonii*, Temm.; Red-breasted Snipe, female, *Macroramphus griseus*, Gmel. ; Tell-tale Tatler, *Totanus melanoleucus*, Gmel.; Wilson's Plover, *Charadrius semipalmatus*, Kaup.; Solitary Tatler, *Totanus chloropygius*, Vieill; Sora Rail, *Ortygometra Carolina*, Linn.; Red Squirrel, *Sciurus*

Hudsonius, Gmel.; Striped Squirrel, *Tamias Lysteri*, Rich.—American Magpie, *Pica Hudsonica*, Sabine; Cedar Bird, *Ampelis cedrorum*, Vieill; prepared and presented by J. H. Slawson, of Houghton, Michigan.

September 16. Specimens of the common Water Lily, (*Nymphæa odorata*) of a pink color, from Yarmouth, Mass.; by Samuel Swan, Esq. Two Crania of Albatross; by Dr. S. Durkee.

BOOKS RECEIVED DURING THE QUARTER ENDING SEPT. 30, 1857.

Memoirs of the Geological Society of India. Vol. I. Part I. 8vo. Calcutta, 1856. *From the Governor-General of India.*

Prodromus descriptionis Animalium Evertebratorum quæ observavit et descripsit W. Stimpson. Part 2d. 8vo. Pamph. Philadelphia, 1857. *From the Author.*

Notice sur une nouvelle Espèce de Davidsonia. Par L. De Koninck. *From Prof. H. D. Rogers.*

Tableaux of New Orleans. By B. Dowler, M. D. 8vo. Pamph. *From the Author.*

Lettres sur les Roches du Jura. Par Jules Marcou. 8vo. Première Livraison. 8vo. Paris, 1857. *From the Author.*

Smithsonian Contributions to Knowledge. Vol. IX. 4to. Washington, D. C. 1857.

Annual Reports of the Board of Regents of the Smithsonian Institution. 8vo. 2 vols. 1855–6. Washington, D. C. *From the Smithsonian Institution.*

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October 7, 1857.

The President in the Chair.

Mr. Theodore Lyman read a paper upon a new genus and species of Coral, *Syndepas Gouldii.*

GENUS SYNDEPAS, (Lyman.)

Derivation, σύν, δέπας, (goblet.)

Growing in tufts (or single?); calicles cylindrical or turbinate; striated on the outside with granulated ridges; within deep; walls solid; larger lamellæ exsert, finely toothed on their edges; budding from the side, low down, or from the cœnenchyma between the calicles.

This genus is distinguished from Desmophyllum of Ehrenberg by the fact that the lamellæ are toothed and not arranged in bundles; from Culicia of Dana, by depth of calicle, external striæ and exsert lamellæ; from Cladocera of Ehrenberg by different mode of growth and by internal dissepiments; and from Dendrophyllia of Blainville, by different mode of growth and the solidity of the walls. The *Caryophyllia solitaria* (Lesueur) and the *Caryophylliæ dilatata* and *pocillum* of Dana will probably come under the genus.

SYNDEPAS GOULDII, (Lyman.)

The general appearance is that of a cluster of little goblets connected by a lime cement, which is often the resting-place of Serpulæ, Bryozoa, and boring shells. The zoöphyte buds, either from the side, low down, or from the open space between the calicles, (*cœnenchyma*, Edwards.) The group begins with three or four cups, low, standing well apart, and connected at their bases by a thin sheet of cœnenchyma. New buds appear, and the whole growing upwards and outwards gradually makes a tuft of crowded though independent individuals. The calicles, though sometimes cylindrical, are normally turbinate; within, they have a depth often as great as 3½ lines. Their height varies from 3½ to 9½ lines. The tallest are the oldest, and have continued growing with their younger neighbors. The greater diameter is from 4 to 6 lines, and the difference between the longitudinal and transverse diameters is occasionally as great as 6 to 3½; at other times the calicles are nearly round. In the longitudinal axis there usually lie two lamellæ of the first cycle, which shows a tendency to a bilateral symmetry. The larger calicles have from 48 to 74 lamellæ, so that there are four cycles, and sometimes part of a fifth. Those of the last cycle, however, are very small and thin, and can scarcely be seen without a lens. The six that make the first cycle are conspicuous for their size; they are rounded at their upper ends, exsert, often as much as a line, and are thicker than the wall of the calicle. Their sides are covered with grains, arranged more or less regularly in curved lines, running from the wall to the edge of the lamella. Wherever one of these lines ends on the margin, it projects a little, and thus the edge of the lamella is toothed. The lamellæ of the second and third cycles do not materially differ, except in size, from those of the first. The lamellæ are not confined within the limits of the wall of the calicle, but appear on its outside, as vertical ridges or striæ, extending often from top to bottom; in some instances, however, they are nearly covered by marine incrustation to within a line of the top; and, again, they may be obliterated by the growth outwards of the wall. These ridges, which may properly be called the outer edges of the lamellæ, are thicker than the inner edges, but present, to a greater or less degree, the same granular teeth. The smallest lamellæ occasionally bend sidewise and join their neighbors, a feature observed in its perfection among the Eupsammidæ, and, to some extent, in other families. The columella is frequently wanting, or represented only by one or two lamellar teeth; but, on the other hand, it may form, at the bottom of the calicle, a spongy mass, two or three lines in diameter. The wall, at its upper margin, is very thin and diaphanous; outside, in the spaces between the lamellæ, it is slightly granulated. It is highly probable that the polyp, like the *Caryophyllia solitaria*, has the protruded, Caryophyllian mouth, and about twenty-two short tentacles, in two rows; and farther, that it has the power of raising itself above the edge of the calicle. It is evidently as successful a collector of crustacea as its numerous kindred; for, still wedged in the visceral cavity of one individual, was found part of a small crab.

The specimens were got by Mr. J. P. Couthouy, from the wreck of the San Pedro, sunk, in 1814, in the bay of Cumana, on the northeast coast of South America, and were presented by him to Dr. A. A. Gould. Dr. Gould, after whom I have named the species, kindly put them all at my disposal to be described.

Prof. Dana briefly notices three species of Caryophyllia, of which he says: "The following species have been observed only in the simple state, and may or may not be budding species." Dana, Zoöph. p. 383. The first of these, *C. solitaria*, has been described by Lesueur, (Journal Acad. Nat. Scien. Philad. vol. 1, p. 179,) and is also spoken of by Lamarck. It comes very near to the present species, but differs as follows : it has fifteen to sixteen larger lamellæ, alternating with smaller, while this species has, at the most, ten or twelve that can in any way be called larger. *C. solitaria* has the margin of the calicle nearly entire, while *S. Gouldii* has it rough with heads of lamella. Lesueur's figure represents the corallum partially buried in, or surrounded by, the substance to which it is attached, a mode of life quite different from the encrusting habit of the present coral. The second species, *C. pocillum* (Dana), is much broader than high, a proportion not met with in over 150 calicles, young and old, of *S. Gouldii* which I have examined ; and in which it is rare to find the breadth as great as the height. The species now under consideration has only six lamellæ decidedly prominent; while the other has "twelve larger, very broad and exsert," and "three intermediate, smaller and one half narrower; an arrangement not found at all in the subject of this paper. The third, *C. dilatata* (Dana), differs so strongly that no comparison is required. All three of these have the outward striæ stretching only part way down the wall, while, in almost all the specimens of *S. Gouldii* the striæ reach quite to the bottom of the calicle. The most important distinction of all, however, is, that *C. solitaria*, *pocillum*, and *dilatata*, have only been seen solitary, while this species has invariably a *grouping habit;* nor do I think a calicle could be broken off in such a way as to give the idea that it had grown single. Prof. Dana has been at the trouble of examining a specimen I sent him, and has written me, that in his opinion the polyp is new.

This species would come under the family of Caryophyllidæ of Dana, though his description certainly seems inexact, or at least ambiguous, when he says; "coralla within not transversely septate, surface not lamello-striate;" for some of the genus Caryophyllia (e. g. *Caryophyllia arbuscula*) have dissepiments, and the exterior of some species is striate, (e. g. *C. pocillum*, &c.) This family is represented in the classification of Edwards and Haime by parts of the families, Eupsammidæ, Turbinolidæ, Astreidæ, Oculinidæ, and Cyathophyllidæ. The present genus has all the characters of the Turbinolidæ, but cannot be put with them, on account of the toothed lamellæ; whereas Edwards expressly says: "The lamellar lines never separate at their extremities, either singly or in bundles, to form crenellations, teeth, spines, or lobes, and the free edge of the lamella remains always entire." This only shows how unphilosophical are the family characters given by some of the most eminent authorities. It must be pretty plain that this genus should make one of the natural group that includes Turbinolia, Desmophyllum, Flabellum, Cyathina, &c., yet it cannot be admitted there, according to Edwards, because the grains on the sides of the lamellæ are continued so as to project a little beyond the edge.

This genus would fall under Dana's tribe of Caryophyllacea, which is characterized by "numerous tentacles in two or more series," inferior gemmation, when any, and many-rayed cells, and corresponds to parts of Edwards's Sections, *Zoantharia aporosa, perforata, rugosa, malacodermata,* and *tabulata.* This Tribe and these Sections would be called, by some systematic writers, Sub-orders. These great discrepances between distinguished authors, and that, too, on the threshold of classification, may perhaps be accounted for by the fact that the classification of Dana is founded on the polyps themselves and their skeleton, while that of Edwards and Haime rests principally on the ultimate structure of the skeleton or *polypier.* A single instance will put this difference in a clear light. Edwards puts Madrepores, Porites, and Dendrophylliæ in the same Sub-order, (*Zoantharia perforata,*) because they all have holes through their walls; but then the Dendrophylliæ have numerous tentacles, in two rows, and a protruding mouth, while Porites and Madrepores have a mouth on a level with the edge of the calicle, and only twelve tentacles. Dana therefore puts under Caryophyllacea the Dendrophylliæ, and under Madreporacea the Madrepores and Porites.

Dr. A. A. Hayes read a letter from Dr. C. F. Winslow, of Troy, N. Y., and presented, in his name, a supposed fragment of a human cranium, found in California, 180 feet below the surface of Table Mountain. The thanks of the Society were voted for the gift.

Dr. Winslow writes: "I sent by a friend, who was going to Boston this morning, a precious relic of the human race of earlier times, found recently in California, 180 feet below the surface of Table Mountain. As it is the first organic sign of human existence preceding or coeval with a drift age, or a general or minor 'deluge,' that has been found in the earth, I have thought it would be interesting for the scientific gentlemen of Boston to discuss the subject, and for a portion of the fragment sent to me to be preserved in the cabinet of your Society of Natural History. My friend Col. Hubbs, whose gold-claims in the mountains seem to have given him much knowledge of this singular locality, writes that the fragment was brought up in 'pay dirt' (the miners' name for the placer gold drift) of the Columbia claim, and that the various strata passed through in sinking the shaft consist of volcanic formations entirely. Whether his knowledge is accurate touching the volcanic formations I have some doubt, and have written for more certain information.

"The mastodon's bones being found in the same deposits, points very clearly to the probability of the appearance of the human race, on the western portions of North America at least, before the extinction of those huge creatures. As I have fragments of Mastodon and *Elephas primigenius*, or a kindred species, taken between ten and twenty feet below the surface, among the upper placer gold deposits of the same vicinity, it would seem that man was probably contemporary, for a certain period, with the closing dynasties of these two formidable races of quadrupeds. This discovery of human and mastodon remains in the same locality gives also great strength to the possible truth of the old

Indian tradition of the contemporary existence of the mammoth and aboriginals of this region of the globe."

Dr. A. A. Hayes also read a letter from Mr. A. P. Davis, of Buchanan, Liberia, giving some farther particulars in relation to the discovery of Native Iron in Africa.

Mr. Davis, from whom the specimen analyzed by Dr. Hayes was received, in the present letter describes the mass found as "being as large as the crown of a man's hat, and like a rock, of a yellow color taken from the earth. From its appearance I supposed it would break into pieces; but it resisted the repeated blows of a sledge-hammer of fifteen pounds weight; and I could not separate it by breaking, as the hardest blows only flattened it. It was by these means we found out it was malleable. The huge bulk was put in the fire and blown to, until it became sufficiently hot to be cut. It was divided into many parts, and some of the same bulk was actually ore, not malleable at all. It had a very craggy appearance, with many cells in it. Where the ore is to be had, or the distance that the ore in question came from, is about four to six days' travel. I have none now, but will, with Divine help, get some as soon as possible."

Dr. Hayes added that he was indebted to the efforts and kindness of Rev. Joseph Tracy, of the Colonization Society, for the letter from Mr. Davis, and other interesting facts in relation to the natural productions of the country bordering on the lands of the colony of Liberia.

The President exhibited specimens of curiously intertwining and intergrowing woods from Surinam; they were referred to the Curator of Botany.

The Curator of Crustacea exhibited the Crustacea collected in California by Mr. E. Samuels, together with other specimens presented by the Smithsonian Institution. Among them are several new species described by Mr. Stimpson in the forthcoming number of the Society's Journal.

The Curator of Ichthyology presented a Fish from the North Atlantic, a new species, and probably belonging to a genus new to North America.

Dr. S. Kneeland presented about fifty specimens of Mammalia, Birds, and Reptiles from Lake Superior.

Dr Kneeland remarked that, as yet, there were no rats and common mice at Portage Lake, the place of these animals being filled by the Flying Squirrels which breed in the walls of the houses, and by the Field Mice.

The reptile, described by him at a former meeting (Proceedings, Vol. VI. p. 152) as a *Siredon*, is a *Menobranchus*, but probably a new species, as it does not answer to the descriptions of either *M. maculatus* or *M. lateralis*. If it is new, the specific name of *M. hyemalis* would hold good. The salamanders, trout, and tortoises vary somewhat from described species.

Mr. F. H. Storer exhibited some proof-sheets of a work upon the Plants of Austria, by Ettingshausen and Pokorny, recently published at the Imperial Printing-Office in Vienna. The impressions, from which these prints were struck off, are obtained by the process known as "Nature's own Engraving," in which the dried plant to be copied is placed between a sheet of steel and another of very pure soft lead, and all together subjected to great pressure by passage between rollers. An impression of the plant, even in microscopic details of the most delicate Algæ, is thus transferred to the soft lead—the plant being forced into it,—from which any number of copies may be taken by electrotyping.

Examples of the application of this process in the delineation of other objects, such as small animals, agates, fossil impressions, sections of wood, lace, &c., were also exhibited.

Dr. D. H. Storer stated that he had lately received a fine specimen of the Sting Ray from Dr. E. W. Carpenter, of Chatham. It proves to be the *Pastinaca hastata* of Dekay. It measured nine feet from the snout to the extremity of the tail. It is described by Dekay as having three caudal spines; this specimen, however, presented but one, and the stump of a second, anterior to it.

DEPARTMENT OF MICROSCOPY.

The Secretary, Dr. B. S. Shaw, exhibited specimens of the larva of some species of Fly (*Musca* or *Œstrus*), which were found in the skin of the scalp, face, neck, and back of a child seven days old.

The specimens were imbedded in pustules of about one eighth of an inch in diameter, resting upon an inflamed base half an inch or more in width. The only specimen preserved for examination was placed in alcohol. After it had been immersed in this fluid for several days, it was found to measure a quarter of an inch in length by a sixteenth in breadth. Color white. Body composed of eleven segments, exclusive of head; anterior portion of each segment surrounded by a band of bristles or spines. Head armed with two black hooklets; no visible mouth.

Cuvier speaks of the mouth of the cutaneous larvæ as "being composed of fleshy lobes only, whilst that of the internal larvæ is armed with two strong bent hooks." If this is true, the natural nidus of these larvæ would seem to be the internal organs rather than the skin. Humboldt, Rudolphi, Linnæus, Gmelin, and others, speak of a species of Œstrus as *Œstrus hominis*. This species, however, so far as is known, has only been met with in South America, and when thoroughly studied may prove to be identical with one of those better known. In endeavoring to ascertain what is known concerning the presence of maggots in the human body, the Secretary had met with a large number of cases where the mucous membranes had been infested with them, and with several cases where the skin had been chosen as the nidus for the larva or egg. Of the Coleopterous insects, such as beetles, mealworms, &c., he had collected between thirty and forty cases, where their larvæ had been found in the stomach, intestines, urinary organs, nostrils, and inner canthus of eye. The larvæ of Neuroptera and Lepidoptera have been found in similar situations. Of the larvæ of Diptera, those of Musca and Œstrus seem to be most common; those of Musca forming by far the largest number of any one genus, thirty-seven cases having been tabulated and reported by Mr. F. W. Hope, in the Transactions of the Entomological Society of London, Vol. II. The species of these maggots was generally unknown; but many were recognized as belonging to *M. vomitoria*, *M. carnaria*, and *M. domestica*.

The genus Œstrus seems to be that which most frequently deposits upon the external surface of the human body. Of these cases he had met with two upon the scrotum, two in the skin of the abdomen, two in the scalp, and one in each of the following named situations,—leg, arm, scapula, ear, jaws, antrum, and stomach. These larvæ were either called *Œstrus hominis*, or they were described without a specific name, with the exception of one, which was *Œstrus bovis*.

A full account of this case was read before the Boston Society for Medical Improvement, and published in the Boston Medical and Surgical Journal of October 8, 1857.

Mr. C. J. Sprague exhibited specimens of a new fungus, *Glæosporium crocosporum*, Berk. and Curt, named from specimens collected by himself.

This fungus is found very commonly in autumn upon various kinds of melon. It appears in orange spots upon the outer surface, and is generally found in places which seem to have received a blow. Sometimes, however, the fungus covers the whole fruit in a yellow and orange incrustation. It belongs to that numerous family of fungi which infest the leaves and bark of all plants, and the epidermis of fruits. There is no true perithecium, but the spores spring in myriads from a nucleus just beneath the epidermis, and then ooze forth through an aperture in irregular granular masses drying on the surface. They are elongated oval in shape, and of a clear yellow-orange color in mass.

Mr. Sprague also exhibited the spores under a microscope.

October 21, 1857.

The President in the Chair.

In the absence of the Recording Secretary, Mr. C. J. Sprague was chosen Secretary *pro tem.*

Dr. A. A. Gould read a letter from Prof. Hubbard of Dartmouth College, giving an account of a fish which was seen to fall to the earth, during a sudden squall of wind and rain, in a town in Vermont. Dr. Gould thought the fact interesting, as corroborating several instances of the same kind which had previously been recorded, some of which had come to his own knowledge.

Dr. Gould also stated that a letter had been sent to him through Prof. Lovering by Mr. George S. Blackie, written by Prof. Gregory of Edinburgh to the late Prof. Bailey. Dr. Gould read several passages of general interest regarding certain observations made by Prof. Gregory on the Diatomaceous Exuviæ of the Post-Tertiary sand at Glenshira, near Inverary, the greater part of the letter being devoted to a close criticism on certain new forms. Several prepared specimens, and a number of pamphlets on the subject, were laid on the table, to be added to the collection of Prof. Bailey.

On motion of Dr. Gould, it was voted that the receipt of the letter and specimens be acknowledged with thanks to Prof. Gregory.

Dr. Kneeland presented a large number of specimens, collected by himself, illustrating the different forms in which the copper occurs, and the various rocks with which it is associated, in the Lake Superior district of Keweenaw Point.

All the copper, with the exception of a small amount of carbonate near the surface, which he had seen over this extensive district, was the pure metal;—he showed its different forms of mass, leaf, and botryoidal copper; of rounded pieces, varying from a rifle ball to a small shot in size, scattered through the rock, called *shot copper;* and also the metal in a crystalline form, in curiously contorted spiculæ, and in the thinnest laminæ. Associated with the metal were the various forms of granular and amygdaloidal trap, tabular spar, quartz, epidote, prehnite, calc-spar, &c.; crystals of dog-tooth spar, of calc-spar containing copper, of quartz, &c. Some of the specimens were blackened by the kiln-fires employed to facilitate the separation of the matrix. The specimens were from the Minnesota, Cliff, and Portage Lake districts. He also presented several specimens of native *silver* associated with copper; of agates from the lake shore; of chlorastrolites, found only on Isle Royale island; of sulphuret of copper and rose quartz from the north shore of the lake; and of fossil corals from the drift. He thought the specimens of value, not only mineralogically, but especially as illustrating this particular and almost unique copper deposit; for such a series he had looked in vain when wishing to study this subject, and he thought the present collection, with others he made last winter from the same localities, would be of great value to any one pursuing this study at so great a distance from the copper region.

Dr. Bacon exhibited a calculus taken from the urethra of an ox. It consisted essentially of silica, with a little carbonate and phosphate of lime. It measured about four lines in diameter, and presented a rough or tuberculated surface.

Dr. Wyman asked how common calculi of this chemical composition are.

Dr. Bacon said that very few cases are on record, but that probably many passed unnoticed.

Dr. Gould asked whether the lime-salts were diffused throughout the mass or not.

Dr. Bacon said that in this case they are uniformly diffused. The silica was amorphous, not crystalline.

Dr. Kneeland, who brought the specimen from the neighborhood of Lake Superior, said that the animal died from this obstruction. The calculus was perfectly impacted in the urethra, so as to prevent the egress of the bloody urine which distended the bladder.*

Mr. John Green made some remarks upon the microscopic structure of certain fish scales he had recently been examining; he showed them to be of bony structure, which he considered to have an important bearing on classification.

Dr. Gould alluded to some recent observations in France in relation to the reproduction of Arachnides, or rather their power of producing fertile eggs, though completely isolated from the male. Blanchard found that the genital apparatus of the female was composed of two ample tubes to which the ovarian crypts were attached. These serve as reservoirs in which the seminal fluid accumulates, through which the eggs pass and are impregnated; but which is not exhausted by one ovulation, serving for many subsequent occasions. Blanchard therefore concludes that one coupling is necessary, and serves for several years. M. Delfrayssé had in like manner invoked anatomy to settle the question. He likewise finds the two tubes and the fecundating liquid; but states that he has found two little glandular bodies between the ovaries and tubes, which secrete the fertilizing fluid. He therefore concludes that the animals are *hermaphrodite*;—that the seminal fluid is furnished at the time of laying eggs, and not kept in store; and that no copulation is absolutely necessary. Dr. G. remarked that there was evidently room for further anatomical research, and did not see how the latter conclusion comported with the well-known organization of the Arachnides as males and females.

* In the account of Calculi from the bladder of an ox, upon page 218 of this volume, it should have been stated that their composition was nearly pure silica. SECRETARY.

Mr. Sprague laid on the table a package of Algæ, presented to the Society by Mr. B. D. Greene. They formed part of Prof. Harvey's collections, and came from Australia, Ceylon, and the Friendly Islands. They were beautifully prepared with printed labels, and furnished another instance of Mr. Greene's liberality to the Society.

The Corresponding Secretary was instructed to make a fitting acknowledgment to Mr. Greene for the donation.

The President made some remarks on the mode of reproduction of certain fishes in Surinam, and detailed some interesting points of structure in their eyes.

Mr. Joseph Tillinghast and Mr. George H. Rogers, of Gloucester, were elected Resident Members.

November 4, 1857.

Dr. C. T. Jackson, Vice-President, in the Chair.

Dr. Jackson exhibited crystals of sugar produced by the *Sorghum saccharatum*, or Chinese Sugar Cane. They were six-sided prisms, and rhombic prisms with angles of 103° and 77°—crystallographic proof, as he considered, of their being *cane sugar*.

Dr. Jackson stated that the young plant contains gum or dextrine, and glucose. As the period of inflorescence is approached, large quantities of starch globules may be seen in the cells of the plant. If, at this period, the stalk is pressed, the fluid which exudes is found slightly milky, owing to the presence of starch globules, which subside after some time. When the seed ripens, the starch diminishes in quantity in the cane, and the expressed juice gives, upon evaporation, almost wholly *cane sugar*. This is a point of interest in the manufacture of sugar. The presence of starch in the syrup prevents the ready formation of crystals of cane sugar, and it should therefore be removed by decantation or filtration. Fermentation of the syrup and the conversion of the sugar into lactic acid and mannite takes place in warm weather. It should therefore be boiled before viscous fermentation takes place. Dr. Jackson expressed the opinion that the Sorghum would ripen in the Northern States in warm seasons, if planted early.

Mr. Theodore Lyman read a paper upon a new species of Coral, as follows:—

The genus Oculina, established in 1816 by Lamarck, includes the polyps distinguished by the solidity of their corallum throughout; to this feature may be added, that they have generally a tendency to branching, and an abundance of solid tissue between the calicles. The animals themselves, so far as observed, have a well-marked central disk, and about twenty-four slender, tapering tentacles, alternating longer and shorter. Prof. Dana (1848) describes nine species under the genus Oculina, and six species under the genus Allopora, which was included by Lamarck's genus Oculina, and which includes Allopora (Ehrenberg, 1834) and Stylaster (Gray, 1831). Milne Edwards and Haime (Monographie des Oculinides, Annales des Scien. Nat. 3ème Série, tome xiii. 1850,) have established a family of Oculinidæ, which includes, besides new species, all species under the above-named genera. This family has twenty genera, principally characterized by the modes of budding, the variations of the columella and paluli, the smoothness or roughness of the surface, and the shapes of the lamellæ. Of these genera, several are fossil, and others have only new species. The species, according to Dana, are changed as follows, by Edwards, *O. diffusa*, *varicosa*, and *pallens* appear under the name *diffusa*; *O. oculata* and *virginea* become *oculata*. *O. horrescens* is transferred to the genus Acrhelia; *O. prolifera* to Lophelia; *O. axillaris* to Cyathelia; and *O. hirtella* to Schlerhelia. And, finally, the *Caryophyllia anthophyllum* of Dana is brought into this family and put in the genus Lophelia. It should be observed that these genera of Edwards and Haime are, as usual in their classification, founded entirely on the structure of the polyp frame, without reference to the soft parts.

OCULINA GLOMERATA, Lyman.

Mass, encrusting a piece of sheet lead. In two or three places there are signs of the beginnings of branchlets. Corallum solid, granulated slightly in the spaces between the calicles. Calicles in some places crowded, and with numerous buds among them; generally $1\frac{1}{4}$ lines broad, and often $\frac{3}{4}$ line high; round, upright, striated and granulated outside; a few much larger than the rest. Lamellæ, in the full-grown calicles, 26, rarely less, and in a few instances as many as 38; a little exsert, rather delicate, every other one reaching the centre; all toothed for their whole length, and the larger ones with two or three little lobes, the lower of which might be considered as paluli; sides finely toothed. Columella small generally, and inclined to be spongy.

The specimen is a couple of inches long and an inch high. It was brought by Mr. Couthouy from the wreck of the San Pedro, sunk in 1814 in the bay of Cumana; and is now in the collection of Dr. A. A. Gould. This species would come under the genus Oculina as defined by Edwards. The other species differ from it as follows: *O. virginea*, Indian Ocean; calicles far apart; rarely more than 24 lamellæ—calicles a little swelled at the base. *O. speciosa* differs like the preceding, and has moreover two circles of *distinct* paluli. *O. Petiveri*, calicles distant, strongly swelled at the base, and with furrows between. *O. Banksii*, calicles distant, hardly raised above the surface, surrounded by a depression. *O. Valenciennesi*, calicles little prominent, sometimes even depressed. *O. fissipara*, fissiparous; lamellæ irregular. *O. varicosa*, calicles farther apart; lamellæ stouter, less toothed; cavity deeper; only 24 lamellæ. *O. diffusa*, calicles farther apart; lamellæ stouter, little, or not at all, exsert, 24 in number. *O. pallens*, calicles larger, deeper; lamellæ much stouter, and less toothed. There is but one Oculina known which is encrusting in its growth. This is the *O. conferta*, (British Fossil Corals, p. 27, tab. 11, fig. 2, 1850,) which is an eocene fossil, and may, perhaps, with the present species, be only the young state of an arborescent form.

Dr. Jackson read a communication from John Bachelder, Esq., dated Monument, October 27, 1857, upon the

Ruins of a Trading House erected by the Pilgrims at that place. The communication was presented, upon motion of Dr. Jackson, to the Massachusetts Historical Society.

Prof. Theophilus Parsons presented a section of an Elm, which exhibited a singular involuted growth appearing after the falling of a large limb.

The growth occurred at the edge of a hollow in the trunk, and presented the appearance of a curling inward of the edge of the cavity,—by which it was several times rolled upon itself, the bark following the curl to its termination. Prof. Parsons, in reply to a question from the Corresponding Secretary, stated that this curl, if unrolled, would more than span the gap on the edge of which it was found.

Mr. Sprague thought that the curvature of the tree admitted of simple explanation. The falling of the large bough had carried with it a considerable portion of the heart wood of the tree, leaving the centre exposed to decay. As, year after year, this central portion disappeared, the outer, living shell became thinner and thinner, and began to assume a convolute form, from the growth being always on one surface only. The shrinking and drying of the internal part, joined to the swelling and increasing of the external part, had gradually curved the rim of wood, like the convolute estivation of some corollas. As the tree grew in height, the aperture left by the fallen bough, and increased by the subsequent decay, gradually became narrower by the shrinkage and inward growth of the margins.

Prof. Parsons concurred with Mr. Sprague in this explanation.

The Corresponding Secretary read the following letters, viz: From the Academy of Natural Sciences, Philadelphia, April 7; the Academy of Science of St. Louis, June 6, and September 11; the American Philosophical Society, Sept. 10; the Académie Royale, &c. de Belgique, Bruxelles, January 15, 1856, and February 6, 1857; K. Akademie der Wissenschaften, Wien, April 10, 1857; Royal Society of Sciences at Göttingen, April 18, 1857; Smithsonian Institution, June, 1857, acknowledging the receipt of the Proceedings of the Society; Verein für Naturkunde in Nassau, March 1, 1857; Cambridge Philosophical Society, February 26, 1857; K. Akademie der Wissenschaften, Wien, November 24, 1856, presenting their various publications. From Prof. Joseph Lovering, July 20, presenting, in behalf of the American Association for the Advancement of Science, its Proceedings; Academy of Natural Sciences, June 19, asking for a missing number of the Journal; the Georgic Association, Randolph, N. Y., July 21, asking for the publications of the Society; Geological Museum, Calcutta, January, 1857, making the same request, and sending its own Memoirs; and from James H. Slawson, Houghton, Michigan, acknowledging his election as Corresponding Member.

DEPARTMENT OF MICROSCOPY.

Mr. John Green exhibited a large number of thin sections of the Bush Ropes, so called,—peculiar woods obtained by him in Surinam, and made some extended remarks upon their method of growth. He said he was preparing a paper upon the subject, which he should read when his examinations are completed.

Dr. James C. White exhibited the Eggs of the Itch Insect, *Sarcoptes hominis*.

He remarked that, as is now well known, it is the female only which burrows. She bores transversely downwards through the skin, but never to a great depth beneath the surface. Each day as she moves onward she leaves an egg behind her. After she has deposited fourteen, the larva of the first matures and creeps out upon the surface, there to ramble with the other young and males till maturity, when if a female, and after copulation with a male, also an outsider, it repeats the process above mentioned. Each day a young one emerges from the burrow, leaving behind the membranous walls of its cell. The acarus may thus extend its hole indefinitely, even to the extent of four inches, and its course may be traced by a white elevated line on the skin. It never leaves its burrow ; but if a pustule should be formed above it, by the scratching of the patient, the larvæ are destroyed ; but the mother cunningly emerges to the surface at the edge of the pustule, and commences a downward descent anew. The male is much smaller than the female, and has ten extremities. The female wants one of these posteriorly, and the young three. She is also armed with two saw-like claws, which cut a way through the tissues by a transverse motion over each other as the blades of scissors do. Hebra thinks the opening for the exit of the eggs is a fold or valve on the belly, which may be easily seen, though it has never been figured.

The present specimen was snipped from the glans penis, a favorite and undisturbed lurking-place. It consists of a canal bored obliquely through the tissues, containing a series of twelve eggs, together with fœcal matter, strewn along the passage. When first cut out, the animal herself was seen at the lower extremity with one egg in her body. The first two or three eggs were quite mature, so that the extremities of the young could be distinctly made out. She generates but one egg a day, though Bourgignon says he has seen four at once in her body. Hebra thinks this impossible, and he is probably correct, as he has made them an especial study, cultivating a colony on himself for two or three months. He once saw the two sexes in act of coition, belly to belly. The same species occurs on the lion, camel, and other animals.

Dr. White showed also the spores of the parasitic plant of *Pityriasis versicolor.*

The specimen was taken two or three days since from the back of a gentleman who was not aware of any cutaneous disease. There were some dozen patches, the largest the size of a pea. They present a yellow appearance, are elevated, and consist of epidermal cells, between the layers of which the parasite is found. Some alkaline carbonate is added to make the epithelium transparent. It is still a mooted point whether the parasite is the cause of the disease, or merely a growth in an exudative process. The fact that we sometimes fail to find the parasite tends to the latter conclusion. Microscopically, it consists of spores, containing a fat-like nucleus, grouped together between the layers of the epithelial cells. Sometimes the cells, by union, form long branching tubes, with here and there a nucleus scattered along their course. The cells sometimes subdivide also. It does not appear to be very rare here, as Dr. White had seen three cases in as many weeks.

Mr. C. J. Sprague exhibited five specimens of *Artotrogus Asterophora*, Fr., parasitic upon Nyctalis, and showed the copious echinulate spores under the microscope. He also exhibited specimens of a nearly allied fungus, *Sepedonium cervinum*, Fr., which is rare, and which in this case grew upon a matrix where it had not before been detected.

This fungus has generally been associated with *Peziza macropus*, and was imperfectly figured by Ditmar upon this plant in Sturm's Fl. Deutsch, where the species was first described under the name of *Mycogone cervinum*. The specimens exhibited were found by Mr. Denis Murray upon *Helvella ephippium* Lév. The lower portion of the hymenial surface was clothed with a white, felty envelope, while the upper portion was brown with the copious spores of the ripened parasite. The spores were exhibited under the microscope in different stages of growth and maturity. Mingled with them were many spores of an entirely different character. They were linear, narrowed at each end, uniseptate, pellucid, nearly colorless, with a yellowish tinge. Mr. Sprague had detected their growth from the ends of long, slender filaments, much smaller than those of the Sepidonium. Bonorden mentions that other parasites are frequently found in company with the Sepedonium, such as Monosphorium and Sporotrichum; but neither of these genera bear spores like those in question.

Prof. Parsons, of Cambridge, exhibited and presented a specimen of Infusorial Earth, from the neighborhood of Bangor, Maine. Copper was said to have been detected in the silica of which the specimen was composed.

Dr. J. C. White was appointed one of the Committee on Chemistry of the Department of Microscopy.

November 18, 1857.

The President in the Chair.

Dr. Hayes remarked that a specimen of Infusorial Earth, (which was afterwards identified as part of the specimen referred to in the proceedings of the last meeting,) given to him by Dr. A. A. Gould, had been submitted to chemical examination, without the detection of any compound of copper, either mixed or combined with it. The existence of copper, as part of the material of the Navicula, would be an interesting fact; but in the present state of our knowledge, there is no evidence afforded by chemical analysis in support of such an opinion.

Dr. Hayes stated, in connection with the reported presence of *cane sugar* in the expressed juice of the variety of sorghum cultivated somewhat extensively the last two years, that he had grave doubts of its production anywhere, as an immediate principle. One or two varieties of sorghum, which really produce cane sugar, had doubtless been cultivated, and had afforded sugar directly. Without having had an opportunity offered for an analysis of the secretion in the stalk, as cultivated so far south as where the ordinary cane can be reared, his most careful inquiries had resulted in the conclusion that there, as well as here, *glucose* alone is contained in the cells of the plant. In Georgia and South Carolina the utmost efforts to obtain sugar from the juice, both on the large scale of manufacture and in more refined and varied operations, have failed, and the most recent information includes the fact that the product, obtained in Louisiana, side by side with that of the ordinary cane, sent to St. Louis for refining, did not prove to be sugar. Masses of crystalline matter have been obtained by evaporating the syrup; but when it is remembered that a gallon of the expressed juice of the fully ripened plant contains more than an ounce of salts of potash, lime, &c., the production of a compound of glucose and salts is not surprising.

If the plant secreted cane sugar, we should not from analogy expect that a change of habitat, *allowing the plant to perfect its* *cells*, would lead to the formation of glucose only. Nor should we, in view of the experience, especially in our Southern States, meet with the two or three doubtful cases recorded of sugar product; but as in the beet, the maple, and the cane, sugar, as a *constant proximate constituent*, would be found in the sorghum juice.

The President gave an account of some observations on the development of Anableps Gronovii, as compared with that of the Embiotocas of California.

Prof. Agassiz has described these last as having a "true ovarian gestation." This statement is true, but in a somewhat different sense from that in which the development of Anableps may be considered ovarian. In Embiotocas the ovary is divided internally into numerous compartments by folds of lining membrane which project into its cavity; these folds are germ producing, as the young ova may be seen between their layers, even when the fœtuses are being developed in the cavity of the ovary. Nothing has been determined as yet as to the period when the ovum of Embiotocas leaves the ovisac, whether before or after impregnation. Wherever it has been observed, the fœtus has been found in the cavity of the ovary, enveloped in the longitudinal folds of its lining membrane. In Anableps, the gestation is carried on to its completion, or nearly so, in the ovisac; this last grows as the fœtus is developed, becomes quite vascular, and by its apposition with the vascular papillæ of the yelk sac, carries on those interchanges between the parent and the fœtus which are necessary for respiration and nutrition.

Dr. C. T. Jackson exhibited to the Society a portion of the supposed meteoric stone from Marblehead, which was brought to him for analysis on the 14th November.

He remarked that it bore so close a resemblance to the slag of a copper smelting furnace, that he at first hardly thought it worth the trouble of analyzing, but since it might become important to record the real composition of this alleged meteoric matter, he had made the analysis, with the following results per cent. :—

Per oxide of iron	=58.72=metallic iron, 41.12	
Silica	34.48	
Alumina	2.40	
Magnesia	0.39	
Sulphur (by difference)	4.01	
	100.00	

Search was made for nickel, copper, and chrome, but no trace of those metals was discovered. The proportions of iron and of silica were not different from those of meteoric stones, but perhaps the perfect oxidation and combination of the iron with the nitric acid was the strongest evidence of its terrestrial origin that the specimen presents; for even had nickel been discovered in it, this would not alone prove its celestial origin, since the copper ores worked at Point Shirley often contain nickel, which would be likely to be found in some of the slags.

Mr. Edwin Harrison, of Cambridge, reported the result of an analysis of two specimens of Magnetite, the first from the Iron Mountain, the second from the Pilot Knob, Missouri.

IRON MOUNTAIN ORE.

Iron	68.95
Oxygen	27.00
Sand and Silic. of Alum.	3.07
Manganese	(trace)
	99.02

Spec. grav., 3.997 at 13.°1 centigr.,

PILOT KNOB ORE.

Iron	54.307
Oxygen	26.720
Insol. subs. in H. Cl.	17.509
	98.536

Spec. grav., 3.137 at 11.°5 centigr.

Mr. Sprague read the names of a small collection of cryptogamous plants brought by Dr. Samuel Kneeland, Jr., from the Lake Superior region, as follows, namely :—

Agaricus Orcella, Bull.; *Lycoperdon pyriforme*, Schœff.; *Polyporus perennis*, Fr., *hirsutus*, Fr., *Cetulinus*, Fr., *igniarius*, Fr., *applanatus*, Pers.; *Tubercularia pezizoidea*, Schw.; *Usnea longissima*, Ach.; *Sticta pulmonaria*, Ach.; *Neckera pennata*, Hedw.

These species are all common over a broad area of the United States. They are mainly interesting as defining their range, and showing how little change is exhibited in the growths of a region extending thousands of miles.

The President announced the resignation of Patrick T. Jackson, Esq., as Trustee of the Courtis Fund. It was voted to present the thanks of the Society to Mr. Jackson for his able and efficient services, and Mr. James M. Barnard was chosen Trustee of the Courtis Fund in his place.

December 2, 1857.

The President in the Chair.

Dr. C. T. Jackson observed that a question having been raised as to the variety of sorghum from which the crystallized cane sugar exhibited at the last two meetings was obtained, he now presented to the Society the panicle of the plant he had operated upon, with the ripe seed attached, which the members would observe was the true Chinese variety of the sorghum, and such as grows in this vicinity.

He also presented specimens of the fructification of that variety of the sorghum from Caffraria, called there the Imphée, which is suited only to warm climates, and will not ripen in New England, but which, in warm seasons, ripens in the Southern States.

He remarked that, after having both last year and this demonstrated that the Chinese sugar cane produces, when ripe, true cane sugar with its perfect crystals, having all the replacements and secondary forms belonging to cane sugar, and wholly incompatible with the forms of grape sugar, or glucose, and having publicly made this demonstration before the Society, by aid of excellent microscopes, he could not consider the nature of the sugar an open or undecided question, about which members had a right to entertain different opinions. It was an absolute demonstrated fact, beyond question. He had shown that the unripe plant produces grape sugar, which is readily crystallizable by suitable operations, and the form of those crystals is that of grape or fruit sugar, wholly incompatible with that of the cane sugar so abundantly found in the ripe plant. He stated that the ripe sorghum juice gives from 12 to 18 per cent. of saccharine matter, and, by the usual process of sugar-making in a practical way, nine per cent. of good crystallized cane sugar.

He had operated also on the Imphée, which, when unripe, gave also grape sugar, and, when ripe, good crystallized cane sugar. The failures alluded to by Dr. Hayes, as having taken place at the South, were from operations on the *unripe* Imphée in South Carolina.

Dr. A. A. Hayes read the following paper, on a chemical change which takes place in the glucose of the sorghum :—

In a paper communicated to this Society some months since, I alluded to the fact, that the glucose of the sorghum cultivated in New England, like fluid fruit sugar, passes to the condition of dry, or crystalline fruit sugar. The subsequent more careful investigation of this change led to the observation, that the action is *continuous*, proceeding indeed during many months, and resulting finally in the *production from pure glucose of sugar having the higher grade of a variety of beet root, or cane sugar.*

In the account which follows, the experiments were made on the glucose of that variety of sorghum which has dark purple seed coverings, the variety generally cultivated in our northern States.

When we extract the saccharine matter of the stalk of the sorghum, either by expression, or through the aid of water, and purify the solution by means of animal charcoal, we obtain glucose, holding in solution some salts of potash, lime, and soda. This glucose does not afford crystals by evaporation in desiccated air, nor does alcohol, saturated with cane sugar, leave undissolved any sugar.

The perfectly formed cells of the plant, triturated with animal charcoal, afford to boiling alcohol the same substance. The dry glucose is abundantly soluble in alcohol of 86 per cent., and the dense syrup of the same dissolves without limit in it. After exposure in warm air, crystalline concretions, resembling dry grape sugar, form in isolated masses. Analysis shows a large proportion of saline matter, composed of phosphoric acid, chlorine, sulphuric acid, acetic acid and potash, soda, lime, and oxide of iron. This saline matter forms a compound with the glucose, and thus makes up the crystalline grains, which first appear in the dense syrup. These are constant results, in treating the plant which has been cultivated the two past seasons, and they present no remarkable feature, in comparison with those obtained on glucose from other sources.

After the lapse of several weeks, however, the pure glucose which has been withdrawn from the foreign aggregates exhibits the production of crystalline points, which, becoming numerous, soon assume the forms of regular crystals. These crystals increase in volume, but while forming in the glucose they present skeletons, rather than solid crystals, of a pure substance, and are often grouped. Crude syrup, remaining after the concentration of the juice by rapid boiling, undergoes the same modification, and crystallized sugar slowly separates from samples which originally did not contain any.

Slips of the pith of the plant, which had been carefully examined under the microscope, without any traces of crystals being found, after some months, show their cells filled with voluminous, dry crystals. Repeated trials prove that the chemical change, resulting in the production of the crystals, from glucose, is not dependent on exposure to air and loss of water, but it takes place when the syrup is kept in closed bottles.

As the glucose is abundantly soluble in alcohol of 90 per cent., this agent enables us to learn at any moment the production of sugar in a sample; the sugar when formed being nearly insoluble in cold alcohol. Thus, when a certain number of crystals have formed, if we withdraw by solution in alcohol the unchanged glucose, and after dissipating the alcohol, allow it to repose, crystallization recommences in the portion removed, and repetitions of this experiment may be made, until after about ten months, small portions only of unaltered glucose remain.

Although the evidence of the conversion of the glucose, step by step, into sugar, afforded by the action of alcohol, is important, the observations here recorded are based upon experiments made in a similar manner, with the alkaline solution of tartrate of copper, and acidulated alcohol saturated with cane sugar; they leave no doubt that the normal saccharine juice of the plant becomes, *per se*, converted into sugar, forming regular crystals of large size. These crystals, by solution in water, are easily purified, losing their porous structure and becoming solid, transparent, and colorless modifications of the rhombic prism from an aqueous solution. They are always apparently more voluminous than the crystals of cane sugar, formed under like circumstances, but they have all the brilliancy of cane sugar. In chemical characters, the most pure crystals yet obtained show a diversity when compared with cane or palm sugar. They are less soluble in water; in sulphuric acid they do not exhibit the same depth of coloration that cane sugar does. With the copper test, a partial reduction takes place, under the same conditions, where cane sugar does not produce change on this agent.

The conclusion reached is, that this sugar, wholly unlike any variety of glucose or fruit sugar, belongs to a higher class, and probably will rank with beet sugar, in most of its characters.

The present is the first instance, within my knowledge, of the conversion of any variety of glucose into a sugar of high grade, after its extraction artificially.

Dr. Jackson remarked that the statements made by Dr. Hayes in his paper were so extraordinary, and so opposed to the experience of both scientific and practical men, that those results should be verified by others before they could be believed. If Dr. Hayes had discovered that the juice of the sorghum, after it was expressed, would change, *per se*, into cane sugar, it was a most important discovery; for no chemist or practical operator had ever attained such a result. Dr. Jackson was aware that starch changes into dextrine, then into grape sugar, and lastly into cane sugar, in the living organism of the plant, and that some of these changes could be effected by chemical art, but thus far no one had ever known grape to change into cane sugar out of the living organisms, though the contrary operation was not uncommon, namely, the conversion of cane sugar into glucose, or even mannite.

Up to this time we are not aware that any authority states that glucose can, by the action of any salts, be changed into cane sugar.

He remarked that the term cane sugar was not restricted to a species, but to a group or family, having a rhombic prism for the primary form, and that there was undoubtedly some slight difference to be found in the dimensions of their crystalline angles, all of which, however, fall within the limits of the general form known as that of cane sugar, and are incompatible with grape sugar, which belongs to the cubic system. The sugar of the ripe sorghum has the crystalline form, and all the physical and chemical properties of cane sugar, and cannot be classed with any other. It exists ready formed in the cells of the plant, and may be seen by aid of the microscope in them when the plant is dried rapidly. It is obtained immediately on expression of a few drops of the juice upon a plate of glass, on which perfect crystals of cane sugar are seen by the microscope.

Dr. David F. Weinland made some extended remarks upon the Parasites of man, giving an account of their early history, from the time of Aristotle to the present day.

After alluding to the two genera of Tapeworms described by Bremser, and a third genus, a species of which has been described by Kuchenmeister, Dr. Weinland announced the discovery of a fourth genus, which he names *Acanthotrias* (three rows of hooks). Thus far he had seen it only in the cysticercus stage. It has fourteen hooks in each of the three rows, the uppermost row being the shortest. The specimen came from a dissecting-room subject, in one of the Southern States, which very probably may have been a Negro. The *Tænia solium* is found in England, Germany, and America. The *Botriocephalus latus* is limited to Switzerland and Russia, or, in the exceptional cases where it has been found in Germany, the person from whom it was taken had been to Switzerland. It remained to be determined if the new genus was peculiar to the negro race.

A discussion ensued as to the manner in which these worms are introduced into the human body, the degree of heat requisite to destroy their vitality in the process of cooking, and the action of salt upon them.

Dr. Weinland suggested that they might be introduced into the human body with butter and other articles, which had been cut with the same knife as measly pork, which, it is well known, is a mass of the cysticercus stage of the tapeworm.

Dr. J. C. White said, that, in Germany, the ova of tapeworms were frequently found upon the green vegetables used for salad.

Mr. F. H. Storer said that raw ham and pork are frequently eaten in Germany.

Dr. Chas. Pickering said that it had been noticed, in the Western States, that the tapeworm is much more frequently found in the immigrants from Europe than in the Americans.

Mr. John Green said that John Hunter speaks of a worm which was found alive in a carp which had been boiled.

Dr. Weinland said that, in the instances where worms were supposed to have been found alive in cod and other fish, their motion was, most probably, not one of vitality, but due to the elasticity of their tissue.

Dr. A. A. Gould stated that several hundred hogs were lost in East Cambridge, during the last summer, from the measly disorder.

Mr. N. H. Bishop exhibited a pair of Albino Rats, which were caught under a barn in Medford, near the Mystic River.

The President, in reply to a question from Dr. Gould, said he believed albinos always propagated albinos. They certainly do through several generations.

Dr. Weinland said he had noticed that if one of the parents has a single dark spot, however small, the pigment shows itself first in the eye of the offspring.

DEPARTMENT OF MICROSCOPY.

Dr. S. Durkee exhibited some of the Red Snow (*Protococcus nivalis*) from Greenland, belonging to the Bailey collection.

Mr. John Green stated that he had found the same or a similar plant near Portland, Maine, growing in the hollow of a rock. The plant contained in its cells nuclei of a greenish color.

December 16, 1857.

The President in the Chair.

Mr. Charles Stodder read a report upon the substance known as Gum Lahoe, which was referred to him at the previous meeting for examination, as follows:—

GUM LAHOE.

The specimen is an amorphous mass, made up of foldings of two colors, shades of brownish drab with some very dark brown spots, which seem to be derived from bits of bark and wood. The two shades of drab appear to be identical in every respect except color. It has a slight peculiar odor, is somewhat friable, as it breaks before a knife, and is non-electric. It bears no resemblance whatever to caoutchouc, or any of the varieties of the so-called gutta percha. Its external characters mostly resemble those of pitch.

It is insoluble in water, cold or hot, but softens with heat. In boiling water it is almost fluid, and particles of bark and wood separate, leaving the gum nearly clean. In this state it is very adhesive, tenacious, and may be drawn into threads and sheets of great tenuity. It may thus be rendered somewhat elastic, and nearly transparent. When cold it hardens very slowly, and is compact, homogeneous, and very adhesive. After exposure to a temperature of 32°, or, during one or two days, to a temperature of from 40° to 60°, it acquires a little brittleness, but readily softens by the warmth of the hand and becomes plastic. It becomes of a dark color upon working it in the hands a short time.

It is insoluble in cold or hot alcohol. In boiling alcohol it behaves the same as in boiling water, except that, the temperature being lower, it is not so fluid; after boiling in alcohol it is more brittle than after boiling in water. Left in alcohol for several days after boiling, a white flocculent matter, heavier than alcohol, is separated; upon boiling the alcohol with the flocculi and the gum, the former totally disappear, leaving the solution clear. It is soluble in cold oil of turpentine, naptha, and chloroform, more readily and in greater quantity than gutta percha. It is also readily soluble in sulphuric ether. Solutions in oil of turpentine, naptha, and ether are heavier than the solvent; those in chloroform are lighter.

It burns with much flame and smoke; immediately before burning, it melts into a transparent amber-colored fluid. Exposed to a temperature above that of boiling water, it melts, boils, and swells, with the rapid escape of gas. The amount of the residue is much less than that of the original, but it seems to possess nearly the same properties; this point, however, was not fully examined.

It is a vegetable product, intermediate with the resins and gutta tuban or percha.

Dr. A. A. Gould read a communication from Dr. Skilton, of Troy, N. Y., upon Equus Major, as follows:—

EQUUS MAJOR.

The last summer, 1857, Col. Leonard McChesney found, in his ploughed field in Brunswick, one mile from the city of Troy, a number of teeth of the Fossil Horse; the spot of marshy ground where they were found had, by trenching, been converted into a fine soil for garden crops. Mr. McChesney has been so fortunate as to find two incisors, slender in form; of the lower jaw, both the first molars, and three out of the next four molars on each side, viz: second, third, fourth, and fifth; of the upper jaw, the left first molar, and three on each side of the next four molars,—embracing of this animal's teeth seventeen. Of all the Fossil Horse teeth we have seen, there is decayed out of them all the fangs and bony parts, some of the dentine, and in this instance more or less of the ends of the plates of enamel. The length of the enamel of the first upper molar still remaining is 1.9 in., ditto the first lower molar is 2.33 in.; length of longest upper molar is 2.9 in., ditto longest lower molar is 3 in., ditto of incisors, 2 in.

Dr. Dekay, at the time of the publishing of "The New York State Natural History," had not learned of the discovery of any fossil horse remains in this State.

Some four or five years since, a lower first molar, in a fine state of preservation, was picked up by the writer's son, George S. Skilton, on the margin of one of the rivers near Troy.

Dr. J. C. White read a paper on the development of Tapeworms, as follows:—

GENERATION OF THE HELMINTHES.

I thought it might not be uninteresting, after the interest evinced by the Society at the last meeting on the subject of the Helminthes of the human body, to give, in a few words, the ideas now prevalent in Germany in respect to their development.

Let us take the joint or proglottis of a *Tænia solium*, and watch it through its phases. We know that it is a perfect individual by itself, capable of reproducing, and that when mature and filled with eggs it becomes congested, separates itself voluntarily from its next younger joint above, and is discharged. We will suppose now that by some means to be presently considered, the eggs regain entrance within the intestinal canal after their wanderings. Each ripe egg or embryo consists of a body armed with three pairs of hooklets, by which it is able to burrow in tissues, and make its way to any part of the human system. After it has found its proper nidus, be it muscle, brain, eye, or other organ, and has become encysted, its hooklets drop off, and from its walls a protuberance grows inwards, which gradually changes into a head, neck, and body, or, in other words, becomes the scolex. This at first remains enclosed within the embryonic bladder as a receptacle, but later the animal pushes itself free. Its head has now become that of the true Tænia, and from it depends the former receptacle as a bladder. Siebold maintains that this cyst is only a joint of the scolex, which has become dropsical; but Küchenmeister (and his views are adopted by all modern pathologists) insists that this is another stage of development, and the normal condition of the animal. Now, unless the encysted animal is set free artificially, the generation stops here; but if, in any way, it escape, and again find entrance within the intestinal canal, it fastens itself by its head to the walls, its bladder drops off, leaving behind the marks of attachment on the oldest joint, and in its place the true joints of the Tænia are developed, forming the animal with which we started.

It is only by this method that a Tænia can be produced; for the eggs or embryos of the proglottis either pass into the tissues, and become there encysted scolices or nurses, or else pass away with the fæces. At all events, they are never converted primarily into Tæniæ, else we should find tapeworms as plentiful as ascarides. To account for the production of Tæniæ, therefore, we must admit the scolex within the intestinal canal, and this may be done more easily than we imagine. The head of the Cysticercus is but a mere mite, and it is not necessary that its bladder should accompany it, which, as above mentioned, drops off, leaving behind the mark of its former attachment. We know how general a disease this parasite forms among swine; but it is not wholly confined to them; for we find it also, though seldom, in the bear, deer, and ox, not to mention many other animals, so that nations who eat no pork may be infested by Tæniæ. It is probable that many scolices may pass through the intestinal canal of man, and yet not generate the tapeworm, for it must attach itself to its walls before the joints are produced.

Some authorities would have it that the embryo discharged from the proglottis is capable of an immediate conversion into the scolex by burrowing into the soft tissues of the same individual; but it is more probable that the eggs must first leave the intestine, and mature outside, since scolex seldom occurs together with Tænia, and then it is probably accidental. When the mature proglottis is discharged from the intestine, it deposits its eggs in moist earth, on plants, in the water, and so on. These eggs are covered with a very thick membrane, which withstands much pressure between the glasses of a microscope, and they are capable of remaining a long time quiescent, like other parasitic ova, till a suitable menstruum is found for their development. That they may pass into the stomach of man and other animals with various articles of diet and drink is unquestioned; for they are found in water, and on salads and other vegetables, which are eaten without being previously cooked, and sometimes not even washed.

The genus Tænia still requires much study to remove the doubt which rests upon several species. Five or six are known, which find a habitation in man, (*T. solium; nana; mediocannellata; echinococcus; T.* of Good Hope; and *T.* or *Bothriocephalus latus,*) one of which wants the hooklets peculiar to the rest. They may be found wanting also in *T. solium*, in some instances. Of these species the scolices are unknown, with the exception of Cysticercus and Echinococcus. The encysted form of Bothriocephalus may have been confounded with that of *T. solium.* The joints of this worm are thrown off in chains, and not singly, as with Tænia. Two varieties of the Cysticercus have been observed.

Of course, after the adoption of the scolex theory, it became interesting to inquire where the Tænia of the common Echinococcus had been all this time. Siebold thought that the Tænia of the dog was the animal in question; for he gave the Echinococcus of animals, *E. veterinorum*, to dogs, and at the end of twenty-two days found in their intestine a Tænia with but three joints; the last one perfect, however, showing that the animal had arrived at maturity. This view was generally adopted till quite recently, when Küchenmeister showed that the *E. veterinorum* differed from *E. hominis* in the form of its hooklets, and he gave some of the latter in soup to a criminal condemned to be executed, and on dissection a Tænia very like *T. solium* was found, with but three joints, and bearing a head of Echinococcus. This *T. echinococcus*, as he calls it, had so long escaped observation only from its diminutive size, it being only three lines in length. The last proglottis of the three was perfect, and contained the sexual organs. This is a late discovery, and must not be confounded with *T. echinococcus* of Siebold, who made the *E. hominis* and *E. veterinorum* the same species.

In our study of these important and interesting parasites we notice three stages of development. First we see the proglottis leaving the intestine, and apparently seeking in the outer world of light and pure air some element, of which we are ignorant, for the development of the embryo. It possesses fibres capable of contracting after it has left the body, and finally discharges its eggs from the ovi-sac. These lead a nomadic life till by chance they once more gain admittance to their old haunts, where, instead of remaining contented, they burrow at once into the tissues, and then, after the formation of a head, leave them again, if possible, to resume their former quarters in the intestine, where the last stage of development is completed.

We can but notice that the Tænia feeds upon matter which has not been oxygenized or converted into tissue; whereas in its other state it exists upon the substance of animal life itself. Rokitansky noticed in the bladder of a Cysticercus, found in the brain, shreds of nerve fibre; and they must obtain from the human tissues they prey upon the great amount of calcareous matter found in their concentric corpuscles. What the object of these is no man knows; but the advancement in this branch of observation within the last few years leads us to hope that light may be thrown upon many points in their history, now obscure.

Dr. Gould read a communication from Mr. William Stimpson, upon a new form of parasitic gasteropodous mollusca, which he calls *Cochliolepis parasiticus*, as follows:—

In the spring of 1852, while investigating the marine fauna of the coast of South Carolina, in company with my friend, Lieut. T. D. Kurtz, U. S. A., I had the fortune to meet with a new form of parasitic gasteropodous mollusca, living under circumstances quite unique in this order. We had succeeded in capturing some gigantic annelides of the *Aphrodita* family, (*Acoëtes lupina*,) which lived in thick leathery tubes, extending down two or three feet into the mud near low-water mark. Upon drawing one of these worms from its domicil, some bright blood-red objects were found concealed under its scales, which, upon examination, proved to be little shells, resembling in size and shape our common *Planorbis exacutus*. These were placed in a watch-glass of sea-water, and drawings made of them, which are presented herewith.

The publication of these figures has been delayed, in the hope that opportunity would occur for a more thorough investigation of the structure of the animal, with the view of determining its place in the system. It has not, however, since been met with; and as the subject is one of great interest, I have been led to give at this time such information as could be collected from the specimens first discovered.

For this curious animal, which evidently forms a new genus and species, I would propose the name

COCHLIOLEPIS PARASITICUS.

The animal was of a blood-red color; foot oblong, tapering behind with a rounded extremity, slightly auricled before, anteriorly bimarginate. Head small, rounded and notched in front, without veil. Tentacles slender, tapering, equalling in length the diameter of the shell. Eyes none. (?) A small supplementary plicated gill on the right side, projecting out freely beyond the aperture of the shell, and attached only at its constricted base. Two long cirri arise from the body on the right side, near the junction of the mantle; these protrude like vibracula from the superior angle of the aperture, when the animal is in motion. Operculum thin, flexible, and pellucid.

The shell is thin, discoidal, convex above, concave and umbilicated below; the edge thin and sharp. Whorls three in number, rapidly enlarging. Surface smooth and glossy, indistinctly striated with lines of growth. Lip not thickened. Diameter one eighth of an inch.

Hab. Harbor of Charleston, S. C.; parasitic on *Acoëtes lupina.*

Dr. B. J. Jeffries exhibited the Atlas and Axis of a man about fifty-five years of age, and very muscular. The Odontoid Process was not united with the Axis.

Mr. Edward Daniels, State Geologist of Wisconsin, and a corresponding member of the Society, presented a number of geological specimens from that State, and remarked as follows:—

Occurring throughout an extensive district of Eastern Wisconsin and Northern Illinois, is a rock of Upper Silurian Age, clearly corresponding to the Clinton or Niagara groups of the New York Reports. In numerous localities, this rock contains cavities and thin seams filled with solid bitumen, which is frequently found in the digging of wells and cellars, and is commonly called coal. Near Chicago is an outcrop of this rock, in which bitumen is very extensively found, in fluid form at ordinary temperatures, as well as in the solid state. The cavities sometimes contain half a pint. The rock is an Encrinal Limestone, the encrinal forms being quite distinct in the northernmost portions of the district. From the walls of a church erected of this stone the bitumen has exuded and run down in streams, giving the building the appearance of some of the ancient ruins of Europe. The scale of bitumen peels off, however, after some time. Quarries have been opened in the limestone to the depth of fifteen feet. A few corals are found in it, and occasionally some of the larger corals.

Mr. Daniels also presented some minute Trilobites, and other fossils, from the base of the Potsdam Sandstone of Wisconsin. The localities were various: the valley of the Black River, in the northwestern part of the State, the mouth of Black River, and a spot sixty miles up the same river. He stated that they were interesting, being the oldest fossil forms yet found in this country, the sandstone resting directly upon the upturned edges of the Azoic rocks. Upon a small island in Black River he had found perfect impressions of Crustaceans, consisting of double rows of parallel tracks, precisely like those in Montreal.

Mr. John Green—referring to a specimen of Silicious Infusorial Earth presented to the Department of Microscopy, November 4, 1857, and which was at that time said to contain copper—stated that other samples of the earth had since been analyzed by Mr. Albert Gould, of the Lawrence Scientific School, with the following result, viz:—

Organic Matter and Water - - -	14.48
Silicic Acid - - - - - - -	82.03
Carbonate of Lime - - - - -	0.32
Oxide of Copper - - - - - -	0.89
Sesqui-Oxide Iron and Alumina - -	1.47
Loss - - - - - - - -	0.81
	100.00

This result is the mean of two determinations.

Mr. Gould stated that the specimens came from a pond in Beddington, Maine, between ten and fifteen feet in depth, and about eight or ten acres in extent. When treated with boiling chlorohydric or nitric acids concentrated, no copper was found by the sulphuretted hydrogen test. The same was the case with diluted aqua regia. When boiled with concentrated aqua regia for an hour, some copper was found; but when it was fused with carbonate of soda, which certainly was itself free from copper, nearly one per cent. of copper was obtained. Before the blowpipe also, on charcoal, a spangle of metallic copper was seen.

From the action of alkalies it would appear that the copper was combined with silica, and not an accidental ingredient.

Dr. H. R. Storer exhibited a Porcupine, (*Hystrix dorsata*, Lin.,) shot in New Hampshire, and belonging to the collection of Master Frederic Gilmore. He also exhibited, in connection with it, the representation of this animal, figured by Audubon and Bachman, showing it to be extremely inaccurate.

Messrs. John D. Philbrick and Edward P. Jeffries were elected Resident Members.

DONATIONS TO THE MUSEUM.

October 7, 1857. A fragment of a Human Cranium, which was said to have been found in deposits coeval with the Mastodon, in California; by Dr. C. F. Winslow. Specimens of intergrowing and intertwining woods from Surinam; by Dr. Jeffries Wyman. A collection of Radiata from the Gulf of St. Lawrence, and a Fish from the North Atlantic Ocean, which probably belongs to a genus new to North America; by Capt. N. E. Atwood. A collection of Crustacea made in California by Mr. E. Samuels, containing fifteen species, viz: *Chionœcetes Behringianus*, *Epialtus productus*, *Cancer gracilis*, *C. productus*, *C. antennarius*, *Pachygrapsus crassipes*, *Pseudograpsus Oregonensis*, *P. nudus*, *Hippa analogica*, *Porcellana rupicola*, *Gebia Pugettensis*, *Callianassa longimana*, *Astacus Trowbridgii*, *Crangon Franciscorum*, *C. nigricauda;* by E. Samuels. Crustacea from the Northwest Coast of the United States; by the Smithsonian Institution. A collection of Animals in alcohol, made by Dr. S. Kneeland, Jr., in the region of Lake Superior; by Dr. S. Kneeland, Jr. The Skin of a Ray; by Dr. D. H. Storer.

October 21. Microscopic preparations of the Diatomaceous Exuviæ of the Post-tertiary Sand of Glenshira, near Inverary, Scotland; by Prof. Gregory of Edinburgh. A collection of Minerals made in the mining districts of Lake Superior; by Dr. S. Kneeland, Jr. A collection of Algæ from Australia, Ceylon, and the Friendly Islands, prepared by Prof. Harvey; by Dr. Benjamin D. Greene. A Red Phalarope, *Phalaropus fulicularius*, Bonap. shot on Charles River; by C. W. Lovett, Jr. A Fish from Boston Harbor; by E. Samuels.

November 4. A section of an elm exhibiting a singular curved growth; by Prof. Theophilus Parsons. A living specimen of young Bald Eagle, *Haliætus leucocephalus*, Linn. taken upon the shore of Lake Superior, and specimens of copper, veinstones, agates, and crystals from Portage Lake; by Samuel M. Nason. Crustacea, Shells, Insects, &c. from Portage Lake, Agates from the Mississippi River, near Winona, Minnesota, and some very productive soil from the borders of Rice Lake, Steele Co., Minnesota; by Dr. S. Kneeland, Jr. A Spider, *Epeira insularis*, Hentz, and some shells; unknown Donors. A Bird's Nest; by Mrs. C. W. Dall. Infusorial Silicious Earth, containing Copper, from Beddington, Maine; by Prof. Theophilus Parsons.

November 18. A specimen of Platycarcinus Sayi from Labrador, heretofore unnoticed north of Massachusetts; by Dr. H. R. Storer. Three species of Crustacea from California, viz: *Sphæroma Oregonensis*, *Idotæa Wosnessenskii*, and *Livoneca vulgaris*; by E. Samuels. The sternum and scapular arch of the following twenty-nine birds, viz: Sharp-shinned Hawk, male and female; male Sparrow Hawk; Barred Owl, female; Acadian Owl, male; Belted Kingfisher, male; Black-capped Titmouse; Canada Jay, female; Blue Jay; American Raven; Rusty Grakle; Lesser Red-poll Snow Finch, male; White-throated Sparrow, male; Snow-Bunting, also the skull and foot; Pine Grosbeak, also the skull; Common Crossbill, also the skull; Three-toed Woodpecker, two specimens; Hairy Woodpecker, female, also the skull; Pileated Woodpecker; Golden-winged Woodpecker, male; Ring-neck Plover, male; Tell-tale Tatler, female; Solitary Tatler, male; Common Snipe, female; Sora Rail, female; Snow Goose; Summer Duck, male, also the trachea; Dusky Duck, female; and Green-winged Teal. Also the stuffed skin and the skeleton of the Northern Flying Squirrel, *Pteromys sabrinus*, Penn., from Lake Superior; and from the same locality, two nests of the paper-making wasp, a fresh-water shell, and a piece of cedar perforated by boring insects; also, Cryptogamia, viz: *Agaricus orcella*, Bull. *Lycoperdon pyriforme*, Schæff. *Polyporus perennis*, Fr. *P. hirsutus*. *P. Cetulinus*. *P. ignarius*. *P. applanatus*, Pers. *Tubercularia pezizoidea*, Schw. *Usnea longissima*, Ach. *Sticta pulmonaria*, Ach. *Nechera pennata*, Hedw. All from the Lake Superior Region; by Dr. S. Kneeland, Jr. The Osseous Schlerotic Coats of the Eyes of the Sword Fish, Mackerel, and Coryphœna; by John Green, Jr.

December 2. Flint, imbedding chalk, from the island of Rügan, in the Baltic Sea; by Dr. Wm. P. Dexter. A sample of Gutta Lahoe from the East Indies; by C. L. Andrews. Aspergillum Javanense; by Capt. Thomas Andrews. Impressions in clay of Raindrops and drops of falling water; by Dr. Jeffries Wyman. A copy of Mrs. Redfield's Chart of the Animal Kingdom; by Messrs. E. B. & E. C. Kellogg, of Hartford, Conn. Skeleton of an American Raven, *Corvus cacalotl*, Wagl. from Lake Superior; by Dr. S. Kneeland. Two Fishes; by Dr. D. H. Storer.

December 16. The Panicles of several varieties of Sorghum and Imphee; by Dr. C. T. Jackson. A collection of Crustacea, many of them described in the Massachusetts Reports; by Dr. A. A. Gould.

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Transactions of the Illinois State Agricultural Society. Vol. 2. 8vo. Springfield. 1856–7. *From I. A. Lapham.*

Memorial of the Inauguration of the Statue of Franklin. 8vo. Boston. 1857. *From the City of Boston.*

Address on the Scientific Life and Labors of W. C. Redfield. By D. Olmsted, LL.D. 8vo. Pamph. New Haven, 1857. *From the Author.*

Catalogue of N. American Mammals. By S. F. Baird. 4to. Pamph. Washington, 1857. *From the Author.*

Studies in Organic Morphology. By John Warner. 8vo. Pamph. Philadelphia, 1857. *From the Author.*

Report on Geological Survey of Vermont. By Ed. Hitchcock. 8vo. Pamph. Montpelier, 1857. *From G. F. Houghton.*

Report of Proceedings of the Geological and Polytechnic Society of West Riding, Yorkshire, 1852 to 1855. 8vo. Pamph. Leeds.

Account of an Egyptian Mummy. By Wm. Osborn, F. R. S. 8vo. Pamph. 1828. *From Henry Denny.*

Description of some new Diatomaceous Forms from the West Indies. By R. K. Greville, F. R. S., &c. 8vo. Pamph. London.

On the Post-Tertiary Diatomaceous Sand of Glenshira. Part 2. 8vo. Pamph. London. By Wm. Gregory, F. R. S., &c.

Notice of some new species of British Fresh-water Diatomaceæ. By Wm. Gregory, F. R. S., &c. 8vo. Pamph.

On a Post-Tertiary Sand containing Diatomaceous Exuviæ, from Glenshira. By Wm. Gregory. 8vo. Pamph. London, 1854.

Untersuchungen zur Vergleichenden Gewebelehre, angestellt in Nizza im Herbste 1856. Von A. Kölliker. 8vo. Pamph. 1856. *From the Heirs of Prof. J. W. Bailey.*

Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften. Band XX 2 und 3 Heft. XXI Band, 1, 2, Heft. XXII Band, 1, 2, 3, Heft. XXIII Band, 1 Heft. 8vo. Wien, 1856.

Register zu den zweiten X Bänden der Sitzungsberichte (Band 11–20) der Math. Natur. Classe der Kais. Akad. der Wissenschaften. 8vo. Pamph. Wien, 1856.

Tageblatt der 32. Versammlung Deutscher Naturforscher und Arzte in Wien. Nos. 1–8. 4to. 1856.

Proceedings of the Royal Geographical Society of London. No. 8. March, 1857.

Archiv für Naturgeschichte. Von A. F. A. Wiegmann, &c. Nos. 3, 1856, and 1, 1857. Berlin.

Verhandlungen des Naturhistorischen Vereines der Preussischen Rheinlande und Westphalens. Viertes Heft, 1856. Erstes Heft, 1857. Bonn.

Abhandlungen aus dem Gebiete der Naturwissenschaften. Dritter Band. 4to. Hamburg, 1856.

Nachrichten von der Georg-Augusts-Universität und der Königl. Gesellschaft der Wissenschaften zu Göttingen. 12mo. 1856.

Zur Naturgeschichte Ägyptens. Von Dr. L. K. Schmarda. 4to. Pamph. Wien, 1854.

Proceedings of the Zoölogical Society. Nos. 305 to 337. 8vo. Pamph. London, 1856–7.

Natural History Review. No. 2 for April, and No. 3 for July, 1857. London.

Bulletin de la Société des Sciences Naturelles de Neuchatel. Tom. IV. Premier Cahier. 8vo. Pamph. 1856.

Wurtembergische Naturwissenschaftliche Jahreshefte. Dreizehnter Jahrgang. Zweites Heft. 8vo. Stuttgart, 1857.

Zweiundvierzigster Jahresbericht der Naturforschenden Gesellschaft in Emden für 1856. 8vo. Pamph.

Proceedings of the American Philosophical Society. Vol. VI. No. 57. January to June, 1857.

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Contributions to the Natural History of the United States of America. By Louis Agassiz. Vols. 1, 2. 4to. Boston, 1857.

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Quarterly Journal of the Geological Society. Vol. XIII. No. 54. London, 1857. *From the Courtis Fund.*

Roumania, or Border Land of the Christian and the Turk. By J. M. Noyes, M. D. 8vo. New York, 1857.

Brazil and the Brazilians. By Rev. D. P. Kidder, D. D. and Rev. J. C. Fletcher. 8vo. Philadelphia, 1857.

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My Schools and Schoolmasters. By Hugh Miller. 8vo. Boston, 1857.

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History of Turkey. By A. De Lamartine. Vols. 2, 3. 8vo. New York, 1857.

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Ruskin, John. The Stones of Venice. 8vo. New York, 1851.

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Missionary Travels and Researches in South Africa. By D. Livingstone, LLD., &c. 8vo. New York, 1858.

Natural History of the Human Species. By Lieut. C. Hamilton Smith. 12mo. Boston, 1857. With Preliminary Abstract, by S. Kneeland, M. D.

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