PROCEEDINGS

OF THE

Boston Society of Natural History.

VOL. IV.

1851 TO 1854.

BOSTON:
PRINTED FOR THE SOCIETY.

1854.

RIVERSIDE, CAMBRIDGE:
PRINTED BY H. O. HOUGHTON AND COMPANY.

PROCEEDINGS

OF THE

BOSTON SOCIETY OF NATURAL HISTORY.

TAKEN FROM THE SOCIETY'S RECORDS.

January 1, 1851.

Dr. Samuel Cabot, in the Chair.

Dr. J. M. Warren read a paper containing some observations upon two remarkable Indian children, a boy and girl, from Central America, who had lately been exhibited in Boston, known as the "Aztec Children." He had been led by his examination of them to the following conclusions: —

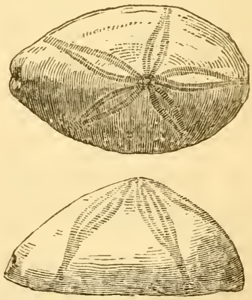
1. That these children are possessed of a very low degree of mental and physical organization, but are not idiots of the lowest grade.
2. That they probably originated from parents belonging to some of the mixed Indian tribes.
3. That they do not belong to a race of dwarfs, because history teaches the truth of the doctrine stated by Geoffroy St. Hilaire, that dwarfs cannot perpetuate their kind.

Dr. Warren exhibited a very accurate colored sketch of these Indian dwarfs, from the pencil of Dr. J. C. Dalton.

At the conclusion of Dr. Warren's paper a letter was read by the Secretary, addressed to him by Mr. E. G. Squier, corroborating Dr. Warren's view of the true character of the so called "Aztec Children," containing the following statement: —

"The Commandant of the Port of La Union, in the State of San Salvador, Central America, informs me that they were born somewhere near the town of Santa Ana, in that State, of parents, one of whom certainly, if not both, was dwarfed or deformed and imbecile. The Indians residing in the vicinity of Santa Ana are civilized, and centuries ago adopted Spanish customs and the Spanish language. So far as I could discover from a few words of their ancient language which came into my possession, they belong to the Cholutecan or Chorotegan stock, which, before the conquest, extended over a part of San Salvador, Honduras, and Nicaragua, but which was chiefly concentrated around the Gulf of Fonseca."

Mr. T. T. Bouvé read descriptions of a number of new species of fossil Echinoderms, from the Lower Tertiary rocks of Georgia, among others of the following: *



Catopygus patelliformis. Oblong-ovate, and rather pointed posteriorly. Superior face conico-convex, and forming with the inferior an acute margin.

Ambulacral areas, narrow. Anus, transverse.

The width of this species in proportion to the length, is as 7 to 10; height to length as 9 to 20.

Description of characters from specimens in the collection of the Boston Society of Natural History.

* Subsequent to the reading of his paper, Mr. Bouvé found that some of the fossils included by him, had already been described by Mr. Conrad a few weeks previous, in the November number of the Journal of the Academy of Natural Sciences, Philadelphia. These are consequently omitted here.

Hemiaster Conradi. Of a small size and very much swollen. General form, ovoid; but having the anal margin so much truncated as to reduce the length to very nearly that of the width.

The height is to the width as about 6 to 7.

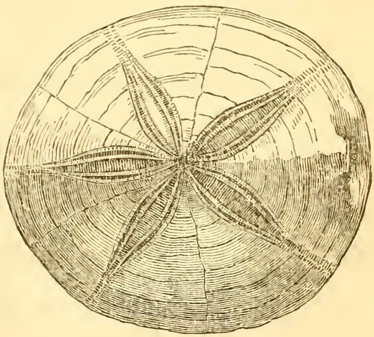
Cidaris. Of a large size, but not sufficiently preserved for specific description. The tubercles have a smooth base, not crenulated.

Arbacea? The characters too indistinct for specific description.

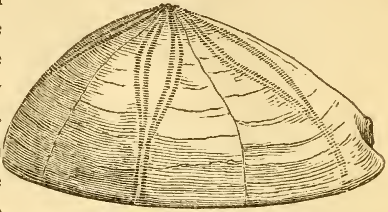
Accompanying the above Echinoderms, from the same deposit, were specimens of the following genera: — Conus, Venus, Pectunculus, Pecten, Natica, Turritella, and the claw of a Crustacean.

Mr. Bouvé repeated the description given by him of the Pygorynchus Gouldii, and published in the Proceedings of the Society, December 16, 1846, in order to annex figures of the same.

Pygorhynchus Gouldii. Syn. *Nuclcolites Mortoni.* (Conrad.) Above conico-convex, a little more sloping posteriorly than anteriorly. Margin somewhat rounded, except near and under the anus, where, by an excavation or depression, it becomes acute. Inferior surface, subcircular. Mouth situated about one third of longitudinal diameter from the anterior margin. Apex subcentral, a little anterior, but not so much so as the mouth. Ambulacra radiating at unequal angles, the interambulacral spaces dividing the three anterior from the two posterior, being wider than the rest. The pores of each



diverge considerably from the apex, becoming quite dilated a short distance from it, then converge as they descend, until about two thirds the distance from the summit to the margin, where they are very limited in width, and where the double rows become single. On the margin they again slightly dilate, and are readily traceable to their termination about the mouth, where they are prominent. The



anterior ambulacrum is much narrower than the rest. Anus transverse and situated at about one fifth the distance from the posterior margin to the apex. Whole length, one inch and seven eighths; greatest width one inch and three fourths; height, one inch.

Mr. Conrad has redescribed the Pygorhynchus Gouldii, in his paper published in the Journal of the Academy of Sciences, in November last, under the name of *Nucleolites Mortoni*. This undoubtedly arose from his specimens being less perfect than those received in Boston. That the fossil under consideration is a Pygorhynchus, was sustained by Prof. Agassiz at the time the original description was given, as may be seen by reference to the Proceedings of this Society.

Mr. Bouvé exhibited specimens of a mineral which was formerly considered pure Titanium. It was in the form of minute cubic crystals, and was obtained from the interior of a furnace in Cornwall. The discovery of this mineral was made some time since, but it was only recently that it had been ascertained to be in reality a Cyanuret and Nitruret of Titanium. Its formula is $10\ Ti + 1\ Cy + 3\ N$.

Mr. Wells remarked that the discovery of the true character of this mineral controverted all that had been hitherto known of Nitrogen, which had been considered almost typical of evanescence and instability. It was remarkable, that in the mineral exhibited it had the power of resisting great heat.

Mr. Wells stated that Mr. Francis Storer had recently discovered, at the Cambridge Laboratory, Iodine in the ammoniacal liquor from the Boston Gas Works. It was the first time that it had been detected in America, and the observation was interesting, as showing the probable existence of this substance in the waters which had supplied the plants which made up the coal formation.

Mr. Alger exhibited a number of specimens of native copper and its associated minerals from Lake Superior, intended for exhibition at the World's Fair, in London. They were specimens unsurpassed for the magnitude and splendor of the crystallization. Some of them presented both native copper and silver, mechanically united, but, according to Dr. Jackson, *never* united as an alloy.

A Snowy Owl (*Nyctea nivea*) was presented in the name of Mr. Edwin Adams, and a young King Duck (*Somateria spectabilis*) in the name of Mr. A. H. Ogden. The thanks of the Society were voted for these donations.

Dr. Joseph P. York and Mr. Thomas P. Cushing were elected members of the Society.

January 15, 1851.

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

Mr. W. O. Ayres commenced a series of observations upon the *Holothuridæ* of our coast. He remarked that very few researches had been made in regard to this family, and that consequently most of the species, unless identical with European forms, must prove to be new. Le Sueur published in the Journal of the Academy of Natural Science, a description of a species from New Jersey, under the name *Hol. Briareus.* From that time till the date of Dr. Gould's

Report on the *Invertebrata* of Massachusetts, we find nothing further. In that Report, Müller's *squamata* and *pentactes* are mentioned but not described. Le Sueur's *Briareus* is noticed with a doubt, and a new species, *Chirodota arenata*, is defined. Another had been previously named in the Boston Journal of Natural History, by Couthouy, as *Hol. chrysacanthophora;* but this species, which is quite abundant in Massachusetts Bay, does not belong to the *Holothuridæ*.

After some general statements in relation to the anatomical structure common to all members of the family, Mr. Ayres proceeded to describe a species found by him at Sag Harbor, and apparently identical with Le Sueur's *Briareus*. It differs, however, so remarkably from all previously recognized types, that a new genus is necessary for its reception. For this the name *Sclerodactyla* is proposed, and the species will be designated *Scl. Briareus*. The genus is characterized as follows: —

Gen. Sclerodactyla Ayres.

Extremities somewhat elevated, thus distinguishing a superior and inferior side. Suckers very numerous, scattered over all parts of the body, but most thickly beneath. Tentacula, ten; of which two or three are smaller than the others, each supported on a stem consisting of a solid, ramified, calcareous tube, which is continued into the branches, but not to the extreme divisions. Of course the tentacula are not capable of much change in length. The solid tube has suggested the generic name. Oral circle not composed of separate pieces, but of a single, broad, thin, calcareous plate, with points projecting anteriorly and posteriorly. Stomach very strongly muscular, intestinal tube of uncommon length. Respiratory trees largely developed, much branched.

The genus appears allied to Sporadipus and Anaperus. It may be here remarked that the partial development of some of the tentacula is not at all uncommon; it occurs in *Thyonidium*, some species of *Thyone* and *Cucumaria*, in *Anaperus*, *Orcula*, *Colochirus*, and *Cuvieria*.

The species appears to inhabit muddy bottoms in shallow water, among the roots of *Zostera*. It is undoubtedly the one mentioned by Dr. Gould in his report on the Invertebrata of Massachusetts, and as the Cabinet of the Society contains a specimen from South Carolina, presented by Prof. Agassiz, the *Briareus* probably exists on almost all portions of our coast. It is commonly of a blackish brown color, and as the tentacula are retracted when the animal is taken from the water, a remarkable resemblance in form to some Ascidians is noticed. They are found three inches long when contracted, and can extend more than twice that length; breadth exceeding half the length in contraction. The ten tentacula, very much ramified, supported by the solid tubes, and the oral circle, consisting of one piece instead of ten as usual, are striking peculiarities. The calcareous supports of the suckers are a terminal perforated plate, the *kalkstycken* of Duben and Koran, and very numerous lateral plates, slender, with a crested arch rising from their centre. Five calcareous points of support are imbedded around the anal aperture. The other points of distinction are sufficiently expressed in the generic description.

Mr. Ayres exhibited drawings showing the structure of the species.

Dr. T. M. Brewer read a paper giving a comparison of the egg of the European and American Fork-tailed Petrel, *Thalassidroma Leachii*, by which he had been led to the conclusion that they are the same species. The paper also contained descriptions of the egg of Bulwer's Petrel, *Procellaria Bulwerii*, Dusky Petrel, *P. obscura*, and the Greater Shearwater, *Puffinus major*. The paper was referred to the Publishing Committee.

Mr. William Stimpson read descriptions of two new species of shells from Massachusetts Bay, namely: *Spirialis Gouldii*, and *Thracia Couthouyi*, and a Holothuria, under the name of *Anaperus unisemita*.

Thracia Couthouyi. T. parva, alba, solidula, orbiculato-ovalis, sub-æquilateralis, compressa, anticè angustior, rotundata; posticè latè truncata; striis concentricis inæqualibus rugosa; sinus siphonalis latus. Ossiculum minutissimum. Long. .7; lat. .54. *Hab.* Massachusetts Bay.

Certain forms of *T. distorta* of Europe approach this shell in external appearance, but differ totally in the hinge. Our species has no prominent cartilage plate at the hinge. From our native species, *T. Conradi* and *T. truncata*, this is easily distinguished; from the former by its compressed form and posterior breadth, and from the latter by the position of the beaks.

I take pleasure in being able to dedicate to Capt. Couthouy a species belonging to a family which he has done so much to elucidate, and to a genus which he has enriched with species.

This shell I first took some years since from a fish taken in fourteen fathoms, some miles east of the Boston Lighthouse. It has since been taken from fishes caught in the Bay, by Messrs. Tufts and Haskell, of Lynn; and I have recently obtained several specimens from twenty fathoms, eight miles east of Scituate.

Spirialis Gouldii. T. ovato-globosa, vitrea, pertenuis, pellucida, lævissima, arctè et profundè umbilicata; spira conoidea; anf. 7, lineis minutis volventibus, impressis, remotis insculpti; anf. ultimus magnus; apertura spiram sub-æquans, anticè obtusa. Long. .1; lat. .075. *Hab.* Coast of New England, north of Cape Cod.

This species being the first Pteropod discovered on our coast, I respectfully dedicate it to Dr. Gould. It belongs to a genus of minute sinistral shells, the true character of which has but recently been detected.

In the two past years specimens have occurred in Massachusetts Bay, from February to April.

Anaperus unisemita. Body covered with minute calcareous grains, about two inches in length, somewhat cylindrical, tapering at both extremities, and covered with numerous short suckers, which, on one side, are arranged somewhat irregularly in a double row. This row is often separated from the rest of the suckers by a smooth space on each side. The tentacula are very small; they are ten in number, two of which, at the point where the double row of suckers terminates anteriorly, are very much smaller than the other eight, which are elongated, frondose at their extremities, and have calcareous supports in the lower half, which is slightly compressed.

It inhabits the Grand Bank, and the coast of New England.

It is in the Cabinets of the Essex County Natural History Society, and of the Boston Society of Natural History.

No calcareous papillæ were observed at the anus. If they should finally prove to be absent, this circumstance, with the occurrence of calcareous grains on the surface, and of the single row of suckers on the ventral side, might warrant the separation of this species from Anaperus.

Mr. Stimpson also gave a list of fossils found in the Post-Pliocene deposit, in Chelsea, Mass. at Point Shirley, namely : —

Balanus rugosus, *Mya arenaria*, *Solen ensis*, *Mactra solidissima*, *Venus mercenaria*, *Astarte sulcata*, *Astarte castanea*, *Cardita borealis*, *Mytilus edulis*, *Modiola modiolus*, *Ostrea borealis*, *Fusus decemcostatus*, *Buccinum plicosum*, *Buccinum trivittatum.*

These fossils occur in the upper part of the stratum of blue clay and pebbles, which crops out from under the coarse drift, at the cliffs on both sides of the hill. On the east side the stratum is at an elevation of fifty or sixty feet above high water mark; on the west side it is but two or three feet above the same level. At some little distance from this site, a stratum of clay, probably the same, containing shells of *Mactra solidissima* was met with in digging a well, at the depth of fifty feet *below* high water mark, showing the great irregularities of the ancient sea bottom.

With regard to the species mentioned in the list I must remark, that those most common in the deposit are inhabitants of deep water, and of northern origin. With the exception of *Venus mercenaria*, I have obtained all of them in a living state by dredging within a mile of the locality where they are now found fossil.

The state in which they occur would seem to furnish evidence in favor of Lyell's theory of the drift being deposited from the melting of icebergs, by which the materials had been transported. The shells are almost invariably broken, but not worn, their angles of fracture remaining sharp.

Mr. Desor said that it had been thought that the coarse drift near Boston is glacial in its origin. The fact that shells had been found in it had been offered as an objection. This had been explained by the supposition that a glacier had entered the sea at the point where the shells had been found in the drift. The existence of a layer of clay containing shells beneath the coarse drift at Point Shirley would seem to indicate a quiet deposition, at variance with the glacial theory.

Mr. Desor read a report on Mr. Wilson's report to the present Congress of the United States, on the swamps and overflowed lands of Louisiana. He gave a minute analysis of its contents, showing it to be of great interest for its scientific statements, and of great value in its bearing upon the domestic interests of the State of Louisiana.

Prof. Wyman exhibited the shell and sternum of the *Trionyx ferox.* He said that the specimens were interesting as showing the homologies in the shell of tortoises. Cuvier had first directed attention to the traces of true ribs on the under surface of the shell, and Geoffroy St. Hilaire had found in the under shell a true sternum consisting of the typical number of bones as in many vertebrata. The specimen exhibited showed true vertebræ and true ribs on its under surface, and the outer surface was covered with dermal plates resembling the scales of crocodiles, thus uniting the endo- and exo-skeletons. A similar union has been pointed out by Mr. Owen in the under shell. The general condition of the shell of the *Trionyx ferox* is embryonic in its type, corresponding to the immature state of *Emys picta,* as Prof. Wyman demonstrated by comparing specimens side by side.

A specimen of American Swan, (*Cygnus Americanus,*) a young female, was presented in the name of Mr. Deming Jarves; a Fish Hawk, (*Pandion haliætus*,) in the name of Mr. A. H. Ogden; a Sand-shoal duck, (*Fuligula Labradora*,) and the skeleton of a Bald Eagle, (*Haliætus leucocephalus*,) by Mr. Theodore Lyman. Seven birds were received from Moses Kimball, Esq. in exchange.

Thirty-eight volumes of the "Dictionnaire des Sciences Naturelles," were also presented in the name of Moses Kimball, Esq.

The tooth of a Walrus was presented by Mr. Ayres.

Monographs by Dr. Mantell on Belemnite and Belemnoteuthis, and on Pelorosaurus, were presented in the name of the author. The former was referred to Mr. Bouvé the latter to Prof. Wyman.

Moses H. Perley, Esq., of St. Johns, New Brunswick was elected a Corresponding Member.

The thanks of the Society were voted to Dr. Mantel and Messrs. Ogden, Jarves, and Kimball for their donations

---

February 5, 1851.

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

Mr. W. O. Ayres continued his account of the anatomical structure of *Holothuridæ*.

He also read a description of a new species of Synapta under the name of *Synapta tenuis*.

Synapta tenuis Ayres. This species is characterized by having the body elongated, whitish, nearly transparent; tentacula twelve, pinnatifid, supported by an oral circle of twelve pieces, of granulated structure, some of which are pierced with holes for the admission of water in respiration; intestinal canal of equal size throughout; hooks smooth, not dentate; size small.

The hooks and plates, which form such a remarkable feature of the Synaptæ, are similar to those of *S. Duvernœa*, as described by Quatrefages. They differ in having the external curve of the hameçon smooth, as also the head, which joins the supporting plate, and in the arrangement of openings through the plate. They are sometimes wanting or imperfectly formed, the development of the plates being apparently subsequent to that of the hooks.

This species is found abundantly in Boston Harbor, on Bird Island, and the adjacent shallows, and as it has been obtained also at Sag Harbor, L. I. as well as at Provincetown, its range is doubtless somewhat extensive. It inhabits the sandy and muddy bottom, creeping by means of its tentacula and the hooks with which its body is covered (as in others of the genus) and which often cause it to adhere to the finger like the seeds of many plants. When kept in confinement it detaches piece after piece of its body by contractions of the transverse muscles till frequently only the circle of tentacula is left, and yet life is not destroyed.

Mr. William Stimpson presented a paper containing notices of several species of Testaceous Mollusca new to Massachusetts Bay, including new species.

Since the publication of Dr. Gould's admirable Report on the Invertebrata of Massachusetts, the more extended investigations to which that work gave rise, from the increased interest with which it invested them, have doubtless been the means of adding to our Fauna many species not before noticed. But although, as may be seen from published notices, our catalogue of Articulata and Radiata has been much extended, I cannot find any notice of additions among the testaceous mollusks. Such have probably occurred, however, to many of our Naturalists, and I have been induced to mention here those which I have met with, in hopes that others will in the same manner aid in efforts to make our catalogue complete. I have here enumerated and remarked upon twenty-five species not before observed in Massachusetts Bay, about twenty of which are new to the State.

Thracia truncata, Mighels. There can be no doubt of the identity of the specimens which I have taken in our Bay, with Dr. Mighels' species. He makes no mention of an ossiculum, which I have detected in numerous instances. It is, however, very minute, and might easily escape observation.

The name *T. truncata* is preoccupied. But the *Thracia truncata* of Turton and Brown is now considered a variety of *T. distorta.*

The animal of this species, in its broad compressed foot, and in other points, resembles that of *Cochlodesma.* I shall take some other opportunity of describing at length the animals of this and of the other species here mentioned.

It was taken from fishes caught on the Middle Bank, (Ayres,) and in deep water off Lynn, (Tufts.) In twenty-two fathoms, eight miles east of Scituate, several specimens occurred to me.

Thracia Couthouyi, nob. In deep water in various parts of the Bay.

Cardium Grœnlandicum, Chemn. Several specimens of the young of this species, finely polished, with well marked ribs, and beautiful zigzag lines of flesh-color were taken in deep water in Cape Cod Bay.

Nucula delphinodonta, Migh. This species is very abundant in Massachusetts Bay, occurring at various depths on sandy and muddy bottoms. It is easily obtained by means of the dredge; I have sometimes obtained some hundreds at a single cast. I may mention as localities, — off Cape Ann, in thirty fathoms; Race Point, in twenty-two fathoms; Broad Sound, in six fathoms, on a sandy bottom, and at Charlestown, in mud, not far below low water mark.

This little animal has its mantle freely open, with plain margins, and forming no siphons; the foot, which is protruded from the longer side of the shell, is large, white, and hyaline, with a deep groove and serrated edges. It is very active, making quite extensive journeys along the sandy floor of the ocean, and leaving a little furrow of the size and depth of its shell. It lives at the surface of the sand or buried just below it.

Spirialis Gouldii, nob. See page 8.

Calyptræa striata Say. This species occurs at St. George's Bank.

Adeorbis costulata, nob. *Margarita ? costulata*, Möller. ———— *? costulata*, Forbes and Hanley. In deep water off Cape Ann, I have obtained a few specimens of a shell which I consider to be the same as that to which the above names have been applied. It is minute, about one tenth of an inch in diameter, white, somewhat thick and rugged near the apex, the sculpture appearing to advantage only on the thinner and more delicate outer whorl, which is convex, rounded, and covered with prominent, crowded ribs. On the side of the whorl many of these ribs divide into two, thus occupying the increased space, and beneath, the ribs flow into each other and gradually disappear without interrupting the five distant, elevated, spiral striæ on the umbilical half of the base. The umbilicus is deep. The aperture is rounded, with the peristome continuous. The operculum is multispiral, of about eight volutions, of which the outermost are testaceous, presenting a frosted appearance ; the central volutions, occupying about one fourth of the diameter, are corneous.

Möller's description of the species is very short; that of Forbes and Hanley is extended, and will not apply to my shells in every respect, but as it was drawn up from a specimen in a not very perfect condition, the differences may not be of importance. The *Marg. minutissima* of Mighels is probably identical with this species ; his description appeared a year after that of Möller.

Rissoa eburnea, nob. n. s. T. parva, ovato-conoidea, alba, nitida, lævis. Anf. 4 convexiusculi, ad suturam subangulati ; apertura ovato-elliptica, labro tenui, simplici, acuto, anticè effuso. Long. .16 ; lat. .09 poll.

This species resembles some varieties of *R. ventrosa*, but is much more angular. Two specimens were taken in thirty fathoms, off Cape Ann.

Rissoa multilineata, nob. n. s. T. minuta, oblongo-ovata, obtusa, alba ; anf. 5-convexi, striis transversis, minutis, ad 20, — ornati ; apertura orbiculato-ovata, labro haud incrassato, effuso. Long. 1 ; lat. .045 poll.

This shell differs from *R. aculeus*, (*Cingula aculeus*, Gould,) in being shorter; its whorls are much more compactly coiled, and its revolving striæ are stronger and more evident. The lip is also more thickened. From *R. Mighelsii* it differs in having much more numerous and crowded transverse striæ.

It was dredged in 5 fathoms, off Gt. Misery Island, and also near Nahant, on sandy and gravelly bottoms.

Rissoa Mighelsii, nob. *Cingula arenaria*, Mighels, Boston Journ. Nat. Hist. IV. 49. This is not the *Turbo arenarius* of Turton nor of Dillwyn, nor is it identical with any other European species. It may take the name of its discoverer, who is well known for the many additions to our Fauna which he has made during his researches on the coasts of Maine.

I have obtained a few specimens of this species from fishes taken in deep water in the Bay.

Rissoa exarata, nob. n. s. T. parva, ovata, fusca, solidula, imperforata; anf. 5 convexiusculi, posticè subplicati, costis transversis, elevatis, inæquidistantibus, (tribus ad anf. supr.,) — cincti; apertura parva, ovata, labro incrassato. Long. .11; lat. .05 poll.

A single specimen of this very distinct species was dredged in three fathoms, on a shelly bottom in Boston Harbor. It is distinguished by its very prominent, distant, transverse ribs, which are three on the upper whorls and eight on the lower. Its aperture is very small.

Rissoa pelagica, nob. *Cingula semicostata*, Mighels, Boston Journ. Nat. Hist. IV. 49. That this species is distinct from the European shell to which it has been referred will be readily seen by a comparison of it with the recently published figures of Forbes and Hanley. It is somewhat abundant in deep water off Cape Ann.

Turritella acicula, nob. n. s. T. parva, turrita, subulata, candida, tenuis; anf. 10 valdè convexi, longitudinaliter striati, costis transversis, quarum tribus majoribus, cincti; apertura rotundata, anticè effusa, labro acuto. Long. .22; lat. .08 poll.

This species is distinguished from the young of *T. erosa* by its much more convex whorls and prominent ribs.

The operculum appears not to be fimbriated at its edges.

This species has been taken from fishes caught off Lynn, (Tufts,) also off Cape Ann; and I have taken several from the stomachs of haddock caught in about twenty fathoms, off Marshfield.

Turritella areolata, nob. n. s. T. parva, subperforata, turrita, rubra, costis transversis, distantibus, quatuor, (duabus ad anf. sup.) et plicis elevatis, interruptis, — areolata; anf. 6, convexi; apertura anticè effusa; labro acuto. Long. .18; lat. .09 poll.

This is probably a young shell, but it appears distinct from any of our species. It approaches *T. reticulata*, Migh., from the Gulf of St. Lawrence, but the transverse ribs are more prominent, and the longitudinal ones less so than in that shell.

It was obtained from a fish caught off Cape Ann, in October, 1850.

Cerithium Greenii, Adams. A few dead specimens were dredged in shallow water, in Charles River, near the Navy Yard.

Chemnitzia modesta, nob. n. s. T. parva, conica, alba, lævis; anf. 4. planulati, ultimo medio subangulato; sutura impressa; apertura uniplicata, subrhomboidea. Long. .14; lat. .06 poll.

This simple species much resembles *C. bisuturalis*, (*Turritella bisuturalis*, Say, *Odost. exigua* (Couth.) Gould,) but wants the revolving line just below the suture.

It was found on stones drawn up by the fishermen from about thirty fathoms, on St. George's Bank.

Chemnitzia interrupta, nob. (*Turritella interrupta*, Totten, Gould.) Several specimens of this fine species have occurred to me while dredging on sandy and muddy bottoms in Boston Harbor, which differ from Southern specimens only in being more ventricose.

Chemnitzia seminuda, nob. (*Odostomia seminuda*, (Adams) Gould.) The specimens of this shell, which I have taken in Boston Harbor, are much larger than those noticed by Prof. Adams and Dr. Gould, and do not agree well with their descriptions; thus, seven revolving striæ only are mentioned on the lower whorl, while my specimens have twelve. But they do not differ materially from a few large specimens which I dredged in New Bedford Harbor.

In Boston Harbor it occurs at the depth of three fathoms, attached invariably to the margin of the *Crepidula fornicata*, where it is fixed on stones and shells. Several occur together. They produce much mucus, and in confinement suspend themselves from the surface of the water by a thread formed from it.

Pleurotoma violacea Adams and Migh. I have dredged specimens of this shell in two and three fathoms on muddy bottoms in the harbors of Salem and Boston. It seems most abundant among dead and decaying Zostera, but I have never found it about that plant when alive.

The name *P. violacea* has since been applied by Hinds to a species from New Guinea, which must receive a new designation. The name of another of our species, *P. decussata*, Couthouy, 1838, is equally unfortunate, having been since appropriated by Macgillivray to a British species.

Natica flava Gould. This species was found in our Bay by Mr. Joseph True, of Salem, and subsequently by myself. Both specimens were young, and possessed a very distinct umbilicus. I have also a full grown umbilicated specimen from the Grand Bank. The operculum is corneous, resembling that of *N. heros*. If a genus *Globularia* is to be separated from Natica, this species cannot belong to it.

Philine sinuata, nob. Three specimens have occurred in Boston Harbor.

Philine formosa, nob. Frequent in deep water in many parts of the Bay.

Bulla puncto-striata Migh. The single specimen of this species found and described by Dr. Mighels must have been immature. I have taken about twenty specimens of all ages from fishes caught in deep water off Cape Ann, some of which exceed in size twice the dimensions given by him. Two specimens are three fourths of an inch in length and seven sixteenths of an inch in breadth. Thus it is the largest species occurring on our coast north of Florida. It is very solid, and covered with a thick greenish epidermis. The appearance of the shell indicates the genus *Scaphander*, which is confirmed by an examination of the animal. But I agree with Mr. Clark, (An. and Mag. Nat. Hist. 2d Ser. VI.) in thinking the genus unnecessary.

There frequently occurs in the stomachs of Haddock a small saucer-shaped corneo-calcareous body, rounded, with a slight emargination on one side. This is a large plate of the gizzard of this Bulla, which is preserved when the shell and animal has been destroyed. It is about one eighth of an inch in diameter.

Bulla pertenuis Migh. This, with the exception of *B. triticea* is our most abundant species. It usually occurs in very deep water, but I have dredged specimens in six feet of sand off Point Shirley. It has been regarded as the young of *B. Gouldii*, and I have seen it in most cabinets marked " *B. debilis*, Gould," which is a very different shell.

Bulla canaliculata Gould. This species occurs in three fathoms, near Bird Island, in Boston Harbor, where it was first found by Prof. Agassiz. From an examination of these specimens, I am induced to believe the *B. obstricta*, Gould, to be identical with this species. The calcareous or corneous gizzard is very large and complicated in this species. It is desirable that this organ should be examined in our other species, by those who may meet with them alive.

Mr. Bouvé read a report on Dr. Mantell's Monograph, on Belemnite and Belemnoteuthis, which had been committed to him, giving an analysis of its contents.

Prof. Wyman presented a paper on a new genus of American Cottoids, by Mr. Charles Girard.

There has been a prevailing opinion among the fishermen at Oswego that the Ling (*Lota maculosa*) swallows its progeny, a thing not uncommon in the class of Fishes. Nevertheless, Prof. Baird, in visiting last summer that locality, was anxious to ascertain, by direct observations, how far this opinion is correct. He opened many of these fishes and found in the stomach of almost every one, a fish, three or four inches in length, half destroyed by the process of digestion, the general physiognomy of which pretty much resembled that of a young Ling, especially if the head and fins are not carefully examined. The fins are generally first destroyed, so that the real affinities of the fish do not strike the superficial observer.

Having paid some attention to those remains, judiciously preserved by Prof. Baird, I have satisfied myself that they belong to a genus of Cottoid hitherto unknown, and I have succeeded in reconstructing the whole fish.

The shape of the head and body resembles that of Triglidæ. The structure of the mouth and fins reminds us of Cottus proper. The opercular apparatus is constructed somewhat as in Acanthocottus. It differs from Triglidæ by its smooth body and the want of the scales, and bony plates covering the head in the latter, and by its first dorsal being lower than the second; — from Acanthocottus, by the shape of the mouth, and also by the first dorsal, which in Acanthocottus is higher than, or at least of the same height as the second. The spines of the preoperculum, uniform among themselves, differ from those of the latter, the uppermost of which are larger than the lower ones; — from Cottus proper it differs by the number of spines on the preoperculum, and the elongation of the head; — from Cottopsis by the absence of teeth on the palatine bones. The structure of the head reminds us of that of Sciænoids by the holes in its bones. It is a real approximation to the last group which it seems to ally more intimately to Cottoids.

I propose to call the genus Triglopsis, and designate the species by the name of our esteemed naturalist, Rev. Z. Thompson, of Burlington.

Triglopsis Thompsonii will be characterized and illustrated in my Monograph of North American Cottoids. I hope the time will come when perfect specimens of that fish will be seen in our Collections. In order to ascertain its geographic distribution it will be necessary to open and examine the contents of the stomach of *Lota maculosa*, living in the northern and western waters; and the locality once known, attempt to discover the peculiar bottoms frequented by those fishes in order to catch it fresh and living.

Mr. Desor referred to an account which he had given at the meeting of December 4, 1850, of the Swamps existing in the neighborhood of many western rivers. He stated that he had received a letter bearing upon the subject from M. Lesquereux, of Columbus, Ohio. By his request, Mr. J. E. Cabot read a translation of it, which he had prepared, as follows: —

(Translation.)

Columbus, December 12, 1850.

. . . The fact you point out is not new; indeed, it nearly always occurs in the formation of peat-bogs, or indeed, of *cedar swamps*, which are the same thing. If you examined attentively what you call the *fine sand* of the banks of the river Monistic, I think you must have observed that it is not a true *sand*, but a loamy, (*limoneux*,) argillaceous, impermeable *alluvium*. This sand is found in all the peat-bogs of Europe; in Switzerland, in Germany, in Sweden, in Denmark, and in Holland; everywhere it is the same. I have invariably found, on putting a handful or two of this sand into a funnel, that it resisted the passage of water to a really astonishing degree. But even supposing your designation to be correct, and the sand of the Monistic to be really permeable, the following explanation is none the less satisfactory. When a river overflows its banks, the slimy sediment is deposited of course at the edge of the current, and where its force ceases, and thus a ridge is formed along the banks, behind which, on the retreat of the river or stream, there remains stagnant water. This is the origin of peat-bogs. The first growth of the still water is *Chara*, a plant of a peculiar composition, containing a large quantity of *silica*, and to the decomposition of which I attribute in a great measure the formation of the clay found in peat-bogs. The idea of attributing a geological formation to vegetable decomposition may seem to you at least extraordinary, but if I am able to complete my work *On the Influences of Vegetation*, I hope to be able to establish this and other facts at least as curious. Next to the *Chara* comes the *Sphagnum*. To enable these plants to grow, requires only a hollow in which moisture can lodge, and a few fragments of woody fibre. My examinations of these curious mosses have proved that in moist climates, on the banks of rivers, or on mountains covered with clouds, their existence and their growth is by no means necessarily dependent upon the soil which they cover. For these mosses, by their peculiar conformation, are so exceedingly hygroscopic that they imbibe moisture in all parts of their tissue, both from the base upwards, and by their leaves, stalks, &c. This peculiarity is not due, as some have supposed, to a mechanical capillarity, but to the nature of their tissue, to the disposition of their fibres, and to the entire absence of chlorophyl, wherein these plants resemble the most simple substances. For vegetable tissue, as you know, is hygroscopic in proportion to its freedom from particles of a foreign nature. I shall give a more satisfactory exposition of this matter in a special work; but you have often observed, without doubt, the curious hygroscopic power of *Sphagnum.* For if you pull off a tuft, even from the driest part of a swamp, on pressing it between your fingers you will always find water running from it as from a sponge. These plants imbibe moisture in this way from the atmosphere, if they cannot obtain it from the soil. Thus, a tuft of Sphagnum, weighing in a completely dry state, three pennyweights twelve grains, suspended in the air during a foggy night, absorbed seven grains of water. On the other hand, evaporation by the tissue is excessively slow, and out of proportion to the absorption.

Another tuft of Sphagnum, about twenty-two inches in superficial extent, and four and a half inches high, and weighing when dried one ounce twenty-one pennyweights, was put into a vase having at the bottom a hole of half an inch diameter. Through this hole, and touching the water with one fourth of a line of the ends of its stalks, the tuft became completely saturated in less than two hours, having absorbed a pound of water. The same tuft, being then exposed to the air and sun for thirty-six hours, lost only five ounces by evaporation. Upon the basis of these facts you may easily follow the operations of nature in the formation of Cedar Swamps.

A little water remaining in a hollow, and saturated with humic acid by the decomposition of vegetable substances, Sphagnum immediately establishes itself. You know how it grows, in compact tufts, and even if the water should escape it will continue to grow, and by degrees will cover very dry soils. For we see it in moist climates ; for example, in the mountains of Ireland, in the Vosges, in the Hartz, climbing up slopes of 25° to 30°, and covering bare granite rocks. A little moisture on the soil in the spring is sufficient to make the spores germinate ; the atmosphere furnishes the necessary moisture for subsequent vegetation. I remember, in this connection, that one day as I was descending the slope of the Brocken, I slipped on a wet rock, and coming down upon my back, found myself buried under a carpet of Sphagnum more than a foot thick, from which I had some trouble in extricating myself.

You yourself remark that the pines are not fond of moisture. As these mosses spread, preventing the air from reaching the roots of these trees, the pines die and disappear, whilst a favorable soil is formed for the cedars, which represent in America the *Pinus pumilio* of Europe. On the sandy banks of the river, where the slope favors drainage, the Sphagnum cannot grow, and thus the pine and spruce thrive.

You ask me why it is that the Sphagnum does not form peat. It is because the slow combustion of wood, which forms this substance, can take place only under water, and thus alone where there is a permanent supply of water. As soon as it runs off, the air reaches the lower part of the stalks, the increase of oxygen decomposes and destroys them, so that after ages of these little vegetables, (which nevertheless contain more woody substance in proportion than the hardest oaks and pines,) there remains only a very thin layer of black earth mixed with sand.

Besides the utility of peat as fuel, it is employed to great advantage as manure, particularly when taken from the banks of rivers, where it contains a much larger proportion of ammonia. But the decomposition must be aided by breaking it up, or by employing it as litter for cattle, where it becomes saturated with their excrements. Thus prepared, I do not hesitate to declare it to be equal in value to guano. But to throw it upon the fields in lumps, as some experimenters have done, is like spreading pieces of coal, or, I may almost say, of stone. For peat is a true coal, and is decomposed only very slowly by the atmosphere.

Dr. Kneeland presented in behalf of Mr. Charles Girard a paper containing a historical sketch of *Gordiaceæ*, with the request that it might be printed in the Society's Journal. Referred to the Publishing Committee.

Dr. A. A. Hayes laid upon the table one of the unique specimens of crystallized Quartz, containing acicular crystals of Rutile, from Waterbury, Vermont, presented to the Cabinet of the Society by Edward E. Phelps, M. D., member of the Society, residing at Windsor, Vermont.

This specimen was early obtained for the Society by Dr. Phelps. It presented some points of chemical interest, and Dr. Hayes was requested to examine some of the minerals accompanying it. These have unfortunately been lost or mislaid. They consisted of hair-shaped crystals of Rutile, exfoliated mica, with bisulphuret of iron and tabular fragments of quartz. The latter had impressions of the Rutile crystals, and were evidently the fractured remains of other crystals produced by inequalities of expansion.

A careful examination of this crystal has led to the conclusion, that it was formed in a cavity containing the needle-formed crystals already implanted on its surfaces. In the different positions of the planes of the quartz crystal, these crystals are seen broken and somewhat confused, but they often present regular terminations and pass through and roughen the surfaces of the quartz.

The most interesting fact, however, in connection with the disposition of the minute crystals is, the *entire absence of any indication of polarization.* Most commonly, when intrusive matter is found in the large quantity here shown, it becomes polarized with the matter of the crystal in which it occurs, and without altering its general form, enters mechanically into its composition. In this case the polarizing power has not acted on the Rutile crystals, to dispose them in lines, or nodal points; they appear simply as a mechanical mixture.

The numerous flaws and rents in the mass of the crystal appearing most frequently where the Rutile crystals are most abundant, indicate that these crystals, by changes of temperature, do not correspond in their rate of expansion to that of the quartz and may prove a cause of destruction.

Prof. Wyman exhibited the shell of a young specimen of *Emys punctata*. In this specimen the vertebræ and ribs could be made out distinctly, but there were no bony dermal plates; the osseous structure corresponding strictly to the endo-skeleton of the vertebrata. Prof. Wyman demonstrated on the specimen the correctness of Prof. Owen's views as to the typical character of the appendages of the vertebral column. The scapula was shown to represent a true rib, and the arm an appendage to a rib, not a rib in itself.

The Secretary read a translation of a letter addressed to him by Prof. Vogt, in reply to the remarks made by Prof. Agassiz, (see Proceedings, November 12, 1850,) in which it was shown that his classification differed from that of Siebold, in the elevation of *Cephalopods* to the rank of a Department as well as in some of the subdivisions of the classes, especially those of the Department of Worms.

The Secretary presented, in the name of Mr. O. V. Hills, of Leominster, Mass., several specimens of minerals from that town, supposed to be Antimony. On examination they were pronounced by Dr. Hayes to be Arsenuret of Iron, although bearing some resemblance to the mineral for which they had been taken.

A series of specimens of *Fusus islandicus* was presented in the name of Mr. James Williams.

Several fossils from the tertiary deposit in the vicinity of Paris, were presented in the name of Miss Sarah Pratt; also a number of minerals and fossils from Mr. Arthur Lyman.

The thanks of the Society were voted to the donors of the above-mentioned specimens.

February 19, 1851.

The President in the Chair.

Mr. Ayres continued his notices of *Holothuridæ*.

Psolus lævigatus Ayres. This species is of a very different type from the Synapta described at the last meeting of the Society. It belongs to the division of Holothurians which have the greater part of the surface covered with strong, imbricated, calcareous scales or plates. Of this division, but two species besides the present have yet been detected on our coast. The suckers, by means of which the animal creeps, are confined to a quadrangular space on the inferior surface. This space has the skin nearly smooth, though strengthened by calcareous deposits. The suckers are in three rows, two lateral and one medial, the rows being joined at their extremities by additional suckers irregularly situated. A European species, allied to this, is stated by Prof. Forbes to adhere so strongly by means of its suckers that in one instance the head was torn from the body by the dredge without loosing their hold. The other parts of the body, except a narrow space below the tentacula, are covered with scales. These are somewhat analogous to the scales of fishes in external appearances but not at all in structure or in relations. A remarkable peculiarity of the calcareous plates occurring in various parts of the structure of many Holothuridæ is, that they are perforated with numerous holes, thus causing them to appear, except on close examination, as if composed of minute grains cemented together. This is shown perfectly in the scales of *Psolus*. When subjected to the action of an acid their intimate structure is readily distinguished, and they are at once recognized as the analogues of the delicate plates of Synapta, and of those which support the tentacula and suckers in most genera. They are not arranged in any regular order, neither are they of uniform size. A few round granules of organization similar to their own are scattered upon them. The fact that these granules are much less numerous than in *P. phantapus*, which this species seems to represent on this side of the Atlantic, has suggested the specific name *lævigatus*.

The tentacula resemble those of *phantapus*, but an opportunity for close investigation has not yet occurred. They are strengthened by minute calcareous plates, as usual, but not sufficiently so to diminish their flexibility.

The oral circle is composed of ten pieces not joined by their extremities, as in Synapta, but placed side by side. The five to which the retractor muscles are attached are bifid anteriorly ; the alternating five are broad at the base and tapering to the apex, shaped like the teeth of some sharks.

The stomach is distinctly marked, but not very muscular.

The respiratory trees cannot be fully traced, from the want of perfect examples, but they are apparently well developed.

P. lævigatus has not yet been found south of Cape Cod. It lives in deep water, and often affords food for fish, from whose stomachs most of our specimens have been procured. Of course we know little in regard to its habits.

The species is readily distinguished by its small size and the comparative smoothness of its scales.

Mr. Desor laid before the Society a paper by Mr. Charles Whittlesey, on the Equivalency of the Rocks between the Conglomerate and the Cliff Limestone in Ohio, as related to the formations of New York in the northeast, and of Kentucky and Indiana in the southwest. The paper was referred to the Publishing Committee.

Mr. Stimpson made some observations on the identity of *Nucula navicularis* and *N. thraciæformis*.

He had recently ascertained that *Nucula navicularis* of Couthouy, and *Nucula thraciæformis* of Storer, are the young and old of the same species. He had for some time suspected this, judging from the similarity of form, and structure of the hinge, and he had recently obtained specimens from which he had formed a series, showing completely the passage of one into the other, which he exhibited to the Society. Mr. Stimpson also mentioned that he had never found specimens of *thraciæformis* without also finding its young, the *navicularis*, at the same time.

The shell will come under the genus *Yoldia*, of Möller, which is included in *Leda*, by Prof. Forbes. As Dr. Storer's description appeared some months before that of Mr. Couthouy, the name of the shell is now *Leda thraciæformis.*

Prof. Wyman exhibited to the Society the cranium of a Hippopotamus recently presented, for the purpose of alluding to some interesting points in the structure of the teeth. On the true molars, which had been used, the enamel was shown to be entirely exposed, while in one, not as yet entirely through the gum, it was covered with *crusta petrosa.* Prof. Owen has ascertained that in nearly all teeth, especially of Pachyderms, at a certain stage, the *crusta petrosa* covers the whole surface of the crown, so that the teeth of herbivora and carnivora may be referred to the same general type, being composed of *dentine, enamel,* and *crusta petrosa,* in regular succession. Prof. Wyman showed by figures on the black-board, that the teeth of Mastodons and Elephants are referable to the same general type, each having its layer of *dentine, enamel,* and *crusta petrosa,* the latter being quite thin in the Mastodon, and early worn away.

The canine teeth of the hippopotamus were shown to resemble very clearly, both in form and anatomical elements, the incisor teeth of Rodents. The lower, however, overlap the upper, and the enamel is deposited on the front of the lower and on the back of the upper. In the process of mastication the opposed surfaces of these teeth are worn away obliquely, the enamel forming the cutting edge. The pulp in the cavity at the bottom of each tooth reproduces it as fast as it is worn off. The thick coating of enamel described by Prof. Owen as covering the upper surface of the lower incisors where they come in contact with the upper did not exist in the specimen exhibited.

Dr. Gould said that he had recently received a number of specimens of shells from California. He remarked, that they were particularly interesting as showing differences in species closely allied to each other on the east and west coast of America, such as are now well known to exist between species of animals of the American and European continents, which were formerly thought to be identical. Many species of shells of Carolina and the Gulf of Mexico have heretofore been regarded as the same as species existing in California. Their general characters are alike, but on being compared side by side, they are found to differ in their details. Dr. Gould exhibited to the Society a piece of bark covered with Mytili, of a new species from Monterey.

Mr. Desor made some remarks concerning the origin of some of the elements of the so-called Tertiary or drift of Lake Superior.

He stated, that all along the shores of this Lake and in the drift around it there are found pebbles of white limestone and fossil corals. It has been a question among geologists from what source they have been derived. Their characters would seem to refer them to the Niagara limestone. No deposit north of their present position has been known to which they could be traced in accordance with the general law of the course of the drift from north to south. Mr. Desor was inclined to refer them to the valley of the Mackenzie, where the Niagara limestone is known to exist. Recently, Mr. Logan, the head of the Geological Commission of Canada, had made an excursion to Lake Temiscomeng, fifty miles north of Georgian Bay, where he had discovered an extensive formation of Niagara limestone; and from the report of *voyageurs*, the country to the north as far as Hudson's Bay is an immense basin of Silurian formation, the counterpart to the great basin of the Western States, so that the granite north of Lake Superior is to be regarded rather as constituting an anticlinal axis interrupting this whole formation than a proper barrier to the southern basin. The fossils spoken of probably came from the region north of the Lake Superior granite.

Mr. Desor also stated that Mr. Logan had obtained from the Laurentian deposit great numbers of fossil Mallotus of the same species as that now found living in the waters of the Atlantic seaboard; also many marine Algæ, the whole skeleton of a Manatus, and part of the bones of a whale, all from Bytown on the Ottowa, one hundred and eighty feet above the sea.

Dr. Durkee exhibited under the microscope several specimens of *Ulva calophylla*, which he had received from Prof. Harvey, of Dublin.

Mr. Bouvé presented, in the name of Mr. Edward Winslow, several living specimens of the larva of the May Fly (*Phryganea*,) inhabiting the cases which they construct for their protection.

Mr. Bouvé announced the donation of forty specimens of Tertiary shells, from the Paris basin, in the name of Miss Chambeaux, of Paris.

Two books, "The Footprints of the Creator," and "The Old Red Sandstone, by Hugh Miller," were presented in the name of Messrs. Gould and Lincoln, the Publishers.

Eight jars, containing specimens of Natural History, from Florida, were presented in the name of Dr. Henry Bryant, a member of the Society.

Messrs. George M. Dexter, Horatio R. Storer, Charles Hale, Amos Binney, and Henry C. Brooks were elected Resident Members.

The thanks of the Society were voted to Messrs. Gould and Lincoln, and to Miss Chambeaux, for their donations.

March 5, 1851.

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

Dr. Kneeland read a communication from Mr. Charles Girard on the Organs of Vision and the Nervous System in the embryo of Ascidia, as follows: —

Every one conversant with the development of Ascidia will recollect that dark, ovoid, or spherical body of early appearance in the embryo, designated under the name of "*Oculiform spot.*"

"Within the thickness of the external layer," says Van Beneden, "appears about in the middle of the body and a little above that region, a cell filled with black pigmentum, which cannot but be considered as the organ of vision."* And a little further: "It persists during the whole period of wandering life, to disappear after the young has become fixed."

Indeed, it seems at first quite natural that an animal which moves freely about when young should have an eye, or an organ of vision that is not wanted when it fixes itself for the remainder of its life. But how far is this view consistent with the fact that the oculiform spot reaches its maximum of development before its escape either from the egg or the body of the parent; and with that other fact, that eye specs exist in the adult and immovable animal upon a region quite remote from the original situation of the oculiform spot in the embryo.

It is well known that in some species of Ascidia eye specs are observed around the external openings of the cavity of the body, four, six, or eight and more in number, and that these eye specs do not exist during early life, but gradually appear and develop as the animal approaches its full grown state, when it attaches itself to some submarine body.

The oculiform spot belongs to the internal layer of the embryonic substance and not to the external one, as supposed by

* Recherches sur l'Embryogénie, l'Anatomie, et la Physiologie des Ascidies Simples. Mémoires de l'Académie Royale des Sciences, Belles-Lettres, and Beaux Arts de Belgique. Bruxelles, 1847. 4to. (fig.)

Mr. Van Beneden. This fact is important to be taken into notice.

In our opinion, the oculiform spot in the embryo represents the nervous system, — the nervous system in its most simple expression, fulfilling the act of vision, which in its lowest degree of development is represented by a spot of colored pigmentum. The organ of vision or perception we see here combined with the sensitive organ or nervous system.

As the embryonic development goes on, the nervous system gradually appears under the oculiform spot, the spot diminishing as it progresses, and disappearing when the eye specs appear on the fringed edge of the outside tubes. Nervous threads have been formed during that interval and now connect these superficial organs of vision to the central mass of the nervous system.

Thus these two organs, (that of vision and the nervous system,) first combined and performing an ideal combined function in the embryo, have become isolated, and each one is called upon to perform its special function.

Mr. Ayres exhibited to the Society a fish from Para, *Vandellia cirrhosa.*

In regard to this species the only information previously recorded was, that it was sent to Prof. Vandelli, of Lisbon, many years since, its origin not being stated. The fish is placed by Valenciennes among the Esocidæ, but Mr. Ayres thought the position of its spines and barbels, and the resemblance of its mouth to that of Hypostoma, should rather arrange it with the Siluridæ. The specimen belonged to the Essex County Natural History Society.

Mr. Ayres also exhibited a specimen of *Psolus*, which, he remarked, differed from *P. lævigatus*, described by him at the last meeting of the Society, in its greater size and more robust form, and in having the scales much more closely set and more thickly granulated. The species is either identical with *P. phantapus*, or very nearly allied to it; so nearly that without direct comparison it is scarcely possible to show in what it differs. The specimen belonged to the Essex County Natural History Society, and was received from the Banks of Newfoundland.

Prof. Rogers called the attention of the Society to a geological problem, namely, — the cause of the want of symmetry in the curves of the earth's strata, as seen in the great mountain chains of America and Europe. Prof. Rogers suggested, as the explanation of the phenomenon, the forward pressure of the lava wave beneath, which he supposed to have produced the curve, in the progress of an earthquake. If a horizontal stratum were acted upon by a perpendicular force from within the earth, it would be raised in a symmetrical arch; but if this force had a horizontal as well as a perpendicular action, the result would be the formation of a curve such as is really found to exist. A railroad bar breaking under the weight of a passing train is fractured towards the extremity farthest from that on which the pressure commences, and in the same way the points of fracture in the curves of upheaved strata are at the most abrupt portion of the curve, towards the termination of the wave. The point of fracture in the railroad bar is nearer to its remote support in proportion to the speed of the passing train. Prof. Rogers supposed that there is a horizontal thrust acting upon the bar through the principle of adhesion in addition to the perpendicular action of gravity.

Mr. Desor stated, as an illustration of the rapid progress of geological science, that the plication theory, which was hardly known fifteen years ago, is now almost universally adopted. This result he thought was due chiefly to the investigations of the Profs. Rogers in the Alleghany chain. In Europe the plication theory had been first practically illustrated by Prof. Studer in the Jura range, and it was by mistake that the credit of it had been given in this country to another Swiss geologist.

As to the cause of the plication, several theories had been proposed besides that of Prof. Rogers. Prof. Studer thought that the plication of the Jura was the result of a lateral pressure, caused by the upheaval of the Alps. M. C. Prévost ascribed the plication to a bulging up, caused by the depression of vast areas. This was also the theory advocated by Mr. T. Dana. Mr. Desor thought that whatever views are entertained as to the real cause of this great feature of the earth's surface, the dynamical illustrations which Prof. Rogers had just adduced in support of his theory were well calculated to hasten the solution of the problem.

Prof. Rogers said, his own and his brother's views in regard to the upheaval of mountain ranges had been fully confirmed in his own mind by visiting the Alps. He proceeded to give an account of the fan-like arrangement of the strata of those mountains, illustrating it upon the blackboard. He gave it as his opinion that the Jura range was raised by a force from the direction of the Vosges, as the plications all lean *towards* the Alps, not *from* them, as would be the case if they had been produced by a lateral pressure caused by the weight of the latter, as supposed by Prévost.

In reply to a question from Prof. Wyman, Prof. Rogers explained, that the upheaved strata preserve their shape by means of trap dykes, and veins of greenstone and quartz, which are always found in great numbers occupying the fissures on the abrupt surface of the curve, and which filling these fissures in a liquid form, harden in cooling, and act as keys and braces to prop up the bent strata.

Mr. Desor read from a note from Mr. Logan, chief of the Geological Commission of Canada, a statement of the height of the Laurentian deposit, called by him drift, at Montreal, as follows: — Height of Laurentian locality at Montreal above the surface of the St. Lawrence, in Montreal Harbor, summer level, 457.34 feet; Fall to tide water at Three Rivers, 12.75 feet; in all, 470.09 feet.

Rev. Zadock Thompson presented specimens of wood taken from a deposit at Burlington, thirteen feet below the surface of the ground and two hundred feet above the level of Lake Champlain.

The deposit was thirty-six feet wide, and forty feet long, and was covered by sand and gravel, which had a slope towards the Lake. Lignite has been discovered at Brandon, Vt., fifty feet below the surface, and is said to have been covered by true drift. In the northern part of Burlington is a stratum of sand and clay sixty feet below the surface, filled with the shells of Sanguinolaria. This circumstance goes to show the former limit of the neighboring waters, as Sanguinolaria is only found within the sweep of the tide, never below low water mark.

Mr. Thompson also presented specimens of wood which had evidently been cut by beavers' teeth, taken from a bed thirteen feet below the surface on Mount Holly, in close proximity to the fossil elephant teeth discovered in 1849.

This deposit is an acre and a half in extent, and about fifteen feet thick in the centre. It was laid open by a railroad cut. The height of the deposit is 1,360 feet above the sea. It rests partly upon solid rock and partly on rounded masses of rock closely compacted together.

In reply to a question as to the exact position of the elephant remains, Mr. Thompson said, that it was his opinion they were not found *in* the drift but *above* it. A portion of them had been said to have been found beneath it, but he was inclined to believe the circumstance accidental, and to be accounted for by the superincumbent mass having rolled down from an adjoining bank subsequent to the deposition of the remains.

Mr. Ayres presented to the Society two specimens of a rare fish, *Aspidophorus monopterygius,* taken from the stomach of a halibut. The only specimen hitherto obtained on the coast of the United States was taken by Dr. Storer, in 1834, at Provincetown, Mass.

Mr. Desor presented a number of specimens of Cyclas and Valvata taken from the clay used as plaster in an old beaver dam.

Dr. Durkee presented to the Society a book of preserved specimens of Algæ, from the coast of Massachusetts, collected by himself during the past two years.

March 19, 1851.

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

Prof. Wyman made some statements with regard to the structure of the spinal cord in Bats.

Cuvier has stated as a general law, that the size of the bulging portions of the spinal cord is in proportion to the " force " of the limbs opposite to them. This is not strictly true, for in birds the posterior enlargement is the largest, while the wings are more muscular and stronger than the legs, except in a few instances ; the enlargements of the chord are not therefore proportional to muscular force ; if the legs and wings are compared with reference to their sensibility, this will be found to be the greatest in the former ; the wings in consequence of being completely invested with feathers are not adapted to receive sensitive impressions. In bats the anterior enlargement far surpasses in size the posterior and extends through the larger portion of the cervical region and to a short distance into the dorsal. Cuvier and Spallanzani proved that these animals are able to fly through intricate passages in the dark without touching the walls, and this independently of the senses of sight and hearing ; a faculty thought to be due to the sense of touch alone, the organ of which is a minute network of nerves, arising from the superior enlargement of the spinal cord and distributed throughout the wing. Thus it would seem that these portions of the cord are intended to be in relation to the function of *sensation* rather than that of *motion.*

Mr. Ayres presented a description of the species of Holothuria, which has been supposed to be identical with *Hol. squamata*, and which is noticed under that name in Dr. Gould's Report on the Invertebrata of Massachusetts.

It is undoubtedly the *squamata* of Fabricius, in the Fauna Grœnlandica, but it has been shown by Duben and Koren to be distinct from the original *squamata*, and as it belongs to the genus Cuvieria, it is called by them *Cuv. Fabricii.* It is distinguished from the original type by having the skin of the ventral surface rugose, the suckers concealed when retracted, and the scales much more roughened with granules.

The genera *Cuvieria* and *Psolus* have been united in one by Duben and Koren, the name Psolus being suppressed. This arrangement, however, seems incorrect, as the two divisions by their zoölogical characters present quite manifest distinctions, which are apparently of generic value. They differ in the relative situation of the anal and oral apertures, in the extent of naked ventral surface, in the suckers and in the scales. The title *Cuvieria* will therefore be retained for those species of which *Cuv. Fabricii* is the only representative yet discovered on this side of the Atlantic.

This occurs on the coast of New England, though not abundantly. It appears to inhabit shallower water than *Psolus lævigatus*, as it has not been detected in the stomachs of fishes, which have afforded many of the latter species. All the specimens seen have been drawn up with the hook. The largest is a little over three inches in length. When living, they are of a bright brick red, and the readiness and abundance with which this color is yielded to alcohol, or even to water after death, is quite remarkable.

The whole upper and lateral surface is covered with large, strong scales, imbricated, and roughened on the part exposed, with numerous granules. These scales are similar in structure to those of *Psolus* previously described, but contain much less animal matter.

The calcareous supports of the suckers are a terminal, perforated plate, like that of *Scl. briareus*, and irregular calcareous concretions, scarcely developed into plates, thickly scattered over the sides of the tube. These concretions are also found on all the ventral surface.

The tentacula are supported on short, soft pedicles, without calcareous support, so far as yet observed. They are frondose-ramose, ten in number, two or three being much less than the others. The whole oral organs and space are of a bright reddish flesh color, entirely concealed within the oral pouch at the will of the animal. The oral circle is composed of ten slender pieces much like those of *Ps. lævigatus*, the alternate ones (to which the retractor muscles are attached) bifid at the extremity. These muscles are thick and stout, terminating very abruptly.

The intestinal tube is long, without muscular stomach. The respiratory trees free, but not large; the ovaries consisting of numerous undivided tubes.

In answer to a question from Mr. Desor, Mr. Ayres remarked that the Holothuridæ present many points of analogy with the other Echinodermata. The suckers, by means of which most of the species move, are of similar organization to those of the Sea Urchins and Star Fishes. Each of these tribes, however, possesses its own peculiar laws in regard to the calcareous deposits, so that from a single sucker it is commonly easy to determine the nature of the specimen. These organs vary in the amount of calcareous matter according to the latitude in which the species live. The plates, also, on many of the *Holothuridæ* closely represent those which form the shell of Echinus, and the allied genera. The oral circle is the analogue, less complicated, of the "Lantern," as it is termed.

The arrangement of parts in quinary order is found to prevail in this family to a great extent, though there are many exceptions. The longitudinal muscles are, so far as observed, always five, and the retractor muscles of the same number. The tentacula are commonly ten or some other multiple of five. In *Synapta*, however, they are in general twelve; the pieces of the oral circle being always of equal number with the tentacula. Where the oral circle is of a single piece, it presents points anteriorly and posteriorly which are multiples of five. The rows of suckers — where they occur in rows — are generally five, though sometimes two or three of them cannot be traced.

Mr. Ayres said that he had intended to make these points of analogy the subject of a special communication at some future time.

Mr. Horatio R. Storer read a description of a new species of *Etheostoma*, under the name of *Etheostoma Linsleyi*, as follows: —

Etheostoma Linsleyi. Color, a uniform dark green, lighter upon sides towards abdomen, serving as the ground for some ten or twelve deep brown, almost black, transverse bands, which are entire at first, but more or less broken towards the tail, and somewhat confluent on dorsum. Head and thorax profusely sprinkled with fuliginous dots. An indistinct dark band descends perpendicularly from inferior orbit of eye to a line with angle of jaws; another, but smaller one, at anterior angle of eye; while a third, much more distinctly marked, of irregular breadth, runs from posterior orbit to angle of operculum. Behind this, upon shoulder, is a circular black spot, appearing at first sight much like the arrangement in *Pomotis appendix*. First dorsal colorless, with the exception of the delicately tinted margin of the connecting membrane. Second dorsal, pectorals, ventrals, anal, and caudal, thickly spotted with black, which, in the caudal especially, gives rise to well-defined transverse bars.

Form slender; the dorsal line depressed at occiput; slightly convex, posteriorly. Ventral line nearly straight. Head flattened above, convex on cheeks; its length about one seventh of the entire length of fish. Opercular spine well marked. Jaws nearly equal; the lower, if any thing, the longer; armed, as also the vomer, with small, yet distinctly visible, and sharp teeth. Beneath jaws, around eyes, and upon cheeks, several rows of mucous pores. Eyes large, projecting; distance between them little over half their diameter. Nostrils double; the anterior and inferior the larger. Lateral line describes a double curve, slightly convex over pectorals, equally concave beneath second dorsal. Anus at about median line.

First dorsal entirely spinous, low and subquadrangular.

Second dorsal a little longer and nearly four times higher than the preceding, like which it is proportionately smaller in adult than in younger specimens.

Pectorals large. Anal as high as second dorsal. Caudal fan-shaped and rounded.

D. 7, 1, 12. P. 12. V. 6. A. 2, 10. C. 16.

In one of the several specimens examined, the number of rays in the first dorsal was 8; in all the others 7, as above.

Length, $2\frac{1}{2}$ inches.

Taken by the late Rev. J. H. Linsley, of Stratford, Ct., in whose memory I have named it, in streams at Walcott, Wayne Co. N. Y. near Lake Ontario.

This species differs greatly from the *Olmstedi* of my father, the only one with which it might be confounded. From all others it is distinguished by the less number of rays in the first dorsal; from this, in that the number of bands upon the sides is much greater, the horizontal one across the operculum, here present, much more marked than that beneath the eye, and that the anal shares in the markings equally with the other fins. The rays of the first dorsal are less in number, and the whole character of the fin is different, it having a much more delicate membrane, and being much lower in proportion to the second dorsal, with which it is closely connected. The pectorals are not so long in proportion as those of the *Olmstedi;* the first of the two spinous rays of the anal is stouter and longer than the second. The form of the head, the relative position of the jaws, and their length, the depth of the body as compared with the length of the head; in short, the very shape and outline of the whole fish would not only characterize it as a distinct species but as belonging to another genus.

What this is to be is as yet doubtful. It has some points in common with De Kay's *Pileoma*, as defined by Agassiz in his Fishes of Lake Superior, and yet more with the genus *Pœcilosoma*, into which it will probably fall. I have preferred, however, to wait until Mr. Girard shall have completed a monograph of these fishes, upon which he is busily engaged, and shall therefore, for the present, simply call it an *Etheostoma.*

Dr. C. T. Jackson read a description and analysis of Pitch Stone, found by him at Isle Royale, Lake Superior, as follows: —

During the summer of 1847, while engaged in the United States Geological Survey of the mineral lands bordering upon Lake Superior, I discovered upon the shores of Isle Royale some rounded pebbles and boulders of a jet black color, which appeared to be identical with Pitchstone Porphyry, like that of the Isle of Arran, in Scotland.

One of these pebbles, which had been mislaid, I have found since I made my Report to the Government, and have submitted it to chemical analysis, which has proved my original opinion to be correct, and it has been confirmed by Mr. Teschemacher. This mineral has not, so far as I know, been discovered before in the United States. I have not had an opportunity of searching for the mineral *in place*, and it is doubtful whether it occurs in the Trap rocks which compose the principal part of that Island, or derives its origin from the dykes in the red Sandstone or from rounded pebbles in the conglomerate.

It occurs in rounded masses of a jet black color, and is porphyritic, with crystals of glassy Feldspar, and occasional amygdules of carbonate of lime, surrounded by a red jaspery crust. It is black and shining like obsidian, but has a more brilliant lustre.

Fracture conchoidal. Hardness, 5.5. Specific gravity, 2.375. Before the blowpipe it swells very much, exfoliates, and becomes ash-gray. At a high temperature on charcoal it melts into a pale green blebby glass. In a tube the mineral gives out by heat, pure water only.

Chemical analysis on two grammes of the mineral, dry at 212° F. gave, per cent.

Silica,	67.90
Alumina,	11.20
Per Oxide of Iron,	6.40
Lime,	3.10
Oxide of Manganese,	0.80
Soda,	2.61
Water,	8.00
	100.01

Comparing this analysis with those given in Dufrénoy's Mineralogy, tom. iii. p. 358, and in Dana's Mineralogy, p. 329, it will be seen that our mineral is very similar in composition to the Pitchstone of the Island of Arran.

Dr. C. T. Jackson also communicated the results of his analysis of a crystal of Phosphate of Lime, from Hurdstown, New Jersey, discovered by Mr. Alger and himself.

The crystal was of a fine yellow color and possessed a resplendent lustre on the surface.

Its specific gravity is 3.205. Hardness, 5. Does not phosphoresce when thrown on heated iron.

By qualitative analysis it was found to consist of Phosphate of Lime, Chloride of Calcium, and Fluoride of Calcium, the color being due to a little per oxide of Iron and Manganese.

By a proportional analysis it was found to contain, per cent.

Phosphate of Lime, ...	92.405
Chloride of Calcium, ...	0.540
Fluoride of Calcium, ...	7.012
Per Oxide of Iron, ...	0.040
Oxide of Manganese, ...	0.003
	100.000

It is obvious that Mineral Phosphate of Lime like this is more valuable for agricultural use and for the preparation of Phosphorus and Phosphates of the Alkalies than burned bones, which contain basic phosphate of lime mixed with a small proportion of Carbonate of Lime; for the mineral phosphate requires less sulphuric acid in the disengagement of a given amount of Phosphoric acid.

Mr. Desor made some statements in relation to the existence of Dunes on the shores of the upper American Lakes.

They were peculiarly interesting as being the only ones of any consequence, so far as his knowledge went, which had been noticed on the borders of an inland sheet of water. On the eastern shore of Lake Michigan they are several hundred feet high. On the north shore, at Point aux Chiens, they are from eighty to one hundred feet high, the highest being half a mile from the Point. They gradually diminish in size, extending along the shore to the west some six miles, until they are reduced to heaps not more than twenty-five feet high. They present no signs of stratification, nor do they contain pebbles, except a few in the depressions between the hillocks where they have been thrown by the waves in severe gales. The back slope has an angle of 32°. In those positions where the ridges are perpendicular to the coast line, the steep side is always opposite to that of the prevailing wind. This feature is also noticeable at several places along the shore of Lake Superior. A peculiarity of the dunes of Lake Michigan is, that they are often covered with trees of considerable size. A white pine growing on the top of the highest ridge was found by Mr. Desor to be eight feet in circumference, showing that at this spot the dune has remained unchanged for a considerable time. Dunes, also, occur at White Fish Point, on Lake Superior, at Keewenaw

Point, the mouth of Eagle River, and several other localities. The existence of these dunes on the borders of fresh water refutes the opinion hitherto held by geologists, that the action of the tide is necessary for their formation, enough sand drying during the ebb to be borne off by the winds. On the other hand, as they occur only on flat coasts where the waters are subjected to considerable motion either from currents or from the action of the winds, or both combined, it is fair to regard these as the agents by which they have been formed.

Mr. T. M. Brewer stated, on the authority of a letter from an observing ornithologist, in East Bethel, Vt., that the Pine Grosbeak, (*Strobilophaga enucleator,*) a bird whose habits are little known, was at this moment remarkably abundant in that neighborhood, not only in the woods, but in the vicinity of farm-houses, being driven by hunger to their very door-steps. This bird is an irregular visitant, at some times being seen in particular localities in great numbers, and then disappearing for several successive winters. These occasional visits have been attributed by many to great severity of weather in their common winter residence. As the past winter has been one of unusual mildness, the supposition appears not to be tenable, and renders more probable the opinion that their migrations are caused by an insufficient supply of food in their northern haunts.

The accounts recently published in the newspapers, of birds breeding in the midst of the winter, at Bristol, Me., probably had reference to this bird. Two nests were said to have been found in February, which must have been constructed in the winter. One contained young.

The letter from Bethel also stated that both species of Crossbill were very abundant there this season.

It was somewhat singular that the common Lesser Redpoll, (*Fringilla linaria,*) usually so abundant there in winter, this year had not been noticed. Last year another variety of Redpoll was observed in that neighborhood which frequented the woods, the common bird always keeping to the open fields. Dr. Brewer was satisfied, that although closely resembling that bird, it was a different species. The differences in its habits were very noticeable. This was worthy of note as some ornithologists were not disposed to admit Mr. Audubon's Mealy Redpoll, (*Fringilla borealis*,) as a distinct species, but only a variety of the Lesser Redpoll.

Mr. Asa T. Warren was elected a Resident Member.

Mr. Charles Whittlesey, of Cleaveland, Ohio, and Dr. Christy were elected Corresponding Members.

BOOKS RECEIVED DURING THE QUARTER ENDING MARCH 31.

Report on Geology and Topography of California. (Congressional Document.) Washington. 8vo. Pamph. 1850. *From R. C. Winthrop.*

Use and Abuse of Alcoholic Liquors. Prize Essay, by W. B. Carpenter. 12mo. Boston, 1851. *From the Massachusetts Temperance Society.*

Physiological Effects of Sulphuric Ether. By W. T. G. Morton, M. D. 8vo. Pamph. Boston, 1851. *From the Author.*

Fourth Annual Report of Smithsonian Institution. 8vo. Pamph. 1850. *From Horace Mann.*

Proceedings of American Philosophical Society. Vol. V. No. 45. pp. 141 – 174. *From the American Philosophical Society.*

Bulletin de la Société Géologique de France. 2ème Serie. Tome VII. Feuille 23 – 30. Paris, 1849 – 50. *From the Société Géologique.*

Dictionnaire des Sciences Naturelles. Vols. 1 – 38. 8vo. Paris, 1816 – 25. *From Moses Kimball.*

G. A. Mantell on the Pelerosaurus and Dorsal Dermal Spine of the Hylæosaurus. 4to. Pamph. London, 1850. *From the Author.*

Contributions to Conchology, No. 8. By Prof. C. B. Adams. 8vo. Pamph. 1850. *From the Author.*

Reports of the Horticultural Exhibition in Salem, Mass. in 1850. 8vo. Pamph. *From the Essex Institute.*

Denkschrift zur Feier des Fünfzigjährigen Bestandes der K. B. Botanischen Gesellschaft zu Regensburg. 4to. 1841. *From Edward Tuckerman.*

J. C. Lehmann, Novarum et minus cognitarum Stirpium, Pagillus Octavus. 4to. Pamph. Hamburgi, 1844. *From Edward Tuckerman.*

Memoire sur la Famille des Myrtacées. Par A. P. De Candolle. 4to. Pamph. Genève. 1842. *From Edward Tuckerman.*

J. G. C. Lehmann, De Plantis Cycadeis præsertim Africæ Australis. 4to. Hamburgi, 1834. *From Edward Tuckerman.*

Report of Commissioner of Patents for 1849. Part I. Arts and Manufactures. 8vo. Washington, 1850. *From T. Ewbank.*

Pinkerton, J., Voyages and Travels in all parts of the World. Vols. 5 and 6. 4to. Philadelphia, 1812. *From Rev. F. Parkman.*

Calmet, Scripture illustrated by means of Natural Science: being 4th volume of Calmet's Dictionary of the Bible. 4to. Charlestown, 1814. *From Rev. F. Parkman.*

Annals and Magazine of Natural History. No. 37. Vol. 7, for January, 1851. 8vo. London. *From the Courtis Fund.*

Memoirs of the American Academy of Arts and Sciences. New Series. Vol. IV. Part 2. Cambridge, 4to. 1850. *From the American Academy.*

Address before Plymouth County Agricultural Society, September, 1850. By Charles T. Jackson, M. D. 8vo. Pamph. Boston, 1850. *From the Author.*

Proceedings of the Academy of Natural Sciences of Philadelphia. Vol. V. No. 6. pp. 117–138. 8vo. Pamph. 1850. *From the Academy of Natural Sciences.*

Supplementary Observations on the Structure of the Belemnite and Belemnoteuthis. By G. A. Mantell. 4to. Pamph. London, 1850. *From the Author.*

Memoir of Dr. Amos Binney. By A. A. Gould, M. D. 8vo. Pamph. Boston. *From the Author.*

Letter to the Rev. John Bachman on the Question of Hybridity in Animals, considered in reference to the Unity of the Human

Species. By S. G. Morton, M. D. 8vo. Pamph. Charleston, S. C. 1850. *From the Author.*

Footprints of the Creator. By Hugh Miller. With Memoir of the Author, by Louis Agassiz. 12mo. Boston, 1851. *From Gould & Lincoln.*

The Old Red Sandstone. By Hugh Miller. 12mo. Boston. *From Gould & Lincoln.*

History of British Mollusca and their Shells. Nos. 33, 34. 8vo. London. By Prof. E. Forbes and S. Hanley, 1850. *From the Courtis Fund.*

Natural History of Carolina, Florida, and the Bahama Islands. By Mark Catesby. 2 vols. Folio. 1754. *Vattemare's International Exchange.*

Annals and Magazine of Natural History. No. 38. Vol. VII. 2nd Series. For February, 1851. London. *From the Courtis Fund.*

American Journal of Science and Arts. No. 31. Vol. XI. for January, 1851. New Haven. *From the Editors.*

Annals and Magazine of Natural History. No. 36. Vol. VI. for December, 1850. London. *From the Courtis Fund.*

American Journal of Science and Arts. No. 32. Vol. XI. for March, 1851. *From the Editors.*

Massachusetts Algæ. 4to. Containing Specimens, arranged by Dr. S. Durkee. Boston, 1851. *From Dr. S. Durkee.*

History of the Boston Athenæum, by Josiah Quincy. 8vo. Cambridge, 1851. *From Dr. S. Cabot, Jr.*

Monograph of the Odontophorinæ, or Partridges of America. By John Gould, F. R. S., &c. Folio. London. Part 3d. *From the Audubon Fund.*

Transactions of the Entomological Society of London. Parts 4 to 9 of Vol. V. and Parts 1 to 3 of Vol. I. to New Series. 8vo. London, 1848–50. *From the Entomological Society.*

Annals and Magazine of Natural History, No. 39. Vol. VII. for March, 1851. *From the Courtis Fund.*

April 2, 1851.

Dr. Samuel Cabot in the Chair.

Mr. W. O. Ayres made a communication with reference to the Holothurian recently described by Mr. William Stimpson, as *Anaperus unisemita.*

From the examination of that specimen, which belonged to the Society, and another in much better condition, belonging to the Essex County Natural History Society, he was convinced that the species was not an Anaperus, but the type of a new genus.

The peculiar character of the integuments, indurated with calcareous deposits, suggests a generic name, and it may be called

STEREODERMA.

Body ovate-elongate, with both extremities slightly elevated, thus distinguishing a superior and inferior side; the entire surface covered with minute, perforated, calcareous plates, so thickly as to render the walls of the body rigid and hard; tentacula ten, (of which two on the ventral side are much less than the others) stiff and unyielding, somewhat ramose; oral circle, like that of Psolus, consisting of ten pieces, tapering anteriorly; retractor muscles very long and slender; suckers scattered irregularly over the body, excepting beneath where they form a well-defined line; respiratory trees not largely developed; genital tubes undivided; stomach muscular.

The genus is allied to *Sclerodactyla* by the structure of the tentacula, and to the same genus as well as *Sporadipus*, *Anaperus*, and *Orcula*, by the arrangement of the suckers, (though differing from them all in the line beneath,) but distinctly characterized by the hard integuments, and by the other features already noted.

Of its geographical range little is known. The specimen here described was brought from the Banks of Newfoundland; the one in the Society's Collection was probably taken on the coast of Massachusetts. It is a small species, not much exceeding two inches in length, and apparently not capable of much change of form.

S. unisemita, St. Calcareous plates of body irregularly oval, commonly pierced with four holes, deposited in many layers. Those supporting the stems of the tentacula and the bases of the suckers more elongated, but in other respects similar.

The suckers differ from those of other species in having no terminal plate ; they are in fact almost destitute of calcareous matter, a few minute pieces only being found on the sides.

The tentacula are harder and more rigid than those even of *Sclerodactyla*, but much less ramose, and have the calcareous deposits arranged in a different manner.

The pieces of the oral circle present a remarkable peculiarity, in being uniform ; the alternate ones, to which the longitudinal and singularly slender retractor muscles are attached, not being bifid anteriorly.

The digestive and respiratory organs are less largely developed than in most species.

Dr. C. T. Jackson read a description and analysis of Botryoidal fibrous Phosphate of Lime, from Crown Point.

Last February, I received from Mr. C. F. Hammond, of Crown Point, N. Y., several well characterized specimens of the Eupychroite Phosphorite, discovered some years since by Prof. Emmons, and described by him in his Report on the Geology of New York. It was first analyzed by Prof. Lewis C. Beck, who ascertained its chemical nature, and published his analysis in the Mineralogy of New York, page 240. It being desirable for scientific purposes to have a new and more minute analysis of this mineral, I undertook it, in connection with the researches I was making on the Phosphate of Lime, of New Jersey. The specimens sent me by Mr. Hammond differ somewhat from those described by Prof. Emmons, — his being green, while mine are brown or pale bluish gray. The surface of the botryoidal concretions is covered with a thin film of Iron Pyrites, which is easily scraped off. In preparing the specimens for analysis, this crust was carefully removed, and only the pure mineral was employed. It occurs in botryoidal masses of a fibrous structure, and is composed of alternate layers or crusts, which separate readily on breaking the mineral. This structure seems to lead to the belief that the mineral was deposited from a liquid state gradually, and it may have been formed from a solution. We are not acquainted with any recent examples of the formation of this mineral, either by mineral springs or by volcanic action, and the subject is one of much geological interest. From the circumstance of the association of Specular Iron ore with the Eupychroite and its occurrence in Metamorphic rocks, it would appear that igneous action took place at the epoch of its formation.

It was formerly supposed that Phosphate of Lime was of organic origin, but the discovery of it in rocks more ancient than organized beings proves that it is one of the primeval substances of our globe, and its occurrence in volcanic rocks has also been recently demonstrated.

The specific gravity of this mineral is 3.053. Hardness, 4.5. It phosphoresces by heat with a beautiful emerald green light, like that of Chlorophane fluor spar; hence the name given to it by Emmons.

When suddenly heated it decrepitates strongly. Before the blowpipe it phosphoresces brilliantly, and at a high temperature glazes on the surface, but does not melt into a globule.

This mineral was found to consist in 100 parts, of

Lime,	47.230
Phosphoric Acid,	45.710
Carbonic Acid,	1.218
Lime,	1.554
Chlorine,	0.130
Calcium,	0.204
Fluorine — by diff.	0.599
Calcium,	0.855
Protoxide of Iron,	2.000
Water,	0.500
	100.000

The pure Phosphate of Lime in the mineral amounts to 92.94 per cent.

One hundred tons of this mineral have been extracted from the mine, as I am informed by Mr. Hammond, and I learn that it is to be employed in agriculture. Owing to its admixture with rocks, in which it occurs, it will be necessary to analyze each lot of the ground mineral in order to ascertain the proportions of sulphuric acid that will be required for its decomposition; the analysis I have made being that of the pure mineral.

Dr. Jackson, in conclusion, spoke of the great importance of this substance in agriculture as manure. In England great quantities of bones are annually ground up and used in agriculture for the sake of this ingredient, which constitutes a small proportion of them, and an extensive trade with South America is carried on in importing the bones of the cattle killed there. Even old battle fields have been dug over for the human bones buried in them. The coprolites are also eagerly sought for, for the very small amount of Phosphate of Lime which they contain. Dr. Jackson expressed the hope that American farmers would not neglect to avail themselves of so bountiful a supply of mineral phosphate of lime, a valuable material so readily within their reach.

Mr. Stimpson made some remarks on an Ascidian found in Massachusetts Bay.

It belongs to the family of Pelonaiadæ, recently established by Profs. Forbes and Goodsir, for two species found by them on the coast of Scotland. They are referred to one genus, Pelonaia, to which the present species also belongs, making a third.

P. arenifera. The body is elongated, clavate, of a brownish color, and covered with grains of sand; the apertures are placed on two small, white, mammilliform protuberances at the smaller extremity. It inhabits deep water; the specimens were obtained from eighteen fathoms, about ten miles east of the Boston light-house.

Mr. Desor called the attention of the Society to the subject of the Parallelism of the quaternary deposits of Europe and America.

The main difficulty which we encounter when we attempt to parallelize the detrital deposits of Northern Europe and America with those of Switzerland, where they were first and most minutely investigated, is the position of the bones of the mammoth and other quadrupeds. In this country and in the north of Europe these are limited to the most recent formations, such as peat-bogs, swamps, and river alluvium. In Switzerland and Italy, on the contrary, they occur in gravel deposits, (diluvium,) which are said to have been separated previous to the scattering of the Alpine boulders over the plains of Switzerland and the Jura, and previous also to the furrowing and polishing of the rocks.

It is plain, from these facts, that in taking as points of reference the transportation of boulders and the polishing of the rocks, which are similar in both countries, the mammoths of Switzerland and Italy must have lived long before those of the north of Europe and America; being moreover separated from them by the most important event of the quaternary period, the transportation of the boulders and furrowing of the surface rocks. According to some geologists it was an event of such magnitude that it caused the destruction of all the living animals, which were supposed to have been suddenly frozen to death; and in support of this view we are referred to the elephants which are found frozen in the mud along the rivers of Siberia. Other geologists take a different ground. They contend that since the mammoths of the north of Europe and America are identical with those of Italy and Switzerland (*Elephas primigenius*,) they cannot but be of the same geological age; and rather than to refer them to different periods, they prefer to oppose the assumption of a simultaneous transportation of boulders in both countries, thus assuming two glacial epochs instead of one. This is especially the ground taken by M. d'Archiac. In reference to this question, Mr. Desor read the following extract from a letter from M. Martins, Professor of Geology at the Sorbonne, at Paris.

"I do not see why you consider it absolutely necessary that the mammoths of Asti, (Italy,) and those of the North (of Europe and America) should have lived at the same epoch. I, for my part, do not feel compelled to that conclusion. I go further and say, that *a priori*, the contrary opinion appears as the most warrantable. There, (in America,) you have a vast continent which is undergoing upheavals and subsidences even during the actual period; here, (in Switzerland,) we have a country with high mountain chains, which, since the Pliocene epoch, has never been invaded by the waters of the sea. What then is there strange in the fact that the one should have had mammoths at a time when the other had none? Thus far I do not see any reason for assuming with M. D'Archiac two epochs of striæ and furrows. What is the law, either paleontological or zoölogical, which proves that the same animals have lived every where at the same epoch?"

Mr. Desor remarked that M. Martins enters here upon entirely new ground, by setting aside one of the broadest principles of geology, which was almost a creed. He was not himself prepared to meet the question on this new ground, which could not fail to attract attention, and will undoubtedly give rise to many interesting discussions.

Mr. Desor stated that he had recently received from Mr. Logan a statement that the fossil Mallotus of Bytown is identical with *Mallotus villosus*, now living in the waters of the Atlantic coast.

Dr. Cabot announced the donation of the following birds, namely: — *Sterna acuflavida*, male, Yellow-tipped Tern; *S. fuliginosa* (?), male, Sooty Tern; *S. Cayanensis*, male, Cayenne Tern; *Anöus stolidus* (?), male, Noddy Tern; *Graculus Floridanus*, male and female, Florida Cormorant; *Larus atricillus*, male, Black-headed Gull; *Gallinula galeata*, male, Florida Gallinule; *Ardea leucogaster*, male and female, Lousiana Heron; *Corvus ossifragus*, male and female, Fish Crow; *Cardinalis Virginianus*, female, Cardinal Grosbeak; *Merops apiaster*, male, European Bee-eater; *Coracias garrula*, male, European Roller; *Tyrannus griseus*, male and female, Pipiry Flycatcher, — from Dr. Henry Bryant; *Tetrao tetrix*, male, Black Cock; *Turdus pilaris*, male, Fieldfare; *Oriolus galbula*, male, European Oriole; *Regulus cristatus*, male and female, European Crested Wren; *Pyrrhula rubricilla*, female, Bulfinch; *Passer domesticus*, female, European Sparrow, — from Mr. Algernon Coolidge; *Icterus Bullockii*, male, Bullock's Oriole;

and a Woodpecker of unknown species, — from Mr. J. C. Leighton; *Athene cunicularia*, Burrowing Owl; and an Owl and a Hawk, of unknown species, from Mr. Moses Kimball, in exchange.

April 16, 1851.

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

Mr. Ayres presented the description of a Holothurian, which he believed to be new, and for the reception of which a new genus is requisite, with the following characters.

Body stout and firm, with a smooth skin; suckers arranged in five rows, of which three are more strongly marked than the other two, with a few suckers scattered between; tentacula ten, thin and membranous, wide, with many very short branches giving a botryoidal appearance; oral circle of ten pieces, similar in shape to those of *Psolus* but less rigid; intestine of remarkable length, stomach muscular; respiratory trees much branched, greatly developed; genital tubes undivided. The form of the tentacula suggests the generic name

BOTRYODACTYLA.

As the species is one of the largest yet found on the coast of New England, it may be called *B. grandis*. All the specimens received have been brought by the fishermen from George's Bank, drawn up by their hooks from about thirty fathoms. It appears to be quite abundant on the Bank, more so than any other according to our present knowledge.

The largest specimens are about six inches in length and three in breadth when at rest, and are doubtless capable of greater elongation. They are of a dark purplish brown, and when the animal is in motion, with its pale red tentacula and brighter red suckers protruded, it must exhibit an appearance far from inelegant.

The suckers, which are quite large, are almost entirely destitute of calcareous support, having only a terminal plate perforated as usual, and a very few minute pieces on the sides. The three strongly marked rows of suckers seem to indicate a ventral side, though there is nothing in the form of the body to denote it; between these rows are no scattering suckers. The other two rows are less marked though plainly discernible, and around them are many suckers scattered without order. The suckers are enlarged at the apex, as in the *Echini*, though to a less degree.

The tentacula are arranged around a disk of nearly two inches diameter. They are short and broad, supported on thick short stems, bearing each a cluster of branches nearly globose. The stem is divided into two or three main branches, these again into others, and on these are placed the small sessile tufts which give the tentacle its botryoidal appearance. The calcareous supports are few; they are in the form of slender, perforated, crested spiculæ, similar to those found in *Thyone* and *Thyonidium*.

The digestive organs are very remarkably developed; the length of the intestinal tube in a specimen of six inches being more than eight feet, the stomach quite large and muscular.

The respiratory trees also of great size, extending more than twice the entire length of the body. The threads joining the anal cloaca to the walls of the body are very numerous and large.

The genital tubes are long and undivided; they present the appearance of a large mass of red, coarse threads, nearly covering the other organs; they open by a single duct near the base of the tentacula.

The species is in fact characterized by the striking development of the digestive, respiratory, and genital organs.

The genus *Botryodactyla* is allied to *Cucumaria* in the arrangement of the suckers, but not at all in the tentacula or the oral circle. Another species of the same genus has been brought from George's Bank by the fishermen, though the specimen is so imperfect that description is delayed for the present.

In reply to a question from Dr. Storer, whether the Ophiuridæ were found at greater depths than the Holothuridæ, Mr. Ayres stated that his observations did not indicate the existence of such a law among the species of our coast.

Both families range from the level of the tide as far down as our researches have yet extended. Of the Holothuridæ, *Synapta* is abundant at low water mark, and occurs from that to six or seven fathoms, from which he had dredged various specimens; *Sclerodactyla* and *Chirodota* both inhabit very shoal water; at a little greater depth we reach *Cuvieria* and *Psolus lævigatus*, the latter going as deep as to eighteen fathoms; passing then across very deep water as we leave the land and rising on George's Bank, at the depth of thirty to fifty fathoms we find *Botryodactyla* very abundant, with another species yet undescribed; still further out on the Grand Bank of Newfoundland we meet with *Stereoderma* and *Psolus phantapus* (?) at about an equal depth. Of the Ophiuridæ, two species of *Ophiocoma* are abundant in Massachusetts Bay from low water mark to the depth of eighteen fathoms; but it is worthy of note that while *O. aculeata* is exceedingly numerous at the latter depth in the inner parts of the Bay, it is scarcely to be detected on the Middle Bank in no deeper water, a much greater depth having intervened before reaching that locality. From George's a few fragments merely of Ophiuridæ have been received, showing that they cannot be abundant there, as many Star Fishes of other tribes are taken by the fishermen. Two species of *Ophiolepis* occur, one from the littoral region, the other from the Banks of Newfoundland.

This slight survey is sufficient to show something of the habitat of the two families. It seems in fact yet too early to establish any general proposition in regard to it, since new facts are daily brought to our notice, many of which directly contradict all previously received opinions. This is true not only of the Radiata, but equally so of other departments. Fishes universally considered littoral have been found at depths of sixteen, eighteen, and twenty fathoms, and others still, one hundred and eighty miles at sea, in forty fathoms. The Ophiuridæ and Holothuridæ of George's, and the Grand Bank may probably yet be found very near the coast and *vice versâ*, and not until after much more extended observation shall we be able to pronounce with accuracy in regard to their limits.

Mr. Horatio R. Storer stated that he had obtained on the coast of Labrador, Ophiuridæ, Holothuridæ, and Starfishes, all from the same depth.

Mr. Stimpson remarked, that so far as his observations on the stations of the Echinodermata went, they certainly tended to confirm the general rule pointed out by Prof. Agassiz. The Holothuridæ form the highest division of that class, and although many of them are found in deep water, the *greater number* of genera and species, even on our own coast, are inhabitants of shallow water; as *Cuvieria Fabricii*, *Anaperus Carolinus*, *Synapta tenuis*, *Chirodota arenata*, *Syrinx Gouldii* and others. The Laminarian zone, just below low water mark, is the favorite residence of the Holothuridæ. The Echini are next in the scale; of these we have three species belonging to different genera, on our coast, all of which are inhabitants of moderately deep water. While the Ophiuridæ, which stand lowest, are found in the deepest water from which we have yet obtained any Echinoderms. One species indeed approaches near the shore, but three (allied to *O. texturata*, *O. albida*, and *O. bellis*, of Europe) are found at great depths, as is also the Astrophyton, one of the low types.

It should also be noticed that among the Holothuridæ, the highest genera, Syrinx, Chirodota, Synapta, and Anaperus are found at low water mark, while the lowest, those provided with rows of suckers, as Psolus and Pentacta, are found in deeper water.

Dr. C. T. Jackson exhibited a specimen of New Brunswick Coal. In appearance it much resembled Asphaltum, but differed from it in its action under the influence of heat. He also exhibited a specimen of the shale from the mine, on various parts of which were scales of ganoid fishes, and what appeared to be a tooth. From the combination in the specimen of properties resembling those of Asphaltum and Coal, Dr. Jackson proposed for this new material the name of "Asphaltic Coal." He thought it would prove to be a valuable article for the manufacture of gas.

Dr. C. T. Jackson exhibited a specimen of Eupyrchroite, of which his analysis had been read at the preceding meeting. He also exhibited sticks of Phosphorus, which he had made from Phosphate of Lime from New Jersey. He had found that one hundred pounds of the Phosphate would furnish nineteen pounds of Phosphorus.

Messrs. Edward P. Abbé and George J. Jeffries were elected Resident Members.

May 7, 1851.

ANNUAL MEETING.

The President in the Chair.

The several Curators were called upon in turn by the President, for their reports on the condition of the departments under their charge.

The Curator of Botany reported, that during the past year but little had been done in his department. His own ill health had prevented his bestowing so much attention upon it as formerly.

The Curator of Ornithology reported, that the department under his care is in good condition. One hundred and-two specimens have been added to the collection during the past year, making the whole number of mounted birds belonging to the Society 1,309. Valuable donations have been received from Mrs. G. H. Shaw, Dr. Henry Bryant, Messrs. Algernon Coolidge, J. C. Leighton, Theodore Lyman, W. T. G. Morton, F. C. Brown, Edwin Adams, Deming Jarves, A. H. Ogden, J. E. Cabot, Moses Kimball, The Harvard Society of Natural History, and the Curator.

The Curator of Geology reported, that the Collections under his care are in good condition. Valuable donations have been received during the year past from the Royal East India Company of Great Britain, from Dr. C. T. Jackson, Messrs. Moses H. Perley and Alexander Vattemare.

The Curator of Mineralogy reported, that about ninety minerals had been presented to the Cabinet during the past year. Of a donation of four hundred specimens offered to the Society from his own Cabinet in 1848, two hundred and eighty-two have been at various times transferred to the Society's Collection, leaving one hundred and eighteen yet to be selected for that purpose. Whole number of specimens added since May 1, 1848, six hundred and ninety-five.

The Curator of Ichthyology reported, that the specimens in his department are in good condition. Valuable donations have been received during the past year from Mr. Horatio R. Storer, Dr. Henry Bryant, and the Curator.

The Curator of Comparative Anatomy reported, that the additions in his department during the past year, though few were valuable. Donations have been received from Rev. Zadock Thompson, Messrs. George Ditson, G. H. Shaw, Theodore Lyman, and Charles Hoffman. There are in the Cabinet seventy-three complete skeletons, namely :

Fœtal human Skeletons, . . .	9
Skeletons of Quadrumana, . . .	4
" " Insectivora, . . .	2
" " Carnivora, . . .	9
" " Rodentia, . . .	6
" " Edentata, ...	4
" " Pachydermata . . ,	5
" " Ruminantia, . . .	6
" " Cetacean, (the Manati,) with the stuffed skin, . .	1
" " Birds, ...	14
" " Reptiles, . . .	12
" " Fish, ...	1
	73

There are also 17 Human Skulls, of which 7 are Caucasian, 1 Mongolian, and 4 American; and 5 of children of 1, 2, 3, 4, and 5 years respectively.

Of skulls of other animals, there are the skull of *Troglodytes gorilla*, the largest of the Quadrumana; 5 of the Chimpanzee, old and young, and 11 other monkey crania; 21 of carnivora; 24 of rodentia; 4 edentata; 2 marsupiata; 9 pachydermata; 15 ruminantia; 10 cetacea; 30 birds; 11 reptiles; 85 jars of specimens in alcohol; a variety of horns and loose bones; and 25 stuffed skins.

The Curator of Conchology reported, that the care of the Conchological department having devolved upon him at about the first of January last, and as winter is not the most comfortable period for arranging the collections, no very great progress had been made. Considerable attention has been paid to the arrangement of the Crustacea and Radiata. Of these departments our collection is small, but contains many valuable species, some of which are believed to exist in no other Cabinet. But a chief object has been, the perfecting our collection of native invertebrate animals. It has been thought advisable to place these apart, by themselves, rather than to mix them with the general collections; not only for the purpose of displaying to our citizens the great variety of animal forms which exist in close proximity with, and yet concealed from them, but that a stranger may see what he would first look for in an institution of this kind. Hitherto our collection of exotic species has been much more full than that of our indigena.

The Curator of Herpetology reported, that there had been but few additions to his department. The catalogue of the collection under his charge is imperfect for want of the proper books for reference.

The Treasurer reported a balance in his hands of $504.05. Total receipts during the year $2,218.59. Expenditures during that period, $1,714.54. Donations have been received of $20 for the benefit of the department of Comparative Anatomy, from Mr. G. H. Shaw, and $20 from Mr. Theodore Lyman for the department of Ornithology.

The Librarian reported the addition to the Library during the past year of three hundred and fifty-three volumes, and one hundred and thirty pamphlets. The whole number of bound volumes at present in the Library is two thousand five hundred and sixty-nine, including fifty-nine copies of the Society's Journal and twenty-eight of the Proceedings; unbound volumes, one thousand two hundred and eighty, including eighty Legislative Reports on the Natural History of the State; and about five hundred pamphlets or parts of volumes. Number of volumes in circulation during the past year five hundred and six.

The Committee chosen to nominate officers reported the names of the officers of the last year with a single change, the substitution of the name of Mr. Horatio R. Storer as Curator of Herpetology in the place of Prof. Jeffries Wyman, who declined a reëlection. The candidates nominated were then voted for and elected, as follows: —

PRESIDENT,
John C. Warren, M. D.

VICE-PRESIDENTS,
Charles T. Jackson, M. D. and D. Humphreys Storer, M. D.

CORRESPONDING SECRETARY,
J. Eliot Cabot.

TREASURER,
Nathaniel B. Shurtleff, M. D.

LIBRARIAN,
Charles K. Dillaway.

CABINET KEEPER,
Charles C. Sheafe.

CURATORS.

J. E. Teschemacher,	*Of Botany*,
Samuel Cabot, Jr., M. D.	*Ornithology.*
Thomas T. Bouvé,	*Geology.*
Francis Alger,	*Mineralogy.*
William O. Ayres,	*Ichthyology.*
Waldo I. Burnett, M. D.	*Entomology.*

Samuel Kneeland, Jr., M. D.,	*Comparative Anatomy.*
William Stimpson,	*Conchology.*
Horatio R. Storer,	*Herpetology.*

Recording Secretary,
Samuel L. Abbot, M. D.

Mr. Ayres described a new Holothurian recently received by him from George's Bank, belonging to the genus *Thyonidium*, instituted by Duben and Koren to receive the species with scattered but somewhat regular suckers, unequal tentacula, and divided genital tubes. The general appearance of the present type may be inferred from the name, *Sea Caterpillar*, given it by the fishermen. It is proposed to call the species, *T. elongatum.*

T. elongatum Ayres. Suckers scattered irregularly, but as they are somewhat more numerous on the sides of the longitudinal muscles, five rows can be indistinctly traced. No calcareous deposits on the sides of the suckers, a very slight terminal plate being their only support. Tentacula ten, ramose, of unequal development, five alternating with the other five, which are scarcely half as large. The entire oral apparatus remarkably small; the largest tentacula in a specimen of four inches being not more than a fourth of an inch long. Oral circle and pouch of course corresponding. The tentacula, especially toward their extremities, have strong calcareous supports, consisting of perforated, irregular plates, of larger relative size than in most genera, but not so large as to render them rigid. The oral circle resembles that of *Psolus*, *Botryodactyla*, and *Stereoderma.* The integuments, except in the suckers, present numerous long, very slender spiculæ, enlarged at the base and ribbed longitudinally, but not perforated. Intestinal canal without muscular stomach, simple, about three times the length of the animal. Respiratory trees not largely developed. The genital tubes present a remarkable feature among Holothuridæ of this form, in being divided into two or three branches. Most of them are single in the greater part of their length, the division being near the extremity. They are also peculiar in their position, being attached to the intestine at a point much further back than in other species; from this point a tube passes forward and opens as usual. Longitudinal muscles uncommonly large and strong, being in fact so broad as to cover the greater part of the internal surface.

The specimen described was obtained at the depth of thirty fathoms.

Mr. Teschemacher alluded to the fact that a very important article to chemists and manufacturers, Platina, was becoming scarce from the exhaustion of the localities from which it has hitherto been procured. It was a well known fact that much of the gold from California had more or less of this mineral in combination with it. Mr. Teschemacher had estimated, that as much as 5,300 oz. of it must have been brought in this way to the Atlantic States.* This would be a very important amount for scientific purposes. Its value in the market is now about five dollars the ounce.

Nine mineralogical specimens were presented by Mr. Alger, and eighteen from Mr. James Robins, of North Chester, Vermont.

The Curator of Ornithology announced the addition to the Society's collection of the following specimens, namely: *Pyroderus scutatus*, Fire-bodied Crow; *Corvus cornix*, Hooded Crow; *Conurus squamatus*, Scaly-breasted Parrot; *Juida nitens*, Shining Grakle; *Xanthornus dominicensis*, St. Domingo Troopial; *Lestes viridis*, Leach's Oriole; *Quiscalus major*, Great Crow Grakle; *Chrysoptilus campestris*, Gold-breasted Woodpecker; *Centurus striatus*, Rayed Woodpecker; *C. flaviventris*, Yellow-bellied Woodpecker; *Chloronerpes aurolentus*, Brazilian Woodpecker, together with a Jay, a Thrush, a Cassican, and three Parrots of doubtful species, — all from Moses Kimball, Esq. in ex-

* This he based on the separation by himself of 0.95 gr. Platina in grains from one ounce of gold, sent to him from the Feather River locality; of these the specimens had been exhibited before the Society.

change; *Fringilla chloris*, Green Finch, from Algernon Coolidge.

Mr. Horace W. Adams and Mr. A. H. Blanchard were elected Resident Members.

May 21, 1851.

The President in the Chair.

Prof. Wyman announced to the Society the death of a distinguished Corresponding Member, Dr. Samuel George Morton, President of the Philadelphia Academy of Sciences. He paid a just tribute to the scientific character and attainments and moral worth of the deceased, and concluded by offering the following resolutions: —

Resolved, That this Society has learned with deep regret the death of Dr. Samuel George Morton, of Philadelphia.

Resolved, That in his death, Science has sustained the loss of an ardent laborer in the cause, a true and faithful observer of the "order of nature," and one who has exerted an influence wide spread and beneficial on the progress of Science in our country.

Resolved, That we offer to the Academy of Sciences our sympathy for the affliction which they have suffered in the loss of their late President, who has so long and so earnestly identified himself with their welfare and progress, and whose labors have done so much to adorn the annals of the Academy and have contributed so largely to the honor of American science.

Resolved, That to the family of Dr. Morton we would tender our deepest sympathy for the bereavement which they have sustained in the death of one, who, with the adornments of a cultivated mind, combined so many traits of Christian excellence.

The resolutions were seconded by Dr. C. T. Jackson and sustained by the President, both gentlemen giving their testimony to the truth of the sentiments conveyed in them, and were unanimously adopted.

Voted, on motion of Dr. C. T. Jackson, that a copy of the above resolutions be transmitted by the Corresponding Secretary to the family of Dr. Morton and to the Academy of Natural Sciences.

Mr. Ayres exhibited a specimen of a new species of *Psolus* recently received by him from George's Bank, and read a description of it as follows.

P. GRANULATUS Ayres. Tentacula ten, short and broad, ramose; of a reddish color, as is also the naked space or neck on which they are supported, with darker, purplish spots. One is much less developed than the others. They are supported by irregular, perforated plates, most numerous toward the tips of the tentacula, much like those of *Thyonidium elongatum.* Suckers arranged in three rows on the inferior quadrangular space. Lateral rows broad, consisting of about four series of suckers; intermediate row much narrower. No traces of suckers along the other two longitudinal muscles, nor any furrows which might indicate their locality; in this feature corresponding with *lævigatus* but not with *phantapus*, as described by Prof. Forbes. Calcareous deposits of suckers closely resembling those of *Cuv. Fabricii.* Longitudinal muscles broad, but rather thin. Retractors remarkable for their great length, equalling half that of the entire animal; and so broad as to cover the oral pouch completely. The two upper ones attached, not to the longitudinal muscles as usual, but to the extremity, in each case, of a transverse muscular branch about half an inch in length. Oral circle similar to that of *lævigatus.* Genital tubes numerous, long, and simple, uniting in a duct about an inch in length, which opens near base of upper tentacula. Digestive tube simple, without muscular stomach, about seven times the length of the animal. Pyriform sac broad, thin, nearly two inches long. Respiratory trees not greatly developed, extending but little over half the length of the animal, and less ramified than in many species.

The species is identical with the one noticed at the meeting of the Society held March 5th, which was referred with doubt to the

European species *P. phantapus.* The only specimen then accessible was one belonging to the Essex County Natural History Society, and as none but the external characters were available, it was not judged proper to impose a new specific name without further investigation. The species, however, proves now to be entirely distinct from *phantapus*, and from the general aspect of the surface it may be called *P. granulatus.*

The nature of the integuments is sufficient to separate it from all species of *Psolus* hitherto described. The calcareous matter is perhaps equally abundant, but instead of being deposited in the form of large scales it constitutes a nearly uniform layer, over which are scattered numerous round granules like those on the edges of the scales in *lævigatus.* When a portion of this layer is subjected to pressure beneath the microscope it is found to consist of innumerable minute perforated plates, overlying each other without order, bearing a strong resemblance to the corresponding parts in *Stereoderma.* The inferior quadrangular space, on which the rows of suckers occur, is as plainly marked as in any species of the genus. On microscopic examination, however, less striking contrast is found to exist as the calcareous deposit is similar to that of other parts of the surface, being merely less in quantity.

The specimen from which the description is taken is about six inches in length. It was caught in thirty fathoms water.

Dr. C. T. Jackson called the attention of the Society to the subject of the coal from the Head of the Bay of Fundy, of which a specimen was exhibited by him at the meeting of the sixteenth of April.

That specimen showed the vein of the coal at right angles to the laminæ of the rock, hence it was thought at the time that this was the general direction of the strata, a position in which coal deposits had rarely been observed. During a recent visit to the mine from which the specimen was taken, Dr. Jackson had ascertained that the deposit is in reality *parallel* to the including strata, but the specimen had been obtained from a vein one foot in width, filling a seam caused by a shift of the rock, by which it communicated with the bed of coal. The strata are inclined at an angle of from 70° to 80°. The depth of the shaft now being worked is fifty feet. The coal is columnar and loose, so that it cannot be worked in the usual way by undermining it, but it is taken out by means of a series of horizontal grades. It requires no blasting, but can be easily detached with the pick. This mine affords evidence that the strata were once horizontal. Black and white Gypsum are found in the neighboring rocks.

The strata adjoining the coal beds are a very fine-grained shale. They contain rounded masses like pebbles, principally made up of scales of ganoid fishes, which must have been formed by eddies and whirls in the water. Ripple marks are also found. These shales must have been formed from very fine mud, such as can only be deposited by very calm water.

Dr. Jackson was so fortunate as to obtain specimens of two species of ganoid fishes from this rock, one of them nearly perfect, which he exhibited to the Society. The specimen also showed traces of fossil plants.

Dr. Jackson stated, that in the vicinity of the coal deposit very numerous specimens of fossil trees, such as Stigmaria, Sigillaria, &c. of great size are found.

Prof. Wyman mentioned some facts which had come under his observation relating to the development of Distomata.

He remarked, that in dissecting tadpoles, which were hatched during the last summer, but had remained through the winter without undergoing their metamorphosis, he had found them infected with great numbers of Distomata, situated within the peritoneal cavity, in the muscular tissues, and beneath the skin. They were most abundant in the latter position, at the junction of the tail with the body, and in most instances were surrounded by a cyst, except in the peritoneum, where they were for the most part free.

The Distoma is interesting as exhibiting one of the phases of an alternation of generations, being produced by Cercaria, which has been traced by Steenstrup to a "nurse" and a "grand nurse." Thus, four generations at least are required for the development of a Distoma.

The development of the pelvis of the tadpole presents some points of interest in relation to its philosophical anatomy. It is not at first developed in connection with the vertebral column, but beneath the skin at the base of the tail on the under side, in the form of two triangular plates, which are separated by a considerable interval from the vertebræ. These gradually extend themselves upwards, the legs elongating downwards at the same time. Ultimately the pelvis becomes united with the sacral vertebræ. The primitive condition of the pelvis of the tadpole repeats the permanent one of the fish, where it is constantly separated from the vertebral column, and lodged beneath the skin on the abdominal side of the body.

Mr. Ayres exhibited a fresh specimen of Solaster papposa from George's Bank, where it had been taken in water of from twenty-five to thirty fathoms depth. It was remarkable for the freshness and brightness of its colors.

Mr. Bouvé presented, in the name of Mr. George Mountfort, United States Consul at Candia, a specimen of bone breccia from that Island, taken from sixty-five feet below the surface. It contained a portion of a skull of a Ruminant.

The thanks of the Society were voted for the donation.

June 4, 1851.

The President in the Chair.

Dr. Gould remarked with regard to Dr. Jackson's suggestion, at the last meeting, that the rounded masses of fish scales found in the shale at Hillsborough, N. B., were probably formed in eddies and whirls in the water from which the materials of the rock were precipitated, — that a more probable explanation was, that they were the contents of the stomachs of fishes.

Mr. Stimpson remarked that, the abundance of Holothuriæ found thrown upon our beaches by the storm of April 16th, would seem to indicate that they were numerous in shallow water. Three or more species of *Syrinx* and *Sipunculus*, the *Echiurus chrysacanthophora* of Ayres, with *Synapta tenuis*, and *Chirodota arenata*, were found in great numbers. The last named species is usually considered rare, but at this time many hundreds might have been collected in a few hours. Twenty or thirty specimens of a large *Psolus* were also found. Messrs. Ela and Bradley first discovered these upon the pebbly beach of a small cove, where, at extreme low water, a ridge of rocks might be seen running parallel with the shore at some distance from it. The specimens exhibited so great a latitude of variation as to induce Mr. Stimpson to believe our species to be identical with the *P. phantapus* of Europe. They were nearly four inches in length; the tentacula usually equal in size, but in some, two or three were a little smaller than the others; in some specimens, the granules thickly covered the whole surface, while in others they existed only at the margins of the scales.

But the most interesting animal obtained was a new species of *Pentacta* (*Cucumaria*, Cuv.) which Mr. Stimpson proposed to call *P. calcigera*, on account of the accumulation of calcareous matter on its surface. It was, when found, of a nearly globular shape, but it extended itself when placed in sea water to a length of two inches.

Pentacta calcigera. Suckers long and very slender; disposed in five distinct bands. In each band they were in two rows at the extremities of the body, and four rows at the middle. Tentacula ten in number, two being much smaller than the rest. Body white, suckers sometimes bright red, tentacula purple.

The whole animal covered with calcareous matter, in the form of perforated plates, thickly crowded on the body, but sparingly distributed on the tentacula and the sides of the suckers.

Mr. Whittemore presented a specimen of a new species of Pisidium, with a description by Mr. Temple Prime, under the name of *P. ventricosum.*

Pisidium ventricosum. P. testâ minutâ, globosâ, tumidâ, posticè brevi et subtruncatâ, albâ, nitidâ, tenui, striis concentricis instructâ, natibus prominentibus, marginibus abruptis. Long. .11 ; lat. .095 ; diam. .085. *Hab.* Massachusetts.

This shell somewhat resembles *P. dubium*, but is much more convex ; its beaks are considerably more elevated.

It was found in a small stream running out of Fresh Pond, Cambridge, in company with *P. dubium* and *Cyclas truncata* of Linsley.

Mr. Wells exhibited specimens of soil from the alluvial lands of Ohio. He stated that he had recently been examining the soils of the prairies and bottom lands of that State, and they were characterized by their extreme fineness. In one specimen all but six and one tenth per cent. passed through a sieve, the openings in which were only one sixtieth of an inch in diameter. In another all but one and five tenths per cent. For forty-five years such soil had produced eighty bushels of corn to the acre. He thought that this fertility was due in a considerable degree to the fine division of the soil, which would admit of a very free absorption of ammonia.

Dr. Gould presented, in the name of Mr. Calvin Brown, a donation of Fossils from Boulton Hill, near Sackett's Harbor, at a depth of from one foot to a foot and a half below the surface.

Dr. Cabot announced a donation of four birds from Florida, in the name of Mr. F. C. Browne ; an Owl, which flew on board a ship five hundred miles west of the Western Islands, from Mr. Sprague ; and also the addition to the collection of eleven birds received from Moses Kimball, Esq. in exchange. The thanks of the Society were voted for the donations.

Dr. James Robbins of N. Chester, and Messrs. William Vaux and John A. Clay were elected Corresponding Members.

June 18, 1851.

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

Mr. Ayres stated that he had recently received from George's Bank, and obtained from fishes taken in the Bay, several specimens of Holothuridæ belonging to the genus *Thyonidium*. They represent three species, two of which are new.

T. glabrum Ayres. Tentacula ten, ramose ; of unequal development, three being about an inch long (in an individual of seven inches,) three a little less, two shorter still, and two only a third of an inch. They have strong calcareous supports, especially toward their extremities, closely resembling those of *T. elongatum*. Oral circle similar to that of the species just named. Suckers not numerous, scattered irregularly, though a tendency to arrangement in five rows may be traced. They are destitute of support, and in fact the species may be characterized by the absence of all calcareous deposit except in the suckers and the oral circle. Intestinal canal simple, without muscular stomach, a little more than three times the length of the animal. Pyriform sacs three, about an inch long. Respiratory trees largely developed, their length exceeding that of the entire animal when most extended ; firmly attached to the walls of the body by strong tendinous slips. Cloaca large, and its muscular threads very numerous. Genital tubes in their point of origin, their duct, and their divisions similar to those of *elongatum*. Longitudinal muscles not of uncommon strength. Retractors inserted further back on the divided parts of the oral circle than in many species.

The specimon was taken on George's Bank in about thirty fathoms of water.

T. musculosum Ayres. This species is smaller than the last, not exceeding four inches, so far as yet observed; in form resembling *elongatum*, to which it is in fact more closely allied than to *glabrum*. Tentacula ten, ramose, unequally developed, two being somewhat shorter than the others. Owing to the slenderness of the branches they wave with the least motion of the water, having a plumose appearance, which readily distinguishes them from those of other species. Calcareous supports, and oral circle similar to those parts in *elongatum*. Suckers irregularly scattered, though a tendency to arrangement in rows may be seen; commonly without support on their sides, though a few oval perforated plates occur; the sucking disk bearing a strong plate like that of *Sclerodactyla briareus*. Longitudinal muscles stronger than in any other Holothurian yet noticed on our coast. To such a degree are they developed, that, in the ordinary state of the animal, they press upon each other laterally, and the transverse muscles are not visible. These latter, however, are also of great strength.

No specimen has been obtained in such condition as to afford descriptions of the intestinal, genital, or respiratory organs.

The species was obtained in Massachusetts Bay in about eighteen fathoms water. It is allied to *elongatum* in general appearance and in muscular development, but differs widely in the whole oral apparatus.

Dr. Durkee read a letter from Dr. J. B. Johnston, Sherbrooke, Can. detailing the case of a girl, a patient of his, who had been suffering for several months with gastric difficulties and a cough, which were suddenly relieved by the vomiting, as she alleged, of a specimen of *Salamandra symmetrica*. The account was accompanied by the specimen preserved in alcohol. The letter stated that the patient being suddenly seized with nausea, hurried to the door, and discharging the contents of her stomach on the door-step, the salamander was observed in the mass. On being taken up it was very sluggish in its movements, and of a light color. It was kept living in water for a week, in which time it assumed a darker hue. It was about two inches and a half in length.

Prof. Wyman doubted the facts in the case. He thought it impossible for this animal to exist in the human stomach alive for any length of time. He knew of an instance in which a toad had been swallowed alive by an insane man, and was ejected dead within half an hour. A few years since a man in Reading was reported to have vomited a snake, and by this act to have been immediately relieved of a chronic disease of the stomach. The fact being doubted, the point was settled by opening the stomach of the snake, when its only contents were found to be another snake, proving incontestably that it could not have been an inmate of a human stomach. The supposed vomiting of the reptiles in both instances was the result of an accidental coincidence, such as might very readily account for the story, without impugning the veracity of the witnesses.

Dr. Burnett remarked, that he had observed that *Salamandra symmetrica* dies very soon when deprived of moisture. This might account for the sluggish movements of the specimen when first seen on the door-step.

Dr. Burnett gave an account of some observations which he had recently made on the Seventeen years Locust (*Cicada septendecim.*)

He had found that in the male in many instances there is scarcely a trace of a digestive canal or biliary apparatus, whereas in the female both are fully developed. This arrangement is adapted to the peculiar wants of each, the male living but a few days, and the female much longer. In the male, the sexual system is fully developed when he emerges from the ground, the testes being full of spermatozoa. The female, in emerging from the earth, has about five hundred eggs in her abdomen of about one thirtieth of an inch in diameter, which is only about half their size at the time they are deposited. The development of the eggs accounts for the necessity of food and her complete digestive system. The male has about five hundred sperm cells, containing each, in round numbers, about one thousand spermatozoa, or five hundred thousand in all. The sheath of the penis is provided with two recurved hooks which strengthen the connection during the act of copulation. Indeed, it is not uncommon for the female to be seen dragging about the dead body of the male still fastened to her by these hooks. As the locusts appear in about the same numbers at every period of their return, it follows that only two of the eggs on the average are developed. It would thus appear, supposing the production of these insects to have always followed the same law, that there must have been originally a multiplicity of individuals. The male is about one third larger than the female.

The drumming apparatus of the male, Dr. Burnett had made the subject of careful microscopic study. He had found it to be integumental in its nature, not presenting any relation either by structure or analogy to the respiratory system. It is situated on each side, between the thorax and abdomen, the head of the drum being just under the attachment of the wings to the body, and of the size of a marrow-fat pea. It consists of a tense, dry, crisp membrane, crossed by cords or bars, produced by a thickening of the membrane, which meet on one side at the point of attachment of the muscles, which by their contraction keep it stretched. The sound is produced by a series of rapid undulations, running from the contracting muscles across the drum. The upper part of the abdomen seemed to serve as a sort of sounding-board ; when a portion is removed the sound is sensibly diminished. A dry condition seems to be necessary to the perfect action of the drum, as on wet days, or when it is moistened, the sound is very much diminished. The drumming sound is heard four or five hours during the heat of the day, principally between the hours of twelve and two. In the female there is no drum, nor any trace of the muscular apparatus belonging to it. As an illustration of the immense numbers in which these insects appear, Dr. Burnett stated that he saw an oak tree on every leaf of which were six or eight individuals.

In reply to a question from Mr. Ayres as to the character of the oral circle of the *Cucumaria*, described by him at the last meeting, Mr. Stimpson said that it was composed of pieces arranged, in the words of Mr. Ayres's illustration, "much like the teeth of some species of sharks."

Mr. Ayres remarked that the species of Psolus, presented by Mr. Stimpson at the preceding meeting as probably *P. phantapus*, was quite distinct from his own *lævigatus* and *granulatus*. He also stated that he had received several specimens of *Thyonidium* from the Grand Banks, and he had caught seven or eight in fathoms of water in Massachusetts Bay. At the time he described *Botryodactyla grandis*, some two months since, the species had only been obtained on George's Bank; since then two or three had been taken from the stomachs of Cod caught in from twenty to thirty fathoms of water. The species found by Mr. Stimpson on Chelsea Beach, he himself had obtained from Cod taken in from fifteen to twenty fathoms of water. These facts tended to confirm him in the opinion which he had heretofore expressed, that as yet there are not sufficient data for the recognition of a law of a gradation of depth of water in proportion to the degree of development of the species, in this class of animals.

Mr. Stimpson stated that all the specimens which he had procured in the month of January had the genital tubes filled with ova, an indication of the breeding season.

Mr. Ayres said that all the specimens he had obtained during the past four or five months showed similar indications.

Dr. C. T. Jackson exhibited two very perfect fossil fishes which he had recently obtained from the rock adjoining the coal formation at Hillsborough, N. B. The specimens from this locality, he said, had a peculiar interest as being the first found in the coal formation in America. Those exhibited belonged to two genera, carnivorous in their habits. In the locality from which they were taken, Coprolites were found, some with and some without scales.

Mr. Bouvé inquired whether Dr. Jackson's observations confirmed the opinion of Mr. Logan, that the *Stigmaria* are the roots of the *Sigillaria*.

Dr. Jackson replied, that such is not the fact. At the South Joggings he had had an opportunity of comparing the *Stigmaria* with the roots of the *Sigillaria*, and had found them unlike each other. The *Stigmaria* also is found in the sandstone, not in the under clay.

Dr. Jackson described the interesting appearance of the shores of the Bay at this locality, through a distance of five miles, presenting a complete geological section of the strata. These are inclined at an angle of 20°, and show the trunks of trees imbedded in them at various depths. He himself saw a flattened stem of *Sigillaria* twenty feet long, and he was assured by the miners that it extended at least forty feet farther into the rock. As there is no sign of decomposition, it would seem that the sand must have been rapidly deposited upon them, and as the trunks of the fossil trees are always at right angles to the strata, the latter must have been lifted since they grew. The formation consists of alternate marine shales and beds of coal. The coal seam which is worked is four feet in thickness, and on going into the mine with a lamp one passes directly beneath the roots of fossil trees.

Dr. Bacon exhibited a donation of thirty minerals from Mr. Alger.

Dr. Burnett presented twelve minerals from the Natural History Society of West Chester, Pa., and a number of minerals from the Burrstone formation of South Carolina.

Dr. Cabot presented, in the name of Miss Lydia Green, a specimen of Nautilus from Fayal; also a portion of a plant of unknown species. He also announced the addition to the Cabinet of ten birds received from Moses Kimball, Esq. in exchange, namely: *Stephanophorus cæruleus; Cotinga cærulea*, Purple-breasted Chatterer; *C. Cayana*, Purple-throated Chatterer; *Schizornis Africana*, Crested Plantain-eater; *Laimodon dubius*, Grove-billed Barbican; *Crotophaga major*, Greater Ani; *Monasa fusca*, Striped Puffbird; *Tropidorhynchus cyanotis,* Graculine Honey-eater; *Rhamphopis icteronotus,* Yellow-rumped Tanager; *Euphonia musica,* Musical Tanager.

Donations were announced of a specimen of a large Shrimp, a new species, from the Everglades of Florida; several specimens of Florida reptiles; a *Pagurus,* a *Gelasimus,* and an *Aplysia,* from Key West, all presented by Mr. F. C. Browne, of Cambridge.

Mr. Ayres announced that Miss Felt had consented that the specimen of *Malacosteus niger,* belonging to her, should be deposited in the Cabinet of the Society.

The thanks of the Society were voted to Miss Greene and to Mr. Browne for their donations, and to Miss Felt for her deposit.

Prof. Robb, of Fredericton College, Robert Foulis, Esq., of St. Johns, and William Cairns, Esq., of Hillsborough, N. B., were elected Corresponding Members.

BOOKS RECEIVED DURING THE QUARTER ENDING JUNE 30.

Bulletin de la Société Géologique de France. 6ième série. Tome 7ième. Feuilles 31–38. (6–23 Mai, 1850) 8vo. Paris. *From the Société Géologique.*

Outlines of Oryctology, by James Parkinson. 2nd Edition. 8vo. London, 1830. *From Dr. W. E. Coale.*

Description of Gigantic Mastodon in Baltimore Museum. 8vo. Pamph. 1836. *From Dr. W. E. Coale.*

Message of the President of the United States, and accompanying Documents. 8vo. Washington, 1850. *From Hon. R. C. Winthrop.*

L. Pfeiffer, Monographia Heliceorum viventium. Fasciculi 1–7. Lipsiæ, 1847. 8vo. Pamph. *Exchange with H. Cuming.*

Silliman's American Journal of Science and Arts. No. 33. Vol. XI. May, 1851. *Exchange.*

Anatomy of the Gasteropoda of the United States. By Joseph Leidy. 8vo. Pamph. Philadelphia, 1851. *From the Author.*

Fourth Annual Report of the Regents of the University of New York on the State Cabinet of Natural History, and Historical and Antiquarian Collection. 8vo. Pamph. Albany, 1851. *From the Regents of the University.*

Annales des Sciences Naturelles d'Agriculture et d'Industrie, publiées par la Soc. Nationale d'Agriculture de Lyon. Tome 1, 2, 2ième serie, 1849–50. 8vo. Lyon. *From the Société d'Agriculture de Lyon.*

Royal Institution of Great Britain. Notice of its Meetings. 8vo. Pamph. 1851. *From the Royal Institution.*

Report upon the Fisheries of the Bay of Fundy. By M. H. Perley. 8vo. Pamph. Frederickton, 1851. *From the Author.*

Catalogue (in part) of the Fishes of New Brunswick and Nova Scotia. By M. H. Perley. 8vo. Pamph. Frederickton, 1851. *From the Author.*

D. Christy's Letters on Geology. 8vo. Pamph. Oxford, 1848. *From the Author.*

Griffith, W., Report on the Tea Plant of Upper Assam. Long 4to. Pamph. 1838. *From E. S. Dixwell.*

Catalogue of the Library of Lawrence Academy. 8vo. Pamph. Lowell, 1850. *From S. A. Greene.*

Report of Commissioner of General Land Office. Congressional Document. 8vo. Pamph. Washington, 1850. *From Hon. R. C. Winthrop.*

Catalogue of Land Shells which inhabit Jamaica. By C. B. Adams. 12mo. Pamph. Amherst, 1851. *From the Author.*

Proceedings of the Academy of Natural Sciences at Philadelphia. 8vo. Pamph. Vol. V. No. 8. pp. 139–200. 1851. *From the Academy of Natural Sciences.*

Notes on Hybridity: By Samuel George Morton, M. D. A Letter to the Editors of the Charleston Medical Journal. 8vo. Pamph. Philadelphia, 1850. *From the Author.*

Second letter on Hybridity. 8vo. Pamph. Philadelphia, 1851. *From the Author.*

Proceedings of the Royal Institution of Great Britain. 8vo. Pamph. pp. 61–74. London. *From the Royal Institution of Great Britain.*

Sixty fourth Annual Report of the Regents of the University of the State of New York. 8vo. Pamph. Albany, 1851. *From the Regents of the University.*

Report on the Geology and Topography of a portion of the Lake Superior Land District, in Michigan. By J. W. Foster and J. D. Whitney. (Cong. Doc.) 8vo. Washington, D. C., 1850. *From Hon. R. C. Winthrop.*

From the Courtis Fund.

Annals and Magazine of Natural History. No. 40. Vol. 7, 2nd Series. April, 1851. London.

Annals and Magazine of Natural History. No. 41. Vol. 7. May, 1851. London.

Spier's French and English Dictionary. 8vo. Paris, 1849.

Worcester's English Dictionary. 8vo. Boston, 1850.

Hoblyn's Dictionary of Scientific Terms. 12mo. New York, 1850.

Adler's German and English Dictionary. 8vo. New York, 1849.

Annals and Magazine of Natural History. No. 42. June, 1851. London.

From the Swiss Society of Natural Sciences.

Neue Denkschriften der Allgemeinen Schweizerischen Gesellschaft für die gesammten Naturwissenschaften. Band XI. 4to. Zurich, 1850.

Mittheilungen der Naturforschenden Gesellschaft in Bern aus dem Jahre, 1846. Nos. LVII. – LXXXVI. 8vo. Pamph. Bern, 1846.

Verhandlungen der Schweizerischen Naturforschenden Gesellschaft bei ihrer 33sten Versammlung in Aarau, sammt dem Neuen Mitglieder Verzeichnisse, für 1850 – 51. 8vo. Pamph.

Verhandlungen der Schweizerischen Naturforschenden Gesellschaft bei ihrer Versammlung zu Schaffhausen. 8vo. Pamph. 1847.

Verhandlungen der Schweizerischen Naturforschenden Gesellschaft bei ihrer Versammlung zu Solothurn. 8vo. Pamph. 1848.

Verhandlungen der Schweizerischen Naturforschenden Gesellschaft bei ihrer Versammlung in Frauenfeld. 8vo. Pamph. 1849.

Deposited by the Republican Institution.

Neues Jahrbuch für Mineralogie, Geognosie, Geologie, und Petrefaktenkunde, herausgegeben von Dr. R. C. V. Leonhard und Dr. H. G. Bronn. Heft 1, 3–7. 1849. 8vo. Pamph. Stuttgart.

Index Palæontologicus oder Übersicht der bis jetzt bekannten Fossilen Organismen unter Mitwirkung der H. R. Göppert und Herm. V. Meyer bearbeiter von Dr. H. G. Bronn. 3 vols. 8vo. Stuttgart, 1848.

Cyclopædia of Anatomy and Physiology. Part XLI. 8vo. Pamph. 1851. London.

Deposited by the Boston Society for Medical Improvement.

Sopra il Sistema Linfatico dei Rettili Ricerche Zoötomiche di B. Panizza. Folio. Pamph. Pavia, 1833.

Panizza, B. Descrizione di un Vitello privo d'Occhi. 8vo. Pamph. Milano, 1849.

Panizza, B. Annotazioni Zoötomico-Fisiologiche sopra i Rettili. 8vo. Pamph. Milano, 1847.

Panizza, B. Sul Rapporto tra i Vasi Linfatici e Sanguigni nei Rettili. 8vo. Pamph. Milano, 1844.

Panizza, B. Sulla Lampreda Marina Memoria. 4to. Pamph. 1844.

August 6, 1851.

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

Dr. J. Lawrence Smith present by invitation.

Mr. Teschemacher laid before the Society the results of his study of the traces of vegetation in coal, as follows:—

My observations have been particularly directed to the traces of vegetation in the coal itself, although I have given such attention to those in the shales accompanying it as was necessary for a thorough understanding of the subject. I believe that the investigation of the former branch, hitherto almost untouched, will lead to by far the most interesting results.

One of the most striking points in this investigation was the appearance, on cleavage, of forms entirely simulating those of well known vegetables of the coal period, yet without a trace of the vegetable, the whole being homogeneous coal. Such are these specimens of Peacock Eye Coal, resembling the roots of Stigmaria, these perfect resemblances of the leaves of Neuropteris and Cyclopteris, even to the course of the veins. Such, also, are these masses of vessels which have hitherto been thought to be scratches by sliding, but of which I have several specimens on which a small portion of the plant remains, and one on which there is a portion of a cylindrical group of cones of these vessels symmetrically arranged and surrounded by a clearly organic bark or rind. Something of this nature may be seen in a transverse slice of a recent Equisetum. These appearances are not unfrequent, and each in its class is constant, the outlines being perfect. Such conditions admit alone of the supposition, that during the consolidation of the coal the mass was in a liquid state, and that each particle of the liquid mass sustained an equal pressure in every part, so that there could be no motion whatever amongst these particles by which the outline of the form could be destroyed, and consequently that all disturbing action took place subsequent to its consolidation. The finely polished surfaces are also unquestionably the surfaces of the vegetable.

Of the same striking nature are the fissures so frequently found on the surfaces of the vegetable imprints, but seldom on the general mass. At first I considered them, as others have done, as mere effects of shrinkage; but after a close examination of some thousand specimens, observing them only on vegetable surfaces, on some containing carbonized vegetable matter differing from all around, on others curved in peculiar forms, so as to shut out the action of any general dynamic law, it occurred to me that the determination of these fissures must have been caused by rupture of the weak annular vessels crossing the leaves; like those traversing the leaves of almost all the Palm tribe. Such are these specimens.

Now this opinion involves the decision of the mooted question, of the existence of the Palm tribe in the fossil flora of the coal period. My own idea is from this as well as from other appearances, that the Palm tribe formed a large portion of the coal, and was a large source of the Hydro-Carbon of that period. On this subject of fissures a book might be written, but I wish on this occasion to be as brief as possible, and certainly only to put forward this idea as one which still requires much study. I think the specimens before the Society completely prove the existence of ferns in great abundance in the coal period, and that other appearances extremely puzzling to me at present will turn out to be the remains of large plants of this peculiar growth.

Göppert has stated, in some of his recent works, that the remains of filices are seldom or never found in the coal itself. There are, however, fine impressions of the veins of Cyclopteris, and perhaps of Neuropteris on the coal itself, and they are so clear and distinct as to forbid any idea of motion in the mass, until the whole had taken a solid form. Specimens of *Sigillaria* and *Lepidodendra* are by no means uncommon in anthracite, and all the surfaces have the well-known beautiful polish.

I am quite persuaded that much light will be shed on the subject of the coal formation by the pursuit of this nearly untrodden path; but to arrive at just conclusions requires a considerable knowledge of dynamical causes, and also of physiological botany, particularly of the vegetation of tropical countries. In the course of my own studies I have had rather to depend on the kindness of friends to send me specimens of recent palms, ferns, &c., which I could dissect myself, than on any thing to be found bearing much on this subject in publications; and I am convinced that the personal examination and comparison in this, as in every other subject of natural history, is the only way that leads to discovery or truth.

Mr. Teschemacher then applied these observations to prove that the new coal, called by Dr. C. T. Jackson, Asphaltic coal, belonged in reality to the true coal formation, — comparing the specimens with each other.

Mr. Bouvé remarked, that since the publication of the "Vestiges of Creation," facts had come to light decidedly opposed to the theory of transmutation of species on which that work was based. In a similar way it would seem that the theory of the progressive development of species was destined to be modified if not overturned. As an illustration, he offered for the examination of the Society a number of specimens of fossil palms, or palm-like plants, from shales *underlying* the Pennsylvania coal. The shales were immediately over a conglomerate containing no coal in that locality, the conglomerate lying next above the old red Sandstone. Mr. Bouvé presented the specimens, together with specimens of Fucoides, &c., to the Society.

Mr. Teschemacher, after examining the specimens, said, that some of them presented characters resembling those of the Ferns; others, however, he considered as undoubtedly Palms. He regarded the discovery a very interesting and important one.

Dr. Jackson stated, that analysis of the insoluble portion of the coal from Hillsboro', N. B. shows that it differs from simple coal, only by fractions of one per cent. This insoluble portion constitutes 80 per cent. of the whole mass. Analysis, therefore, does not give a test by which to distinguish the true coals from bitumens.

Dr. Smith, at the request of Dr. Jackson, presented his views on the subject of coals, which he had made a special study. He had himself given particular attention to the study of *Lignite.* He noticed the characters of the various kinds of coal known to commerce, and in speaking of the recently discovered coal of Hillsboro', about the real character of which there had been of late so much discussion, he said, that it approaches much nearer to true coal in its properties than *Lignite*, which is now admitted by Geologists as a genuine coal.

Prof. Wyman exhibited the brain and spinal chord of the

Lumpfish, and called attention especially to the fact, that the chord was distinctly and unequivocally enlarged at the origin of each of the several pairs of spinal nerves.

Cuvier, in the last edition of his Lectures on Comparative Anatomy (Vol. III. p. 175) has made particular reference to these enlargements, but Prof. Owen more recently, in his own published Lectures, denies the correctness of Cuvier's statement, as follows: — "Although many fishes show a slight enlargement at each junction of the nerve roots with the myelon, the anatomical student will look in vain in the recent Eel or Lumpfish, for that ganglionic structure of the myelon, which the descriptions of Cuvier might lead him to expect." (Vol. II. p. 173.) In the present instance the description of Cuvier is entirely confirmed.

Gall and Spurzheim were among the first to insist upon the fact, that the spinal chord consisted of a series of ganglia, and compared it to, and identified it with, the ganglionic chain of the invertebrate animals; or to use another and more recent expression, regarded the spinal chord of vertebrates and the ganglionic chain of Articulates as *homologous.* This position, somewhat modified, has been more recently maintained by Dr. Carpenter, who does not hesitate to identify, (to homologize,) the vertebrate brain, (excepting the cerebral lobes and cerebellum,) with the ganglia of the head of invertebrate animals. (See *General and Comparative Physiology*, 3d edition, p. 1025.) In doing this he does not seem to have kept in mind the distinction between *homology* and *analogy;* which he has failed to do in other instances in the same book, (p. 994,) e. g. where he regards the arms of Hydra as *homologous* with the *muscles* of the throat in Vertebrates. He might with equal propriety have identified the arms of man, the trunk of an elephant, or the legs of a crab with the same parts. The vertebrate and invertebrate nervous systems are no more homologous than their skeletons.

The homology of the spinal chord and the ganglionic chain is opposed, 1st, by the fact that they occupy different positions in the body, — the spinal chord always being enclosed in a bony or cartilaginous canal, the ganglionic chain always in the general cavity among the viscera; the first being situated in the back, the second, excepting the first pair of ganglia, in the front of the body: 2d, the spinal chord never forms a ring through which the œsophagus passes, but the ganglionic chain always does: 3d, the "vesicular substance" of the spinal chord is continuous throughout, and never intercepted, as it is in the ganglionic chain of the Invertebrates. It may be laid down as a general proposition, that the organs of *animal life*, that is, organs of the motory or sensorial systems are never homologous in the different *great divisions* of the animal kingdom. Parts may be *analogous*, have similar functions, as the wing of a bird and the wing of an insect; but they are not identical parts.

The enlargements of the spinal chord have been noticed in many Vertebrates, though they do not exist so distinctly as Gall and Spurzheim have described. Their existence is interesting as tending to show that the spinal axis, as regards its typical structure, like the muscular, the osseous, and the vascular system, is reducible to a linear series of segments, which are equally repeated in the length of the body.

Prof. Wyman also exhibited the cranium of a Flathead Indian, from the Columbia River, which had been recently presented to him by Dr. H. C. Perkins, of Newburyport.

It exhibited in a marked degree the distortion from pressure during infancy, by which the members of many of the tribes in Oregon are characterized. The distortion consists in a depression and an indentation of the forehead; the upper and middle part of the face being thrust back so that the orbits are directed a little upwards; the crown of the head is likewise depressed, and the parietal bones are bent upon themselves so as to form an acute angle, which, in place of the occiput as in the natural conformation, constitutes the most posterior part of the head. The breadth of the head and face is very much increased. The right and left half of the cranium are not symmetrical, the right being much the most compressed. In the neighborhood of the left ear the cranial walls are much dilated, from unequal pressure, so that the mastoid process of that side is completely lost and its substance is apparently converted into the immediate walls of the cranial cavity. The entrance to the left ear is compressed and the condyles of the occiput are thrown out of their horizontal position.

The question naturally presents itself, whether the capacity of the cranium, or in other words, the size of the brain, is diminished by this distortion? This can be answered only by actual measurement. The following table gives the capacity of eleven crania from different Oregon tribes.

	Cubic inches.
1. Calapooyah,	91
2. "	$89\frac{1}{2}$
3. Chinook,	88
4. Chickatat,	84
5. Clatsap,	82
6. Calapooyah,	80
7. Cowlitsk,	79
8. Clatstoni,	75
9. Chinook,	72
10. Unknown,	70
11. Chinook,	84

Of the above, the 2d and 6th are in the Collection of the Boston Society for Medical Improvement, and described in the Catalogue, and the others, with the exception of the last, are quoted from the Catalogue of Crania in the Collection of the late Dr. S. G. Morton.

The capacity of the skulls of the North American Indians generally, as stated by Dr. Morton from the measurements of one hundred and sixty-one crania, gives an average of 84 cubic inches. The average capacity of eleven distorted heads deduced from the above table is a little less, namely, $81\frac{3}{4}$ cubic inches.

It does not appear that the Flatheads are less intelligent than other North American savages. Dr. Pickering describes them as even more intelligent, and as having made greater advancement in the arts than the hunting tribes of North America.

Dr. Kneeland exhibited the cervical vertebræ of the Snapping Turtle, (*Emysaurus serpentina,*) for the purpose of showing the homologies of the "odontoid process" of the second cervical vertebra.

Between the first and second cervical vertebræ there appears, for the first time, in the Chelonians an intervertebral body, forming a separate "odontoid bone," which, in the higher animals, becomes the odontoid process. Oken, finding that it had a separate point of ossification, called it a distinct vertebra, thus making eight in the human cervix. Other authors consider it as the *body* of the atlas; but that this is not true is shown by a specimen, in the possession of Prof. J. Wyman, of the fœtal condition of these bones, in which the points of ossification for the *body* and *arches* of the atlas are seen, and also a distinct point for the odontoid process. The explanation of Carus seems more satisfactory from this specimen. The *body* of the atlas is feebly developed, in which it resembles the cranial vertebræ, where the neural arches are much developed, and always at the expense of the body; to make up in part for this deficiency of body, lateral articulating processes are developed. As the second vertebra has a very large body, there results an opening between the first and second, which nature fills up, to protect the chord, by an intervertebral body, the *odontoid process*, which thus serves the purpose of the body of the atlas; so that it may be considered analogous, (as performing a similar office,) but not homologous, to the interneural pieces interposed between the neural arches in many cartilaginous fishes, to the interparietals of the rodents, or the temporal and wormian bones in man.

Dr. Cabot read some notes on the internal anatomy of a female Mina bird, (*Gracula religiosa,*) which he had dissected, as follows: —

Brain large in proportion, skull rather thin. Os frontis more rounded and projecting than in other birds of allied genera which I have examined. Tongue $\frac{11}{16}$ ins. long, $\frac{5}{16}$ across at base, slightly bifid at tip; opening of larynx $\frac{3}{16}$ in. behind tongue; os hyoides projects $1\frac{5}{8}$ ins. beyond the tongue, tips cartilaginous, jointed at about its middle, the muscle surrounding it rather thick, like that of a woodpecker. Trachea measures 4 inches to its bifurcation. Upper larynx $\frac{1}{2}$ in. long by $\frac{3}{8}$; nothing remarkable about it except, perhaps, rather an unusually large opening. Lower larynx exceedingly muscular, more so by far than that of any bird I remember to have dissected. Membraneous partitions between thoracic and abdominal viscera quite strong and extended, so that the free cavity in which the lungs were situated extended quite down to the pelvis on each side; the abdominal viscera being quite firmly held in the middle, by this sort of diaphragm. Heart $\frac{3}{4}$ in. long by $\frac{5}{8}$ across. Liver, right lobe $2\frac{1}{4}$ in. long by 1 in. across. Left lobe $\frac{7}{8}$ in. long by $\frac{5}{8}$ in. across. Gall bladder quite large, $\frac{5}{8}$ in. long by nearly $\frac{3}{8}$. Spleen $\frac{7}{8}$ in. long by $\frac{1}{8}$ wide. Pancreas very large, more than $1\frac{1}{2}$ ins. long by $\frac{3}{8}$. Œsophagus to proventriculus, (measured in situ,) 4 ins. Provent. $\frac{7}{8}$ in. long to stomach. Stomach filled with coagulated blood, not very muscular, muscle not quite $\frac{1}{8}$ in. in thickest part. Lining membrane very firm and rugose, separating with great readiness from muscular coat. Intestines from stomach to anus $1\frac{1}{2}$ ft. No appearance of Vitelline duct. Cœca, at $1\frac{1}{2}$ ins. from anus, about $\frac{1}{4}$ in. long. Left ovary $\frac{3}{4} \times \frac{3}{8}$ in. containing many ova much swollen and projecting. Right ovary very small, but visible. Ovarian duct $2\frac{7}{8}$ ins. long; after $\frac{7}{8}$ in. of its course suddenly expanding to a great size so as to measure when flattened down $\frac{3}{8}$ in. across; opening into intestine just at anus. Pectoral muscles full and rounded. Adipose matter very yellow.

A number of specimens of fossils from the Coal formation at Attleboro' were presented in the name of Mr. Henry Rice.

Several mineralogical specimens from the interior of the crater of Vesuvius, and several land shells from West Africa were presented in the name of Capt. Garland, United States Marines.

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

Erratum.—Page 80, line 13, for "ferns" read "fungi."

September 3, 1851.

Dr. Samuel Cabot in the Chair.

Prof. James Hall, of Albany, and Dr. Josiah C. Nott, of Mobile, present by invitation.

Dr. Burnett read a paper on the relations of Embryology and Spermatology to classification. The purport of the paper was to show the value of the latter as an element in a perfect system of classification, by exhibiting the distinctive forms of the Spermatozoa in the various departments of the animal kingdom. It contained many interesting facts which had come under his observation in the course of his investigations with the microscope during the past two years.

Dr. Gould exhibited and presented descriptions of a number of California shells, collected by Maj. William Rich and Lieut. Thomas P. Green, United States Navy, some of which had hitherto been considered identical with species on the East coast of the United States. On comparing the specimens side by side, marked differences were evident, as was pointed out by Dr. Gould, who remarked that he had found similar differences between fossil and recent shells from Carolina, which had heretofore been regarded as the same species.

Pholas ovoidea. T. ovoidea, solidula, cinerea, posticè hiantissima et epidermide valdè prolongata; margine ventrali anticè laminâ calcareâ clauso; apicibus ad trientem anteriorem testæ positis; valvis sulco mediano partitis, portione antico rotundato laminis concentricis radiatim striatis exasperato, portione postico subcylindrico, striis concentricis remotis notato; apophysi cardinali subulato, ad apicem dilatato; valvis auxiliariis nullis? Long. 3; lat. $1\frac{3}{4}$; alt. 2 poll. Inhabits Monterey. *Maj. Rich.*

Remarkable for its short and ovoid form, and its great dehiscence. The epidermis is prolonged posteriorly, much as in specimens of *Mya truncata*. There seem to be no accessory pieces at the hinge, though the hinge margin is reflected into a broad plate on each side so as to answer the same end.

Petricola bulbosa. T. solida, ovato-cuneata, posticè hiantula, costis radiantibus numerosis parvis compressis ornata, ad interstitiis concentricè striatis; apicibus ad trientem anteriorem, tumidis; latere antico subgloboso; latere postico subtriangulari; compresso, ad apicem truncato; margine ventrali coarctato: intus livida, cicatricibus calcareis: cardo dente unico ad valvam dextram subulato, recurvo instructus. Long. $1\frac{1}{8}$; lat. $\frac{6}{8}$; alt. $\frac{7}{8}$ poll. Inhabits Guaymas. *Lieut. Greene.*

This is the analogue of *P. rocellaria*, Lk. which it very closely resembles. The posterior end declines more rapidly; the radiating folds are much more delicate. It grows larger. The dark leaden hue of the interior is not constant, nor are the cicatrices always chalky.

Mactra nasuta. T. solida, transversa, ovato-cuneata, albida epidermide stramineo posticè incrassato et fuscato induta; vertice ferè mediano, acuto; latere antico angustato, compresso, subadscendente; latere postico dilatato, truncato, hiante; areâ dorsali posticâ lanceolatâ, excavatâ: intus polita, candida; foveâ ligamentali perobliquâ; dente V-formi tenui, elongato; dentibus lateralibus crassis. Long. $3\frac{1}{4}$; lat. 1; alt. $2\frac{1}{4}$ poll. Mazatlan, *Lieut. Green*; San Pedro, *Maj. Rich.*

The analogue of *M. Brasiliana*, distinguished by the posterior position of the beaks, and the more attenuated form of the anterior half caused by the concave outline of the dorsal margin. The parts composing the hinge are more oblique.

Mactra mendica. T. ovato-triangularis, compressa, concentricè striata, epidermide rufo induta; apicibus antemedianis, acutis, incurvatis; margine dorsali utrinque citò declivi; latere antico citò rotundato; latere postico triangulari, desuper viso angustè cordiformi profundè striato: intus lactea; sinu siphonali parvulo; foveâ ligamentali retrorsum profundè effossâ; dente V-formi parvo; dentibus lateralibus conspicuis. Long. $1\frac{1}{8}$; lat. $\frac{1}{2}$; alt. $\frac{6}{8}$ poll. Mazatlan, *Lieut. Green.*

A remarkably small and solid species, with a very unusual hinge. It resembles in general small specimens of *M. similis*, but is more triangular and more ventricose, as well as more solid. It is closely allied to *M. cuneola*, G.

Lutraria undulata. T. candida, papyracea, ovata, posticè hians, nisi propè marginem posticum concentricè undata, concinnè rugosa; apicibus vix anticis; latere antico rotundato; latere postico angustato, compresso, ad apicem rotundato; margine dorsali declivo, rectiusculo, costâ submarginali munito. Long. $2\frac{1}{2}$; alt. 2; lat. $1\frac{1}{4}$ poll. Inhabits La Paz, Lower California, *Lieut. Green.*

Differs from *L. canaliculata*, Say, of S. Carolina, in its strictly ovate form, in having the beaks anterior, in having the posterior half less compressed and more gaping, and in the acute ridge bordering the posterior margin.

Lutraria ventricosa. T. tenuis, fragilis, ventricosa, ovato-cuneata, alba, epidermide stramineo rugis remotis radiato induta; apicibus vix anticis, tumidis; latere antico angustato, compresso; latere postico dilatato; facie dorsali valdè declivo, angulo obtuso limitato, aream latam concavam efformante lineâ submarginali partitam: intus alba, punctis nitidis notata. Long. $3\frac{3}{4}$; lat. $1\frac{3}{4}$; alt. 3 poll. Inhabits Mazatlan, *Lieut. Green.*

This would at first sight seem identical with *L. carinata*, from the coast of Carolina and Florida. But it is more ventricose, less solid, the beak more arching, the region of the posterior margin excavated, and the posterior umbonal ridge obtuse and destitute of a crest. A small African species (*Mactra albida*) is a miniature of this shell; but the posterior slope is less vertical, and there are deeply impressed grooves in front of the beaks.

Amphidesma flavescens. T. subrotunda, compressa, striis concentricis lamellosis decussatis insculpta, aurantia demum albida et epidermide fusco induta; apicibus medianis, acutis, haud elevatis; areâ dorsali anticâ excavatâ, posticâ lanceolatâ, concavâ, lineâ limitatâ; intus flavo-tincta punctis nitidis notata; sinu siphonali spatulato, striis crebris divergentibus insculpta; foveâ ligamentali profundâ, elongatâ; dente laterali antico ad apicem approximato. Long. $2\frac{3}{8}$; alt. $2\frac{1}{8}$; lat. $1\frac{1}{4}$ poll. San Diego, *Lieut. Green.*

Usually found about half the above size; the concentric lamellæ become worn off and more irregular towards the margin. The interior is faintly tinted yellow when young, but very richly so when old. It is near *A. corrugatum*, Sowb.

Donax obesus. T. parva, solida, ovato-cuneata, ventricosa, nitida, radiatim leviter striata, coloribus albidis et fulvidis omninò vel radiatim picta et plerumque zonis violaceis ornata; angulo postero-dorsali rectangulari; facie posteriori cordiformi, subtriangulari; latere antico angustato, citò rotundato; margine ventrali denticulato, posticè coarctato: intus alba, vel flavescens, violaceo nubeculata, ad marginem dorsalem fuscata. Long. $\frac{9}{10}$; alt. $\frac{6}{10}$; lat. $\frac{4}{10}$ poll.. San Diego. *Lieut. Green.*

In general appearance, especially as to striation and posterior area, it is much like *D. anatinum;* but the angle at the apex is more nearly a right angle, the anterior margin is less acutely rounded, the striæ are none of them punctate; some of the small specimens are very tumid. The coloration is quite various.

Tellina miniata. T. transversa, ovata, tenuis, compressa, valdè hians, concentricè striata, erubescens; apicibus ante-medianis; latere antico semiovali; latere postico ovato-triangulari; margine ventrali sub-pendulo: intus miniata: cardo dentibus duobus divergentibus utrâque valvâ instructus; nymphis conspicuis. Long. 2; lat. $\frac{5}{8}$; alt. $1\frac{1}{4}$ poll. Inhabits San Juan. *Lieut. Green.*

Compared with the analogous West India species, *T. rosea*, it is longer, more delicate, less convex, more inequilateral, more acuminated posteriorly, the ventral and posterior margin less arcuate: color much more roseate externally, and intensely red internally; hinge in that species with but a single tooth and the vestige of one at its side.

Lucina orbella. T. parva, subglobosa, tenuicula, albida, concentricè inequaliter striata; apicibus medianis, haud eminentibus, absque lunulâ anticâ; lateribus ferè symmetricis; intus alba. Cardo valvæ dextræ dentibus duobus quorum antico minore — valvæ sinistræ dentibus duobus quorum antico bifido, postico perobliquo, instructus; dentibus lateralibus nullis; cicatricibus leviter impressis, palleali serie punctorum composito. Long. $\frac{4}{5}$; alt. $\frac{6}{8}$; lat. $\frac{1}{2}$ — $\frac{5}{8}$ poll. San Diego, *Lieut. Green.*

The size and globose form of this shell recalls *L. columbella*, Lam. (*L. Adansonii*, D'Orb.); but the valves are much less solid, the beaks less elevated, and have no area on either side of them; and the surface is not lamellar. *L. globularis* may be more like it. Some specimens are nearly perfect spheres, and all are very convex lenses.

Tellina (Strigilla) fucata. *T. carnariæ* simillima, sed rotundior, striis rarioribus, latioribus et magis angulatis, haud undulatis insculpta; intus omnino miniata.

The species named *Tellina carnaria* is one of those which have been regarded as occurring in widely separated seas, in some of its varieties. I am inclined to think that upon close examination they may be fairly separated, and I have removed the Pacific shell on account of the marks designated above. The interior is throughout deep carmine, and not roseate passing into white at the margin, as in *T. carnaria;* the striæ are less numerous and deeper cut, and their angle of flexure is more acute, so that on the disk they are more vertical, and become crowded and confused at the margin.

Arthemis saccata. T. tenuis, albida, ventricosa, rotundato-rhomboidea, margine ventrali dilatato; apicibus sub-medianis, eminentibus; lunula cordata, lineâ impressâ finita; valvis tumidis, posticè compressis et ad marginem sinuatis: cardo valvæ sinistræ dentibus tribus — valvæ dextræ dentibus binis fissis instructus; cicatrice siphonali acuto, elongato. Long. $1\frac{3}{5}$; alt. $1\frac{1}{2}$; lat. $\frac{7}{8}$ poll. Inhabits Mazatlan? *Lieut. Green.*

The outline is very much as in *Cyth. prostrata*, especially its pouched ventral margin, but it is much more ventricose, and perfectly simple in its sculpture.

Cardium luteolabrum. T. magna, ovato-globosa, posticè truncata, albida epidermide tenui lutescente induta; apicibus submedianis, tumidis, contiguis; valvis radiatim costatis nisi ad marginem dorsalem anticalem; costis 42 rotundatis, canali profundo sejunctis, et aculeis prostratis (postremis fornicatis,) ad angulum anticum armatis: intus alba, dentibus marginalibus luteo tinctis. Long. $3\frac{1}{4}$; alt. 3; lat. $2\frac{1}{4}$ poll. Inhabits San Diego. *Lieut. Green.*

This resembles *C. pseudolima*, and has been regarded as such; but the position of the spines at one angle of the ribs instead of along the middle, and the color of the marginal lip, which in that shell is roseate, may alone distinguish them. It has also a more rounded outline and more globular form, and the ribs are more numerous; the grooves between the ribs are deeper.

Anodon ciconia. T. solidula, transversa, oblongo-ovata, ventricosa, epidermide lutescente-corneo induta; apicibus ad trientem anticum longitudinis positis; latere antico angusto, rotundato; latere postico dilatato, ad apicem acuto; margine dorsali haud angulato; margine ventrali rectiusculo, anticè hiante; declivitate postico tumido, haud angulato; margarita ex ochraceo incarnata, demum argentea: cavositas apicalis ampla. Long. 4; alt. $2\frac{3}{8}$; lat. $1\frac{1}{4}$ poll. Mexico? *Lieut. Green, Maj. Rich.*

It is evidently a tropical type, and resembles *A. anserina*, from Brazil; it is thicker in substance, more tumid on the posterior half, and the epidermis and nacre are quite differently colored. The posterior dorsal and ventral margins have a corresponding slope and meet at the middle of the altitude. It is more like *A. implicata* than any other North American species.

Lithodomus falcatus. T. fragilis, sub-cylindracea, falcata, posticè ad declivitatem umbonalem valdè angulata, margaritacea epidermide crasso castaneo rugis interdum bifurcatis corrugato induta, apicibus ad octantem anteriorem positis, valdè involutis; latere antico dilatato, subgloboso; latere postico arcuato, coarctato-acuminato, supernè fimbriato. Long. 3; alt. et lat. $\frac{1}{2}$ poll. Monterey, in indurated marly clay. *Maj. Rich.*

The slender, falcate, and angular form of this shell clearly distinguishes it from all other species.

Mytilus glomeratus. T. parva, solidula, arcuatim oblongo-ovata, posticè obtusa, nitida, ex indico nigrescens; apicibus remotis, excurvatis; valvis ventricosis, obliquè subangulatis; margine ligamentali recto demum subitò arcuato; margine ventrali recto vel excurvato; cardinis alterâ valvâ dentibus duobus, alterâ tribus : intus argentata, ad limbum nigra ; cicatricibus profundis. Long. $\frac{5}{8}$; alt. $\frac{3}{8}$ poll. San Francisco, *Maj. Rich.*

A very curious species, clustering on sea-weed in the most crowded manner, so that two adjacent specimens sometimes wear each other nearly through, from friction in opening and shutting. This circumstance, with the strong hinge and deep cicatrices, show that the specimens are mature. The byssus is coarse, wax yellow.

Lima tetrica. T. solida, obliquè ovato-triangularis, albida, costis radiantibus ad 18 squamis semi-erectis posticis longioribus armatis, horrescens ; apicibus acutis, elevatis, remotis, muriculatis ; marginali byssali rectilineari, hiante ; areâ cardinali latâ, validâ ; foveâ ligamentali minimè profundâ, costâ transversali suffultâ. Long. $1\frac{1}{2}$; alt. $1\frac{1}{8}$; lat. $\frac{1}{2}$ poll. Gulf of California, La Paz. *Maj. Rich.*

Compared with *L. squamosa*, it is narrower and more compressed ; the dorsal and ventral margin is less broadly rounded ; the scales are more crowded, twice as long, inflexed at their points, and much more developed at the dorsal margin ; there are no striæ on the dorsal area. The remarkable brace or rib under the ligament pit, by which a deep cavity at the apex is formed, is remarkable, but possibly accidental.

Avicula sterna. T. solidula, badia radiis pallidis ornata ; epidermide cinereo serratim fimbriato induta ; apicibus ad quadrantem anteriorem positis ; alâ semicirculari, modicè obliquâ, declivitate umbonali tumido, abrupto ; caudâ longissimâ, gracili ; auriculis magnis, radiatim striatis ; fissurâ byssali profundissimâ, acutangulari : margarita argentata, valdè iridescens ; limbo fusco-marmorato. Long. $2\frac{1}{2}$; lat. $1\frac{1}{4}$; alt. $\frac{5}{8}$ poll. Inhabits Mazatlan. *Lieut. Green.*

Has the general appearance of *A. semi-sagitta*, but the wing is less oblique and curves directly into the cauda without any sinus ; the byssal sinus is deeper and much more acute, making a trapezoidal auricle. The cauda is much shorter in *A. Tarentina* and the wing much more oblique. It most nearly resembles a Florida species, but in that the byssal angle is obtuse, the auricle triangular, the cauda shorter.

Mr. H. R. Storer stated, that he had recently seen the common Toad, *Bufo Americanus*, in an uncommon locality, namely, at Race Point, near Provincetown, where the soil was nothing but sand, covered with beach grass. In another place he noticed specimens which he thought must have crossed the sand flat at low tide, a distance of two or three miles. The Snapping Turtle, (*Emysaurus serpentina*,) was also seen at the same place. Such facts he thought were new in the history of these reptiles.

Dr. Cabot said, that he several years since found a Snapping Turtle on the Island known as the Outer Gooseberry, in Beverly Harbor, some miles from the main land. It had fed on the eggs and young of the Terns, which the year before were quite numerous on the Island, and had nearly depopulated it. Dr. Cabot was informed, by the fishermen of the vicinity, that every year the Snapping Turtles swim off from the main land to the islands; but he was inclined to doubt the fact.

Mr. Storer presented, in the name of Dr. W. I. Burnett, a jar of Fishes and Reptiles from New Hampshire. The colors of the specimens were remarkably bright. Dr. Burnett stated, that this was owing to the presence of a small quantity of saltpetre in the alcohol in which they were preserved.

Dr. Kneeland presented several specimens of Annelids, of the genus Aphrodita.

Prof. Hall remarked, that it would be of great value to geological science if Naturalists in collecting such specimens were to observe attentively the tracks left by them on the sand and mud where they were found. It would throw much light on the question of the origin of certain marks observable on the beaches and flats of past geological epochs. In reference to the shells exhibited by Dr.

Gould, he remarked, that he had been much struck by the manifest difference of species among shells which, if not placed side by side, might have been easily taken for the same. It had been common to regard deposits from very distant localities and of different geological formations as of the same origin, from their containing fossils thought to be of the same species. The differences indicated by Dr. Gould were of great importance in their bearing on this subject, since they were found among fossil as well as recent shells.

Mr. Storer presented, in the name of Mr. J. C. Habersham, the rattle of a Rattlesnake, from Georgia.

Dr. Bacon presented, in the name of Mr. Henry Burnett, specimens of crystallized Pyrites and Galena, from the Isthmus of Tehuantepec.

The thanks of the Society were voted for the donations.

Mr. John Dutton was elected a member of the Society.

September 17, 1851.

Dr. A. A. Gould in the Chair.

Mr. W. C. Redfield, of New York, present by invitation.

Mr. Stimpson announced, that he had recently spent a few weeks among the islands at the mouth of the Bay of Fundy, and on the extreme northeast coast of Maine, and he offered the following summary of his observations on the Fauna of that region.

There are two causes which combine to make the Zoölogical character of these shores quite different from that of any other part of the coast of New England. These are, — the great depth of the sea contiguous to the land, and the coldness of the water. The latter cause is in some measure consequent upon the former, since there is but little surface exposed to the action of the sun compared with the volume of the water. The action of the sun is also prevented, or very much weakened, for a large portion of the time by the thick fogs for which the region is noted. The surface temperature of the sea is from 15° to 20° lower than in Massachusetts Bay at the same time.

The shores are in general bold and precipitous; the primary rocks of which they are composed often rising one or two hundred feet perpendicularly from the water. Consequently the depth of the water is very great in close proximity to the land. Soundings in one hundred fathoms may be obtained within a mile of the shore. This depth cannot be found on any other part of the coast of the United States within twenty or thirty miles of the shore. The sea bottom is usually rocky, and covered with Sponges, Actiniæ, Sertulariæ, Ascidiæ, and various univalve mollusks; but in places, as in eddies and points where the violence of the rush of the tides is diminished, the sediment brought down from the red Sandstones of the upper part of the bay is deposited, and a reddish-brown muddy bottom is formed, which abounds in pelagic species of shells, chiefly bivalves.

A character which cannot fail to strike the observer in this region, is that of the great profusion of animals which inhabit the sea, especially those of the lower classes. The Radiata are chiefly abundant. The shores of Grand Manan are covered, in many parts, with such numbers of sea-urchins, (*Echinus granulatus*,) that it is impossible to make a step without crushing one or more of them. At Eastport the shores abound in like manner with specimens of *Uraster rubens*, a foot in diameter. Holothuriæ are also abundant, especially a species of Botryodactyla, which grows to a foot or more in length, and present a beautiful appearance seen from a boat sailing over them. They usually adhere to the bare surface of the rocks by the suckers of one side of the body, (which is always of a lighter hue than the other side,) but they are pleased to find a chink or some pebbles in which to bury themselves, when nothing can be seen of them but their tentacula ; ten beautiful purple tufts radiating from a centre and occupying a circle of six inches in diameter. This species, with the other Holothuriæ, Psolus, Cuvieria, &c. adhere so strongly by their suckers that their disks are left upon the rock when they are torn away.

It would be interesting to ascertain what constitutes the common food of such a multitude of animals. I have seen a barren rock of several rods in extent, covered with Echini, upon which no other animal nor any plant could be detected, which might serve them for food. I should mention, that when a fish is killed by the fishermen and thrown into the water, it becomes covered with the Echini, who soon devour it.

The pebbly shores are also covered with Mytili, the larger boulders being encased with Patellæ, (*Acmæa testudinalis*,) and below with a large species of Ascidia. Of the free swimming animals, the Medusæ, chiefly *Staurophora laciniata*, Ag. are sometimes met with in such crowds that the passage of a boat through them is obstructed. The waters are also filled with Crustaceans, of which a shrimp, the *Mysis Fabricii*, is the most abundant. These form the food of the herring and pollack, which visit the shores in large shoals at this season.

The first visit of an observer to the shore at low tide would lead him to form an opinion that the number of species inhabiting the region must be very great, since two or three hundred, of different classes, might be obtained during a single retreat of the tide. But a second visit, and dredging operations, soon correct this view ; for although the same species present themselves in increased abundance, the number of additional species obtained is very few. In fact, the region presents the true characteristic of a northern climate ; the number of species being small, while the number of individuals is very great.

The naturalist will not fail to be struck with the facts which present themselves concerning the depths at which the species live. It is surprising to find species which we have always regarded as inhabitants of very deep water, living at very slight depths or even above low water mark. Many remarkable instances of this might be mentioned. The Terebratula, a mollusk of the class Brachiopoda, which is always referred to as inhabiting great depths, — from fifty to two hundred fathoms, — to the great pressure of which its structure is said to be adapted, is here found in great abundance some feet above low water mark, where it is daily left by the tide. At a locality called Bucknam's Point, a large rock was found covered with this species on its under side. Of the Holothuriæ, — Psolus, Cuvieria, Botryodactyla, Orcula, and Synapta, also the starfishes *Solaster endeca*, *S. papposa*, *Cribella rosea*, *C. oculata*, and others, were found at various points between half tide and low water mark; that is, in the third and fourth sub-regions of the littoral zone. Here, also, were pelagic mollusca, *Pecten Islandicus*, *Modiolariæ*, *Mya truncata*, *Chiton albus*, *Fusus Islandicus*, *Buccinum undatum*, etc. The eggs of the last mentioned species, in large masses resembling ears of maize, were found abundantly under the edges of rocks. Each mass of these eggs is the product of a dozen or more individuals of the species, an arrangement probably for the greater security of the eggs.

The same proximity of pelagic species to the shore is noticed among the Algæ. I will mention only the Nullipores, which live at fourteen fathoms and over in Massachusetts Bay, but which at Grand Manan form the sea bottoms from low water mark to five fathoms.

The cause of this might at first be sought for in the great rise and fall of the tides which are well known to occur in the Bay of Fundy. At Eastport the tide retires five fathoms; and it might be said that a species living at the depth of five fathoms would thus be left at spring tides above low water mark. But this does not account for the circumstance, since on those shores we find the same divisions of the littoral zone, inhabited by the same common species of littoral mollusks which inhabit our whole New England coast, *Littorinæ*, *Acmeæ*, *Purpuræ;* the only difference being that the divisions are there of much greater extent.

Thus each of the four subdivisions of the littoral zone in the vicinity of Boston has a vertical range of three feet, while at Eastport it has a range of seven feet, still the common or characteristic shells of the respective sub-regions are the same in each locality.

The Algæ likewise mark the sub-regions, and at low water the beaches are seen beautifully divided into colored zones by the species of Algæ peculiar to each.

The true cause of the appearance of pelagic species above low water mark is probably to be sought for in the difference of the temperature of the water.

Certain species require water of a low temperature, which, in the broad and shallow bays of Massachusetts, can only be found far from land and at great depths, while in the cold waters of the Bay of Fundy, the proper temperature may be found close to the surface.

The water scenery of the region is very striking and beautiful. Long and narrow inlets of the sea run far into the land, and seem more like fresh water lakes and streams, resembling in this, as well as in their great depth and in other particulars, the lochs of Scotland. These inlets are studded with islands, the rocky sides of which are almost perpendicular. The islands are thickly wooded, the trees and boughs often overhanging the water; so that it is possible to glide along under the shade of these trees, while looking down into a depth of twenty or thirty fathoms. The surface of the water in the inlets is quite smooth, and the absence of the heavy roll of the open sea renders dredging very safe and easy.

The greatest depth reached with the dredge was sixty fathoms, and from this to low water mark all depths were explored. The number of new species, and of species new to our coast thus obtained was very large. Nearly all of these were invertebrates. The most interesting vertebrate obtained was a lamprey of the genus Mycine, a genus new to North America. It is interesting to notice a great similarity of the Fauna of this region and that of Greenland, as described by O. Fabricius and others. The correspondence is very great, especially among the Tunicata and Echinodermata of which the species are nearly the same.

Mr. Redfield suggested, as an additional cause for the coldness of the water near Nova Scotia, the probable existence of polar currents. He thought there was evidence of such a current extending as far south at least as Cape Hatteras, and underlying the Gulf Stream.

Mr. Stimpson agreed with Mr. Redfield in his suggestion. It had been thought that the occurrence of certain species of southern shells near Nova Scotia might be accounted for in a similar way by thermal currents from the south. As to the existence of the two currents one above the other, he remarked that it was well known that off the coast of New Jersey the shells from the level of the Gulf Stream are quite different from those below it, the latter being some of the New England species, such as *Cardita borealis*, for instance, as shown by Dr. Gould.

Mr. Ayres thought that the Starfishes, mentioned by Mr. Stimpson, would prove to be new species. He was inclined to the opinion that none of the Radiata of our shores would be found to be identical with European species. With regard to the Botryodactyla, he remarked, that in dissecting recently a Trepang, he had been struck with its fleshy character as closely resembling the species of that genus. It occurred to him that the Botryodactyla might be made an important article of trade as the Trepang is at the present time in the East. It would appear, from Mr. Stimpson's account, that an abundant supply might be obtained for this purpose.

Mr. Stimpson replied, that he had compared *Solaster endeca* with one from Denmark, also several other American with European species, without being able to make out any essential differences. If any differences did exist, he thought they were only such as might be expected among individuals of the same species obtained from opposite and extreme limits of the range of the species.

As to the value of the Holothuridæ as articles of food, Mr. Stimpson said he had availed himself of the abundance by which he was surrounded at Nova Scotia, and had found them, when boiled, quite as palatable as lobsters. The same was true of some of the Echini of that region.

Dr. Gould mentioned the fact, that among specimens of the same species of land shells from different localities, there were marked differences. He had been informed, by a conchological friend, that these differences are constant, and always bear a relation to the geological formations over which the shell is found. He had himself been struck, in coming from Albany, by the abrupt change in the species of trees along the line of the railroad in passing from one geological formation to another. Each deposit seemed to have its own species. He thought the natural productions of the surface had not been sufficiently dwelt upon by geologists as illustrating the character of particular formations.

Dr. Burnett presented the results of his observations on the phenomena of muscular contraction.

It was Haller's doctrine, that muscular fibre is capable of contraction without the aid of the nervous system. More recent anatomists had thought that it must be due to nervous influence, even when communication with the nervous system had been cut off. Bowman had seen a single fibre, when detached from the nervous system, contract backwards and forwards. Within the past year he had himself observed this phenomenon several times. He considered this a sufficient proof that muscular tissue has a contractile power of its own, distinct from that under the influence of the nervous centres. It had been observed that muscles, in contracting, lose none of their volume. In examining the tentacular muscle of Alcyonella with the microscope, he had found it to be a simple tube, containing numerous grains, at short distances from each other. In contracting, the muscles shortened one half. At this time the granules were seen to touch each other; and it would thus appear that the essential element of muscular contraction is a sudden increase of cohesion among the granules, or rather utricles, of the ultimate muscular fibrilla. What is the force which suddenly attracts the granules to each other does not appear.

Dr. Burnett alluded to the motion of Spermatozoa, about which there has heretofore been so much obscurity. On examining them under a high power, treated with acetic acid, he had found them to be made up of utricles, which in the tail are arranged in a single line. The motion begins in the head of the spermatozon, and is continued to the tail. It would seem probable that it is due to the same cause as that which produces muscular contraction, namely, utricular action.

Mr. Ayres remarked, that recent observations upon numerous living specimens of *Sclerodactyla briareus* had shown some points of interest in regard to both the habits and structure of the species.

It is found on muddy bottoms, from low water mark to three or four fathoms. It lies commonly among the roots of the *Zostera*, just beneath the surface of the mud, with the two extremities protruding above. Its motions are very sluggish, an occasional slow waving of a tentacle and the opening and closing of the anus for respiration being the only signs of life visible often for many minutes. The form of the body also changes very gradually by contractions of the transverse muscles. The process of respiration is curious and interesting. The sides of the posterior portion of the body are seen to flatten, from the contraction of the slips joining the walls to the cloaca; the anus is expanded and remains so for two or three seconds during which a current of water is constantly entering. This operation is repeated three or four times at intervals of twenty to thirty seconds, and then the whole is expelled at one effort with considerable force. In shallow water the extremity is often raised above the surface for expiration, and the ejected column is thrown to the height of three or four inches. Where a number of specimens are kept in a basin, these miniature fountains keep the water in continual agitation.

Two points of structure were also detected, showing an entire analogy with other species.

The solid calcareous tubes supporting the tentacula were seen under pressure to consist of very numerous, minute, elongated, perforated plates. In some specimens the deposite was so far deficient as scarcely to constitute a perfect tube, and here the plates were readily seen.

The oral circle was formerly described as consisting of a single piece. This is strictly true, but an examination of this organ in many specimens, when removed and dried, showed that the single piece is formed by the union of the typical number, (ten,) as occurring in other species. Five of these are bifurcated anteriorly, (and to these, as usual, the retractor muscles are attached,) and prolonged posteriorly in two slender points. The remaining five are the representatives of those pieces in

Psolus, *Botryodactyla*, &c. which have the form of sharks' teeth; this form they retain at the base and apex, but lose it of course on the sides, from their fusion with the adjoining plates. The analogy with *Thyone* and *Chirodota* in this respect is striking.

In reply to a question from Dr. Gould as to the results he had obtained from his examination of the track of the recent tornado near Boston, Mr. Redfield said, that the phenomena were similar to those which he had noticed in the paths of many other tornadoes.

A Snake and several Insects from California were presented in the name of Mr. T. G. Cary, Jr.

Dr. Cabot announced the donation of several birds from the same locality, presented by the same gentleman. Among them were two, differing in no respect from the common Song Sparrow, except in the color of the legs, which were much darker than in that species as seen here. A Pipery Flycatcher and a new species of Goldfinch also constituted a part of the donation.

A specimen of Hillsboro' Coal was presented in the name of Dr. C. T. Jackson; part of the skin of a Sturgeon, from Mr. James Dennie; a specimen of *Anodon fluviatilis*, from Dr. H. C. Perkins, and a specimen of *Syngnathus Dekayii*, male, from the Secretary.

BOOKS RECEIVED DURING THE QUARTER ENDING SEPTEMBER 30.

Reports on the Sea and River Fisheries of New Brunswick. 8vo. Pamph. By M. H. Perley. *From the Author.*

Sixty-third Annual Report of the Regents of the University of New York. 8vo. Pamph. Albany, 1850. *From the Regents of the University.*

American Journal of Science and Arts, No. 28, 2nd Series, for July, 1850. *From the Editors.*

Thesaurus Literaturæ Botanicæ. Curavit G. A. Pritzel. Fasciculus I. Plaq. I–X. continens. 4to. Pamph. Lipsiæ, 1847. *From Little & Brown.*

Die Operative Chirurgie von J. F. Dieffenbach. Erstes Heft. Bogen 1–8. Leipzig, 1844. 8vo. Pamph. *From Little & Brown.*

System der Physiologie. Von C. G. Carus. Erstes Heft. Bogen 1–12. 8vo. Pamph. Leipzig, 1847. *From Little & Brown.*

Leipziges Repertorium der Deutscher und ausländischer Literatur. Von E. G. Gersderf. Achtes Jahrgang. I. Bds. I. 11 ft. 8vo. Pamph. Leipzig, 1850. *From Little & Brown.*

Bulletin de la Société Géologique de France, 2ième série. Tome VII. Feuilles 9–13. VI. Feuilles, 44–47. Paris, 8vo. Pamph. 1849–50. *From the Société Géologique de France.*

Liste des Membres de la Société Géologique, 18mo. Pamph. Paris, 1850. *From the Société Géologique.*

Bulletin de la Société Géologique de France. 2ième série. Tome 7ième. Feuilles 4–8. (17 December, 1849 — 21 January, 1850,) 8vo. Pamph. Paris, 1850. *From the Société Géologique.*

Proceedings of the Zoölogical Society of London. With Illustrations. Part III. July — December. 8vo. London. pp. 17–172. Title-page and Index. *From the Zoölogical Society.*

Bulletin de la Société Géologique de France. 2ième série. Tome VII. Feuilles 14–22, (4 February – 1 November, 1850.) *From the Société Géologique.*

Éloge Historique de Benj. Delessert, par M. Flourens. 8vo. Pamph. Paris, 1850. *From Francis Delessert.*

Structure and History of the Articular Cartilages. By Joseph Leidy. 8vo. Pamph. 1849. *From the Author.*

American Journal of Science and Arts. 2nd Series. No. 29. For September, 1851. *From the Editors.*

Received from the Courtis Fund.

Annals and Magazine of Natural History. Nos. 30 and 31. Vol. VI. 2nd Series. For June and July, 1851.

History of British Mollusca and their Shells. By Prof. Edward Forbes and S. Hanley. Nos. 27, 28, 29, 30, 31. 8vo. London, 1850.

Thesaurus Conchyliorum. By G. B. Sowerby. Part XI. 8vo. London, 1850.

Annals and Magazine of Natural History. No. 32. For August, 1851. Vol. VI. 2nd Series.

Annals and Magazine of Natural History. No. 33. Vol. VI. 2nd Series. September, 1851.

Deposited by the Republican Institution.

Reports of the British Association for the Advancement of Science. Vols. for 1836 – 40. 1843 – 49. 8vo. London.

Lardner's Cabinet Cyclopædia. 133 vols. 12mo. London, 1835 – 45.

Cyclopædia of Anatomy and Physiology. Edited by R. B. Todd. Nos. 39 and 40. 8vo. London, 1850.

London Encyclopædia. 22 vols. 8vo. London, 1844 – 5.

Writings of General Washington, with a Life of the Author. 12 vols. 8vo. New York, 1847 – 8.

October 1, 1851.

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

The announcement having been made, that the President of the Society had returned, since the last meeting, from a visit to Europe, the following Resolution was unanimously adopted, and the Secretary was ordered to communicate it to the President.

Resolved, That the members of the Society have learned with much pleasure of the safe return of the President, Dr. John C. Warren, from a long and rapid tour in Europe, which could not have been undertaken without much solicitude. They congratulate him on the event, and trust that it may essentially conduce to the prolongation and enjoyment of a life so zealously devoted to science.

Dr. Burnett made some statements with regard to the male sexual organs of Spiders.

He observed that the complicated structure of the palpi of some spiders, (especially *Tegenaria* and *Agelena*,) together with the fact, that they were sometimes seen applied to the vulva of the female, has led many Entomologists to think that the penis was situated here.

After a careful examination of the matter microscopically, he had come to the following conclusions, namely, —

1st. That the testes are situated at the upper portion of the abdomen, in a position analogous to that of the ovaria in females, and that they open externally, beneath, near the thorax.

2nd. That the horny process in the palpi of *Agelena nævia*, has a canal throughout its entire length, and a capsule at the base, which is filled with peculiar corpuscles, and in which, (the capsule,) Spermatozoa have not been detected.

3d. That there are tubes in the abdomen filled with corpuscles looking exactly like those found in the capsule of the palpus; but that they are not testes is evident from the fact, that they contain only these corpuscles; no Spermatozoa ever being found in them as far as observation yet goes.

4th. That there is no direct communication between the testes or any abdominal organ and the palpi.

5th. That the fact, that these peculiar organs are found only in the male, and in the foregoing relations, leads to the inference that they are excitatory rather than true intromittent parts.

Dr. Burnett proposed to continue his investigations throughout the family of Spiders.

Prof. Wyman said, that he had been making some experiments with a view to ascertain the cause of the sudden bursting and scattering of the seeds of the capsule of the common Garden Balsam.

The seed capsule of this plant is found, under the microscope, to consist of two layers of cells, the inner of which is arranged with the long diameter of the cells parallel to the axis of the capsule. Dutrochet thought that by a sudden act of endosmose, the fluid contents of the inner layer were transferred to the outer, which becoming distended, the capsule exploded, scattering the seeds about. Prof. Wyman found, that after the outer layer of the cells had been shaved off the explosive power of the capsule still remained. There would seem, therefore, to be some other cause for the phenomenon in question, probably a contractile power in the cells themselves ; a power no more improbable in itself than that which produces ciliary motion. Many capsules, when suspended for some time in the vapor of chloroform, lost their explosive power ; others burst almost immediately under its influence.

Prof. Wyman also gave the results of his microscopic examination of the structure of the brain and spinal chord in Frogs.

The transparency of the upper portion of the cerebral lobes in these animals made it quite easy to examine their structure by transmitted light. It had been recently maintained, by European anatomists, that the essential elements of the structure of cerebral matter are cells containing granules, and nerve tubes with which the cells communicate by caudate appendices. In the frog's cerebral lobes all the cells were destitute of an appendix, nor a single nerve tube except near the base. He had observed a few lines resembling nerve tubes, which he considered capillaries. The optic lobes contain both cells and nerve tubes, but no connection between them was noticed.

In the end of the tail of the Tadpole the minute structure of the spinal chord was quite apparent. In the middle of the chord cells and transverse and longitudinal fibres were quite numerous. Towards the end, however, the transverse fibres gradually disappear, leaving only cells and lateral nerve fibres, the latter also diminishing in number, and at last leaving only cells.

Dr. Burnett stated, that he had carefully examined the human brain to discover, if possible, the structure described by Wagner, alluded to by Prof. Wyman, but without success.

Prof. Wyman remarked, that Kölliker and others have made out the structure described by Wagner in some of the Annelids.

Mr. Wells read a paper on the origin of Stratification, in which it was shown, that earthy matter soaked and washed with water for a considerable time, and then filtered, separated itself into strata on settling, according to the fineness of the materials.

The general idea respecting the origin, or cause of stratification, as expressed in geological text-books, or as inferred from the writings of geologists, seems to be this, — that strata, or the so-called divisions of sedimentary matter, have been produced either by an interruption of deposition, or by a change in the quality of the material deposited. This idea is well illustrated by the desposition of matter by tides, or inundations, its subsequent consolidation, and a renewed deposition on the plane of the former deposit. That such is really the cause of stratification, in many cases, I do not dispute, but that there are other causes which tend to produce, and have produced stratification equally extensive and varied, is, I think, clearly shown by the following observations.

My attention was first drawn to the subject during the past summer, while engaged in the analysis of soils. By the process adopted, the soil was worked upon a filter for a considerable number of days, in some cases for a period as long as two weeks, and dried at a temperature of 250° F. The residue of the soil left upon the filter, consisting chiefly of silica and alumina, was found after drying, in every instance, to be more or less stratified, and this too by divisional planes in some cases not at all coincident with any division of the materials, although this is apt to take place. The strata so produced were in some instances exceedingly perfect and beautiful, not altogether horizontal, but slightly curved, and in some degree conforming to the shape of the funnel. The production of laminæ was also noticed, especially by the clearage of the strata produced into delicate thin, parallel plates, when moistened with water. These arrangements, it is evident, were not caused by any interruption and renewal of the matter deposited, or by any change in the quality of the particles deposited, but from two other causes entirely distinct, and which I conceive to be these : first, from a tendency in earthy matter, subjected to the filtering, soaking, and washing of water, for a considerable period, to arrange tiself according to its degree of fineness, and thus form strata; and secondly, from a tendency in earthy matter consolidated both by water and subsequent exsiccation, to divide, independently of the fineness, or quality of its component particles, into strata and laminæ. The tendency of the earthy matter is generally to divide along the lines formed by the arrangement of the particles according to their nature, or quality; this is not, however, always the case, as was proved by the observations noted, and which is also conclusively shown by the examination of almost all stratified rocks.

In the valley of the Connecticut, where the sandstones remain unaltered to any great degree, by heat, or dislocation, the stratification produced by the several causes may be clearly seen, and studied. On the western edge of this deposit, we have rocks composed of strata, which would at once be referred to the action of tides, or inundations, by the most inexperienced observer. The strata here may form the fraction of an inch to an inch in thickness; they are also covered with mud-cracks, and the various markings which are usually found upon a shore or beach. In other portions of the valley, we have strata divisions occasioned by the lines which separate materials differing either in quality or nature, as the shales from the sandstones, the coarse conglomerates from the fine sandstones, or the highly bituminous shales from those less bituminous. And then, upon the extreme eastern edge of this sandstone deposit we find strata, the leaves of which measure from one to two, and in some instances, three feet in thickness, each embracing in itself matter ranging from a coarse conglomerate to the finest sand, and yet none of these within the limits of the particular strata-leaf in which they are included, exhibit the slightest tendency to break or divide in any one direction more than another.

The observations here stated I am happy to find have been also noticed to some extent by others conversant with the subject of stratification. Saw-dust, subjected to the filtering action of water, has been observed by Prof. Agassiz to assume a regularly stratified appearance. The same has also been noticed by Dr. Hayes, of Boston, in the vats in which clay, used for the manufacture of alum, is washed. I have also noticed regular stratification in the dried deposits of a puddle in the streets, when no apparent change in the character of the materials deposited could be noticed, and where there was certainly no interruption of deposition.

If the divisions of stratification, which I have thus pointed out, be admitted, it is not improbable that in many cases of what are now considered disturbed and tilted strata, it may be their normal condition.

Mr. Girard read a letter from Miss M. H. Morris, of Germantown, on the subject of the Seventeen Years' Locust. It contained many interesting facts connected with the development and history of these insects. From her study of them in 1817 and 1834, she had been led to the following conclusions, which had been confirmed in her mind by their appearance during the present year, namely :

"That the larvæ feed on the roots of certain species of trees and shrubs on whose branches the parent has instinctively deposited them. That they are not apt to migrate. That when groves or forests are cut away and the land cultivated for a series of years, the larvæ perish for want of food, and hence distinct tribes have been found."

The following extract also bears upon the question of a distinct creation of tribes in different places.

"My note book gives the following dates of their appearance in various places. In 1845, they extended from Broad Mountain, in Pennsylvania, far to the northwest in that State. The northern portion of New York from Buffalo through the entire length of Genesee county, in 1849. In Pennsylvania, the west side of the Alleghany mountain, from the summit of Chestnut Ridge into Ohio, in 1849. Northeast Pennsylvania and North New Jersey, in 1850; South Pennsylvania, Maryland, and Virginia in 1851, and also in Georgia in 1851.

"In most of these instances only a year intervenes between the appearance of these tribes; and as I have shown a few individuals always appear before and after the main body, the evidence is clear, how, in the course of ages, distinct tribes have been formed, without supposing them to be a distinct creation."

"In the localities where the tribes overlap, the swarms will appear in the given period of their natural lives."

Dr. Burnett said, that from all that he had seen of the *Cicada septendecim*, seventeen years was the period required for its development, just as a certain number of months was the period of the higher animals, and several years that of some of the borers. In West Chester county, he had seen it on rail fences surrounding a lot of land destitute of trees. The trees had been cut down, the ground ploughed, and the rocks had been dug out four or five years before; yet on the seventeenth year the insect appeared. In another place, the side of a house, which had been built four or five years, was covered with the insects which had emerged near it. The trees about it had been thinned out. Dr. Burnett remarked, that there was some difference in size and color in specimens from different localities. In the different squares of Philadelphia are four or five different swarms which appear in different years. An old man in Pennsylvania had told him that he had seen the locust three times in his vicinity; at each time after an interval of seventeen years, and on or about the 21st of May.

Mr. Girard said, he thought that slight atmospheric causes might account for a difference of time in the appearance of the insect at different places without supposing them to have originated from different swarms. They might all have come from a common stock.

Dr. Theodore Cantor, of Calcutta, was elected a corresponding member.

The skin of a South American serpent and several birds were presented in the name of Dr. Cragin, of Surinam.

October 15, 1851.

Dr. A. A. Gould in the Chair.

The Secretary read a letter from the President in reply to the resolution passed at the preceding meeting, greeting him on his return from Europe. It contained gratifying assurances of the estimation in which the Society is held abroad, and of his own continued interest in its welfare.

Mr. William Stimpson read a monograph of the genus *Cæcum* in the United States.

This genus, belonging, as is shown by the animal, to the *Turritellidæ*, is remarkable for the form of the shell, which approaches that of *Dentalium*. This has occasioned the general misapprehension of its true position which has existed among authors, until the animal was first examined, three years ago, by Mr. Clark, of Exmouth, England. The genus has not been before noticed as occurring on our coast.

C. NITIDUM. Shell arcuated, thin, pellucid; surface white, shining, glabrous, with indistinct striæ of growth; aperture very oblique, in diameter about two thirds that of the shell at its broadest part, which is at the middle. The shell is contracted at its posterior extremity. Thus the inner outline is much shorter and less curved than the outer one. Long. .075; lat. .025 poll. *Hab.* Florida.

C. FLORIDANUM. Shell much arcuated, somewhat thick, white, shining; with about thirty-two sharp, elevated ribs, much narrower than their interspaces. Aperture slightly oblique, not contracted. In some specimens there is a broad rib just above the aperture. Long. .075; lat. .02. poll. *Hab.* Florida.

C. PULCHELLUM. Shell, in its adult state, clavate, arcuated, contracted at both extremities, and having a somewhat angular appearance at its outer or dorsal outline, which is much longer than the inner. It is somewhat thick and strong, of a pale yellowish-brown color, and sculptured with about twenty-five strong rounded ribs, broader anteriorly, but narrower posteriorly, than their interspaces, not projecting sharply beyond the outline of the shell, but giving it a waved appearance. Long. 1; lat. .025 poll. *Hab.* Buzzard's Bay.

Mr. Stimpson also read descriptions of several new species of shells from the northern coast of New England.

Leda obesa. T. parva, tenuis, ovalis, inæquilateralis, posticè longior, epidermide nitido, tenuistriato; apicibus parvis; margine ventrali arcuato: areola parum conspicua; dentibus anticis decem, posticis duodecim, parvis. Long. .22: lat. .12 poll.

Teredo dilatata. Valves white, polished; length and height equal; anterior area with fine, concentric, somewhat divergent striæ, varying in number in different specimens, and more crowded below; the slightly oblique lines on the succeeding narrow area are very minute but sharp; the next, fang shaped area, is ornamented with distant, narrow, elevated, subimbricated, concentric lines, more conspicuous on the anterior than on the posterior half of the area; the remaining portion of the body and the auricle are smooth and glossy. The auricle is not separated from the body by any sharp angle on the posterior ventral outline, but by a gently waved sinus. A depressed line runs from the beak around to the tips of the auricle, which does not tower above the callosities of the hinge. The sub-umbonal blade is thin, tapering, and extends to about half the distance from the beak to the ventral edge. The pallets are of an angular ovate form, truncated posteriorly, where also, on the external surface there is a small depressed area. The style of insertion is sharp and extends in the form of a ridge for some distance on both sides after its juncture with the pallet. The tubes are very thin, strongly concamerated posteriorly in an imbricated manner. This species differs from *T. megatara*, Hanley, which it greatly resembles, in the smaller altitude of the valves, the greater breadth of the auricle, which is also placed much lower, and in its concamerated tubes. Length of valves nearly one half of an inch. For many living specimens of this species, I am indebted to Mr. S. Tufts of Lynn, (Mass.) who obtained them from a pine buoy used to indicate the position of the lobster pots of the fishermen. Thus there can be no doubt of their being indigenous. They commit yearly great ravages upon the shipping of Lynn and Marblehead.

Dentalium striolatum. This species I obtained in great numbers by dredging in from ten to sixty fathoms on muddy bottoms at the mouth of the Bay of Fundy. It is that referred to as *D. entale* by Dr. Mighels. Having had opportunities of comparing numerous specimens of the European species with ours, I am convinced they are distinct. It differs from *D. Tarentinum* in being larger, tapering more gradually to a point, in being more rugose with the lines of growth, and in being almost always destitute of longitudinal striæ.

The length of one specimen is an inch and one half; the diameter at the aperture .175. Imperfect specimens indicate a length of two inches.

Chemnitzia dealbata. T. ovato-conica, alba, glabra, pellucida, tenuis; anfr. 6 convexiusculis: apertura ovata, vix effusa, plica parva, inconspicua munita. Long. .17; lat. .065 poll. *Hab.* Boston Harbor.

Chemnitzia nivea. T. aciculata, subcylindrica, alba, nitida; anfr. 11, planatis, longitudinaliter plicatis, plicis rectis, interstitiis lævissimis. Long. .28; lat. .04 poll. *Hab.* In forty fathoms, off Grand Manan.

Columbella dissimilis. T. parva, ovato-conica, solida, longitudinaliter substriata, fusca, sæpe albo trizonata; anfr. 5 planatis, apertura dimidiam spiram subæquante. Long. .23; lat. .1 poll. *Hab.* In from four to forty fathoms, at the mouth of the Bay of Fundy.

Mr. Stimpson also read descriptions of several new species of shells from the Southern coast; by Lieut. J. D. Kurtz and himself.

Rissoa pupoidea. T. ovata, fusca, pellucida; anfr. 5 convexis, linea transversa, angusta, subnigra, subincrassata, posticè ad suturam cinctis: apertura ovata. Long. .072; lat. .047 poll. *Hab.* South Carolina; on decaying wood at the edge of the sea.

CHEMNITZIA SPIRATA. T. ovato-conica, umbilicata, alba, nitida; striis transversis minutissimis; anfr. 6 planatis, anticè angulatis: sutura profunda; apertura parva, ovata; columella edentula. Long. .1; lat. .035 poll. *Hab.* North Carolina.

EULIMA CONOIDEA. T. lanceolato-conica, alba, nitidissima; anfr. 13 planis, ultimo subangulato: apertura rhomboidea. Long. .35; lat. .1 poll. *Hab.* North and South Carolina; dredged on muddy bottoms, in shallow water.

EULIMA OLEACEA. T. parva, subulata, solida, nitidissima, alba, vel fasciis transversis pallidè fuscis, ornata; anfr. 12 planatis contiguis; sutura inconspicua; apertura parva, ovata. Long. .25; lat. .06 poll. Dredged in Buzzard's Bay, in eight fathoms, on a muddy bottom.

MANGELIA RUBELLA. T. ovato-fusiformis, longitudinaliter costata, costis elevatis, acutis, spiraliter concinnè striata; spira anfr. 7 angulatis, ultimo $\frac{3}{4}$ longitudinis æquante; apertura angusta, $\frac{1}{2}$ long. testæ adequans; labro incrassato, vix sinuato; costis cerinis, interstitiis lividis, suturâ eburneâ, ultimo anfractu admodum fasciato. Long. .4; lat. .15 poll. *Hab.* Coast of Carolina.

PLEUROTOMA CERINUM. T. fusiformi-turrita, cerea, vel cinerea, plicis longitudinalibus, circa 10, elevatis, striis transversis numerosis; anfr. 7 planiusculi; apertura oblonga, dimidiam spiram sub-æquante; labro simplici; cauda brevissima. Long. .3; lat. 09. *Hab.* Buzzard's Bay, and the Coast of South Carolina.

Dr. Burnett read some notes on the Fauna of the Pine Barrens of upper South Carolina.

The resident Mammalia observed were,—*Procyon lotor*, *Mephitis chinga*, *Mustela erminea*, *Putorius vison*, *Lynx rufus*, *Vespertilio Carolinensis*, *Nycticeus Noveboracensis*, *Sorex Carolinensis*, *Condylura cristata*, *Scalops aquaticus*, *Sciurus Carolinensis*, *Pteromys volucella*, *Mus decumanus*, *M. musculus*, *Neotoma Floridana*, *Lepus sylvaticus*, *Didelphis Virginiana.*

On these I would remark that the Squirrels are quite rare, a pine region affording them little means of subsistence. The Wharf Rat is found only along the line of the railway. The Florida rats exist in the back country in great numbers, being granivorous and destructive. As for the Rabbit it is quite common, — the light soil affording it great facilities for life; it is quite harmful to gardens. The Opossum, also, is common, and the male and female live in separate burrows, two or three rods apart.

The birds may be divided into two classes, — those residing, and those wintering in this region. The residents were as follows: — *Cathartes aura*, *C. atratus*, *Buteo borealis*, *B. lineatus*, *Falco sparverius*, *Bubo Virginianus*, *Strix asio*, *Antrostomus Carolinensis*, *A. vociferus*, *Chordeiles Virginianus*, *Progne purpurea* (in summer,) *Cotyle riparia*, (in summer,) *Ceryle alcyon*, *Sitta Carolinensis*, *S. Canadensis*, *S. pusilla*, *Mniotilta varia*, *Thryothorus Ludovicianus*, *T. palustris*, *Sialia Wilsonii*, *Mimus polyglottus*, *M. rufus*, *M. felivox*, *Parus Carolinensis*, *P. atricapillus*, *Sylvicola coronata*, *S. striata*, *Tyrannula acadica*, *T. phœbe*, *Tyrannus crinitus*, *Milvulus tyrannus*, *Lanius Ludovicianus*, *Cyanocorax cristatus*, *Corvus Americanus*, *Sturnella Ludoviciana*, *Agelaius phœniceus*, *Molothrus pecoris*, *Cardinalis Virginianus*, *Pipilo erythrophthalmus*, *Pyranga æstiva*, *Dendrocopus principalis*, *Dryotomus pileatus*, *Picus villosus*, *P. pubescens*, *Melanerpes erythrocephalus*, *Centrurus Carolinus*, *Colaptes auratus*, *Erythrophrys erythrophthalmus*, *E. Americanus*, *Ectopistes Carolinensis*, *Meleagris gallopavo*, *Ortyx Virginianus*, *Bonasa umbellus*.

The winter residents were as follows: — *Surnia nyctea*, *Certhia familiaris*, *Turdus migratorius*, (for a short time,) *Sylvicola æstiva*, *Vireo Noveboracensis*, *Vireosylvia olivacea*, *Struthus hyemalis*, *Zonotrichia melodia*, *Spizella socialis*, *Ægialites vociferus*, *Squatarola helvetica*, *Actitis macularius*, *Gallinago Wilsonii*, *Anas obscura*, *Cyanopterus discors*, and *Querquedula Carolinensis*.

Of the Reptiles inhabiting this region, the terrestrial ones have been already spoken of at a former meeting; and those living in the creeks need not be mentioned, for they are the same as those of the lower country. This last remark holds true of the Fishes also.

The insects of this pine barren region are quite peculiar. One cannot but be struck with the great numbers of wood-eating, boring beetles. These, certainly, are the most numerous of all, the carnivorous and anthophagous insects being comparatively few. The *Buprestidœ*, of which I recognized no less than ten species, are the pine boring insects, and small as they are, they form a most formidable enemy to the luxuriance of the pine. The insidious yet certain work of destruction the myriads of these insects carry on, can only be appreciated when we consider that tracts of pines miles in length, and the most stalwart trees, that never have even noticed winds or currents, gradually bend before them. On some of the fallen trees, I counted the holes of the insects' exit, to the number of one hundred or more, within the space of a square foot. By several of them boring for a year or two, the tree is so weakened that the next strong wind breaks it off, sometimes five, and sometimes fifty feet from the ground; or the tree may die in a standing position.

There is another insect which from its great numbers deserves mention, namely, the Ant-lion, (*Myrmeleon*,) which from the fineness of the sand in many places entraps its prey with ease.

Such is a cursory representation of the Fauna of this district, giving the following numbers: — Mammalia, 17; Birds, 43: Reptiles, (mentioned in an account given by Mr. H. R. Storer,) 40.

Of both Birds and Reptiles, many more may be found to reside here for a little while, but in giving this list, I believe I include nearly all which make this their permanent habitat.

A few words should be said on the conformability of individuals of the Fauna to each other and to the Flora of the locality, beside alluding to such habits of some of them as I have noticed.

The Turkey Buzzard is constantly seen flying about seeking dead animal matter. I suppose the question as to whether it discovers its food by sight or smell, has for some time been settled in favor of sight. I had many opportunities to try their skill, of which I took advantage. If a dead dog were dragged into the woods and carefully covered up with pine boughs, it might remain there any length of time untouched; but if fully exposed, it would remain but a few hours. And to show how acute their sight is, I need only say that a snake, hung upon a twig, will be removed in less than twenty-four hours.

The Blue Bird has three broods in a season, beginning to nest as early as February. It need spend no time in seeking out a place for nesting, for the holes in dead pine trees, left by the past year's woodpeckers, offer it a convenient retreat. The dead pine trees therefore contribute to this bird's increase.

The Robin stops here a little while in March on its way North, and as this is the time when the grounds are burned over, they collect morning and evening on these patches, to pick up the half roasted insects, and getting quite fat, are shot for food by hundreds.

The great number of Woodpeckers here seen must be noticed by every one. Not only does every species known in the United States here reside, but numerous specimens of each, and especially the Red-headed and Golden-winged, which meet the view on every side. Their great numbers are in exact accordance with many conditions to which we have alluded, for they seem always to follow on the track of the wood-boring insects.

Dr. Cabot remarked that from his own observations he had been led to believe that the Vultures are guided by the sense of smell as well as by that of sight in the discovery of their prey. During his stay in Yucatan, he observed that the body of a Turkey Buzzard thrown into a dense thicket was discovered by its surviving companions; giving reason to believe that they had been guided to it by the former sense rather than the latter. The cannibal habits of the species were also verified in the instance in question.

Mr. Ayers exhibited to the Society a Starfish, which he believed to be the type of a new genus, allied to *Pentagonaster*, Gray, although distinct from it, which he proposed to call

STEPHANASTER Ayres.

Body depressed, nearly flat, formed of smooth, rounded, prominent, spineless plates or ossicula, each surrounded with a ring of granules. Margin formed by a double row of larger, smooth, oblong plates, similarly bordered; the terminal one of each series enlarged and convex, thus forming a distinct protuberance at the end of each arm. Plates of lower surface like those of upper, but more crowded and less prominent; those near the border with an even, central groove. Ambulacra margined with 2-4 series of smooth, close, equal spines. Madreporiform tubercle single, lateral.

The specimen from which the description is taken was brought from Patangaroa, New Zealand. It displays much beauty of form and structure, and probably also during life, of color, and I would, therefore, propose the name of

S. ELEGANS.

Dorsal plates arranged somewhat symmetrically, the largest in the centre, and in lines radiating to the arms. Sides of body concave, but not deeply so, of unequal length, one bearing but three marginal plates while the others have four. The prominent knobs formed by the four swollen, marginal plates at the extremity of each arm, constitute a striking feature of the species. The sort of crown shown by each plate, with its border of granules, readily suggests the generic name.

Specimen not quite four inches in breadth.

Mr. Ayres stated that in taking a cast in type metal of the specimen described, he had observed a singular phenomenon. The fused metal having become partially cooled, so as not to run well in the mould, he threw it into cold water; when the whole mass immediately divided into fusiform bodies, most of them about $\frac{3}{4}$ of an inch long, and about two lines thick in the middle. Some of them were a little obtuse, and ragged at one end, and a few were pear-shaped; but most of them presented the form of two regular cones with quite sharp apices, united by the apposition of their bases. The specimens were exhibited to the Society.

Prof. Wyman stated that in studying the nervous system of the tadpoles of the common Bull-frog, he had noticed an interesting peculiarity in the distribution of the vagus nerve. Van Deen first described in Batrachian Reptiles the existence of a *nervus lateralis*, similar to that found under the lateral line in fishes; in addition to this, Prof. Wyman had found another branch of the vagus, extending along the back, and distributed to the fold of integument, forming the caudal fin, and analogous to the *dorsal* branch in fishes described by Weber.

Branches from the vagus were likewise traced to the branchial arches, three in number, analogous to the branchial nerves of fishes. The *dorsal*, *lateral*, and two of the branchial branches disappear at the period of metamorphosis.

Dr. Burnett presented a carefully-executed drawing of the palpus of the Spider, described at the preceding meeting. His observations since that meeting had fully confirmed the statements he then made as to its function.

Dr. Burnett also presented a Worm, the Larva of one of the Tortricidæ, which had been taken from the middle of a cake of Opium, which had constituted its food.

Mr. Stimpson alluded to the importance of having in the cabinet a collection of the animals of the shells of New England, which was now entirely wanting. He presented the following forty species, and hoped the members would aid in making the collection complete by obtaining, as opportunity occurred, the animals of any species not in the list: *Terebratula septentrionalis, Pecten concentricus, Nucula tenuis, Leda sapotilla, L. limatula, L. tenui-sulcata, Mytilus decussatus, M. discrepans, Cardita borealis, Astarte sulcata, Cyprina Islandica, Cardium pinnulatum, Mactra ponderosa, M. solidissima, Solen ensis, Solemya velum, Thracia Conradi, Lyonsia hyalina, Saxicava rugosa, Chiton ruber, C. albus, C. marmoreus, Acmæa testudinalis, Dentalium* ———, *Margarita obscura, M. undulata, Turritella erosa, Scalaria Grönlandica, Admete viridula, Fusus Islandicus, F. pygmæus, F. decemcostatus, Mangelia harpularia, Buccinum undatum, Natica heros, N. triseriata, N. immaculata, N. clausa, N. Grönlandica, Bulla triticea.*

Mr. Stimpson also presented in the name of J. G. Anthony, Esq. of Cincinnati, a fine series of the following species from Tennessee: *Io spinosa, I. fluviatilis, I. tenebrosa, Anculosa genicula; Melania robulina.*

Dr. Cabot announced the donation of a case of mounted birds from Dr. William R. Lawrence, two specimens of Richardson's Jager, obtained at Chatham from Mr. Horatio R. Storer; a Black Guillemot, from Dr. T. M. Brewer; a Red-tailed Hawk from himself. He also exhibited three mounted specimens of birds recently presented by Dr. Cragin.

Mr. Storer presented, in the name of Mr. C. C. Hayes, of S. Berwick, Maine, a jar of Reptiles containing the following species: *Coluber eximius, C. vernalis, C. occipitomaculatus, Tropidonotus sirtalis, Salamandra symmetrica.* He also presented a living specimen of *Coluber punctatus*, obtained at Hingham, Mass., in the name of Dr. T. M. Brewer.

The thanks of the Society were voted to Mr. Hayes for his donation.

Dr. Josiah C. Nott, of Mobile, was elected a Corresponding Member.

November 5, 1851.

The President in the Chair.

The President remarked that this was the first opportunity he had had, since his return from Europe, to be present at a meeting of the Society, and he gladly availed himself of it to acknowledge his sense of their kindness expressed in the vote which he had received from the hands of the Secretary. A few days since he had met a friend, a member of the Society, who expressed some surprise that he had not been present at its meetings since his return. For his part his own surprise was great at hearing the remark. He had supposed the Society understood that nothing but imperative necessity would keep him away from their meetings. He considered his duties to them to be paramount to all others. Ill health must be his excuse for absence. He congratulated the Society on its present prosperous condition. It stood deservedly high at home and in Europe also, so far as it was known. During his recent tour he had been principally interested in scientific objects, and had visited many collections, chiefly with a view to satisfy himself on certain geological questions.

The President then proceeded to give brief notices of the Zoölogical Collections, and the Royal Institution in Liverpool, the British Museum, the Collection of the Royal College of Surgeons, the Institution of Economical Geology, the Collection of the East India Company, the private Collection of Dr. Mantell, the Jardin des Plantes, the Eppelsheim Fossils at Darmstadt, and the beautiful Collection made by Professor Phillips. He spoke of specimens which had interested him in these Collections, particularly the bones of the Mylodon, at York, now under the care of Mr. Charlesworth, the restored skeleton of the Dinornis, and a dissection of the Nautilus Pompilius, belonging to the Royal College of Surgeons.

On his first visit to the Garden of Plants or National Museum at Paris, he found the scientific M. Laurillard in the midst of a collection of fossils just received from the Sub-Pyrenees Mountains. Among these were very noble specimens of *Mastodon longirostris* or *arvernensis.* The first aspect of these interesting pieces led him to believe that the opinion he formerly entertained of the identity of *M. longirostris* and *M. angustidens* was not well founded, and he was inclined to consider them as varieties or different species of the narrow-toothed group.

Dr. Storer read from his Report on the Fishes of Massachusetts, portions of his account of *Charcarias obscurus.* At the time it was written he had not seen a specimen, and it was only within the last week that one had been sent to him from Provincetown, by Capt. Atwood. He had placed it in the hands of Prof. Wyman for dissection.

Prof. Wyman proceeded to state some of the points in the anatomy of this Shark as follows:

The length of the specimen was six feet. In its general features the *intestinal canal* conformed to the type of Plagiostome fishes; its whole length was fifty-nine inches, namely, *œsophagus*, six inches in length; *stomach*, thirty-one inches, the pyloric portion measuring fifteen inches, and the intestine twenty-two inches. The large cavity of the stomach was of a cylindrical form, three or four inches in diameter, terminating in a blunt cone, and near its extremity the pyloric portion communicated by a small aperture, and was continued in the form of a tube about one inch in diameter, the muscular coat being quite thick. The intestine in place of the spiral valve, which exists in most of the Plagiostome fishes, was provided with a broad fold of mucous membrane, attached by its edge lengthwise of the intestine and rolled upon itself like a roll of paper; a similar arrangement, according to Prof. Owen, exists in the allied genera Zygœna, Scoliodon, Galeocerdo, and Thalassorhinus. The breadth of this valve in its widest part was fourteen inches, and it serves to increase very materially the absorbing surface without adding to the length of the intestinal canal.

The bile duct was two feet, and the gall bladder about seven inches in length.

There is a peculiarity in the olfactory lobes not mentioned by Cuvier, Prof. Owen, Wagner, or Stannius. The olfactory commissure divides into two branches, each nearly an inch in length, and at the extremity of each is an olfactory lobe about one half of an inch in diameter; thus there are four distinct olfactory lobes instead of two, which is the usual number in vertebrates. In some of the rays, and in the Fox shark an approach to this subdivision of the lobes exists.

The internal ear is remarkable for the great size of its semicircular canals and vestibule; the former are more than one and a half inch in length, and the latter would contain the whole internal ear of the human body.

The spleen consisted of an immense number of lobules, or small spleens, the largest of which did not exceed one quarter of an inch in diameter.

In the stomach were found the remains of a Dog fish, which had been swallowed whole, and of two or three other fishes not recognized.

Dr. Burnett read a paper on "The organic relations of some of the Infusoria, including investigations concerning the structure and nature of the genus *Bodo*. (Ehr.) The following are extracts.

"In regard to the question, — What characteristic in organic animal matter shall constitute an individual, I feel satisfied of this much, — that cell-processes, however closely interwoven they may be with the expressions of individual life, cannot be considered as constituting the groundwork of its definition.

"The tailed Monads of the genus *Bodo* are the most interesting, from the fact of their having a long, filamentous tail, which is their locomotive organ. On this account, and because from their form being more definite, they are more distinctly visible than any other particles of this family, I have devoted considerable time to them. Those which are found in the intestines of the common House fly, or in those of the Frog, answer very well for studies of this kind.

"Those in the Fly when first seen resemble in shape a kernel of rye. They are about $\frac{1}{2000}$ of an inch in length and $\frac{1}{6000}$ in breadth. Attached to the body is a delicate, hair-like tail, four or five times its length. In contact with water the body becomes larger by endosmosis, assuming a perfectly spherical shape, so that, when magnified with my highest power, it is nearly an inch in diameter; permitting the most thorough and satisfactory study of its structure. This presents no peculiarities but those belonging to cells. It is a closed cell-sac, with a filiform caudate process, and endowed with the actions of cell-membranes, namely, endosmosis and exosmosis. In the interior of this sac are found sometimes a few granules, and sometimes a nucleus.

In those of the Frog, which are larger, I have seen distinctly in some a nucleus with a nucleolus, in others two nuclei, and in others still, four nuclei of equal size; showing that here the multiplication of cells occurs as elsewhere, by segmentation of the nucleus.

"Besides these characteristics, which are sufficient, the fact that I have sometimes met with them in the interior of epithelial cells would be strongly presumptive of their cell origin from minute granules that pass through the cell wall. The representatives of the genus Bodo, therefore, appear to be simple cells, each with a filiform appendage for locomotion, which locomotion cannot be of an adaptive character.

"Specimens differ according as they are taken from different localities; but since they are cells, capable of considerable variation in shape from dilatation and contraction, such differences should not be made the basis of specific distinctions, particularly as they have no individuality of their own.

"In answer to a question, how a Bodo is distinguishable from a Spermatozoon, Dr. Burnett replied, that the former is a cell, the latter the result of a cell, and so far as is known, a solid body. They had been, however, sometimes mistaken for Spermatozoa."

Mr. Stimpson presented a paper on the Classification of Acephala, in which he proposed to reverse the usual order of Classification.

A bottle, containing reptiles from Surinam, was presented in the name of Dr. Cragin, of Surinam.

Mr. Stodder presented, in the name of Mrs. Stodder, twelve speci mens of Butterflies, collected in Dorchester.

Mr. T. J. Whittemore presented four species of Cyclas, namely, *C. elegans*, *C. truncata*, *C. similis*, and an undescribed species, from the stream running through Cambridge Meadows.

Mr. Whittemore remarked, that *C. elegans* is a beautiful species, which Dekay had described as "*rhomboidea*." He had received it from Dr. Budd, of New York, who obtained it in

Rockland county, N. Y. He had seen the shells of this latter name in the possession of Dr. Budd, and they were the *elegans* of Adams. Dekay also identifies this shell with *rhomboidea*, Adams, described in the American Journal of Sciences.

Cyclas elegans, *C. truncata*, and the new species are found in company and often with C. *dubia*. *C. similis* is seldom found in company with the others.

Mr. H. R. Storer presented a number of birdsnests, mostly obtained in the vicinity of Boston.

November 19, 1851.

The President in the Chair.

Dr. Kneeland made a communication on the question, "Does the human lumbar vertebra develop a rib ?"

In answer to the above question, Wilson* and Maclise † say that it does. Wilson calls the "transverse processes" of other anatomists, *lumbar ribs*, and maintains that the tubercle (so-called) is the *true* transverse process, arising, as in the cervical vertebræ, from the superior articulating processes, which he, without giving his reasons, assumes to be the normal origin of transverse processes. Another reason for this opinion is, that these two elements converge, and, if prolonged, would enclose a foramen as in the vertebral foramen of the neck ; or they would rest in contact as in the dorsal region, or become consolidated as in the sacrum. And, again, the tubercles if prolonged, would come in contact with a small process occasionally seen at the base of the tubercle of the vertebra above, and form a posterior intervertebral foramen, as in the sacrum.

Allowing this convergence and the consummation of these "ifs," it does not seem to me that these are valid reasons. The so-called tubercles, which appear to be in a continuous line with

* Anatomists' Vade-Mecum : by Erasmus Wilson.

† Cyclopædia of Anatomy and Physiology, art. Skeleton.

the transverse processes of the dorsal vertebræ, will be found, even in man, to exist in the lower dorsals together with a transverse process and a rib ; and in many animals (the Beaver is a good example) they are found the whole length of the dorsal region coexisting with ribs and transverse processes, so that the tubercle of the lumbar vertebra cannot be properly called a transverse process, nor the transverse process a lumbar rib ; and the *lumbar* transverse process may still be considered, as Owen maintains, the homologue of the *dorsal* transverse process.

Moreover, there is just as good reason for making a " tubercle " to the *inferior* as to the *superior* articulating process of the lumbar vertebra ; and in many cases the inferior tubercle is the larger ; the tubercle is not characteristic of a *lumbar* vertebra, as it is found in many mammals the whole length of the *dorsal* region ; if it merits any special name it may perhaps be included under the general term " *diapophysis*." But it rather seems that this " tubercle " is of secondary importance, non-essential as a characteristic of any kind of vertebra ; as an inconstant process, like the posterior spines of lower Mammals, for muscular insertions ; in man, for the insertion of the posterior aponeurosis of the transversalis abdominis.

Another reason for admitting that the *lumbar* transverse process is the homologue of the *dorsal* and not a *rib*, will be found on examining the sacrum. Immediately external to and parallel with the median crest is a row of five small tubercles, in a serial line with the so-called lumbar tubercles ; that these are not transverse processes, but points for mere muscular and ligamentous insertions, seems to me evident by following them in the sacrum and tail of the Beaver, where they are seen to be only largely developed *articular* processes, surrounded by the rough points always found where strong muscular insertions are required, as, in this case, to move the powerful tail. In the Beaver, especially in the tail, the articular processes, with their tubercles, cease long before the transverse ; which last are very much developed, and extend quite to the end of the tail, where the vertebra is reduced to a mere *centrum ;* it would be hard to believe that these last are *caudal ribs*, which they must be, if the tubercles are called transverse processes.

In the human sacrum, also, the lowest pair of these tubercles bound on each side the sacral canal, and form the articulation with the coccyx ; this would show that they are not transverse processes, as these do not form articulations between contiguous *neural arches*, and do not give origin to articulating processes. Owen says, " it is peculiar to fishes to have articular processes developed from the parapophyses," (transverse processes.)

Tubercles on the transverse processes are well seen in the dorsal region of Birds, where they are prolonged upwards and downwards, often touching each other and forming foramina ; yet in this class, as in Mammals, *they coexist with ribs* and transverse processes. In the Eagle the tubercles are large, and nearly coalesce ; in the Puffin and Parrot, they are slender processes which enclose complete foramina.

Supposing, with Wilson, that the convergent tubercles and transverse processes were prolonged, they would not enclose a foramen homologous with the cervical vertebral canal. The formation of this canal is excellently well shown, in the Alligator, to be due almost entirely to the forked origin of each rib of the neck, the transverse process having comparatively little to do with it ; the canal is mainly formed by the forks of the ribs, and not by the union of a transverse process with a single costal process, which would be the case, allowing Wilson's homologies. In the neck one of these forks is attached to the vertebral body, and the other abuts against the transverse process ; in the dorsal region both forks are united to the transverse process ; in Man, the outer or posterior fork being represented by the " tubercle " of the rib, resting against the transverse process.

It will also be seen that the cervical ribs in the Alligator are prolonged by both an upward and a downward process, which touch each other ; thus forming what may be called *anterior* and *posterior cervical* foramina ; these are analogous to, and perhaps *homologous* with, the anterior and posterior *sacral* foramina ; the former are certainly formed by ribs, and, according to Owen, the latter also. So that the argument of Wilson, that the lumbar " tubercles," if prolonged, would form posterior intervertebral foramina is of no weight as proving that they are true transverse processes, since as we have a similar formation produced by ribs ;— if it proves any thing, it proves too much, as it shows equally well that they are transverse processes or ribs.

Taking, then, the trifurcate transverse process of the human lumbar vertebra, and supposing each division to be prolonged, we should have in the anterior the true transverse process, which would articulate with a rib, if this were present, while the second and third would form posterior intervertebral foramina, though not homologous with these foramina in the neck, and perhaps not even with those of the sacrum ; in which last they open outside of the articulating processes, making the wings of the sacrum transverse processes against which abut the iliac bones (or ribs.) But Owen considers the ilium as only the *distal* end of the *pelvic rib*, the *proximal* portion being included in the wings of the sacrum ; in this case, the *sacral* canal would be homologous with the *cervical* vertebral canal, being formed by the forks of the sacral ribs abutting against rudimentary posterior transverse processes, as in the neck ; and from these forks the ascending and descending processes, as in the neck of the Alligator, would unite above and below, thus making the anterior and posterior vertebral foramina, as well as the vertebral canals, homologous in the *neck* and in the *sacrum.*

The human skeleton is the worst that can be selected to prove any point of philosophical anatomy. This is well exemplified in the above instance ; for it would be impossible to arrive at Wilson's conclusions from the examination of almost any other vertebrate skeleton. That the lumbar vertebræ do not develop ribs, and that their transverse processes are in a serial line with the dorsal, could not be better shown than by the skeleton of the Alligator, in which they are simple and uncomplicated by tubercles of any kind.

The President exhibited a cast of a Mastodon's tooth, an allusion to which he had happened to meet with some years since.

It had been dug up from the banks of a stream about twelve miles distant from Baltimore, under the direction of Dr. Ducatel, State Surveyor. After having possessed it a considerable time, Dr. D. showed it to Mr. Charlesworth, who judged it to have belonged to *Mastodon longirostris*. Sir Charles Lyell having seen it, was disposed to believe it to be a tooth of *M. angustidens*, and in this opinion concurred Drs. Hayes and Harlan, of Philadelphia. The President said that, being in Baltimore, he sought for this tooth and ascertained it had disappeared some time before, in a manner wholly unknown. Some time after, being in the Museum of the Academy of Natural Sciences, Philadelphia, looking over a fine collection of Mastodon teeth, in company with Dr. Hayes, this gentleman discovered a tooth which had all the characters of the lost Baltimore specimen. Dr. Wilson, who had given it to the Academy, on being inquired of, said that it was purchased by his brother in London, as a supposed American fossil. On examination, it appeared to have none of the characters of the tooth of the American *Mastodon giganteus*, but evidently belonged to the narrow-toothed group, either angustidens, longirostris, or Humboldtius. Furthermore, whatever was its species, it was a Miocene fossil, and of course was derived from a deposit that had never presented any relic of *M. giganteus*, in this country. Being an insulated fossil, since none belonging to the same species or group had ever been seen among thousands of Mastodon specimens met with in North America, it was of course an object of great interest, and he had been led to investigate its history with all possible exactness. All the evidence he could obtain concurred in supporting the opinion that it was the tooth actually possessed by Dr. Ducatel, and which was brought to light in the manner he had described. On a recent visit to Europe, the President said, he had taken with him a cast of the tooth, colored, under the direction of Dr. Wilson, exactly as when discovered, and exhibited it to Sir Charles Lyell and Mr. Charlesworth, who were fortunately in London. Both of these gentlemen distinctly recognized it as the tooth they had formerly seen in America. On exhibiting it to Professor Owen, he thought the fact of its being an insulated fossil ought not to be considered an objection to its being a native of America, since every newly discovered species would be liable to the same difficulty. He considered it as decidedly belonging to the narrow-toothed group, and thought it probable that other portions of a skeleton might hereafter be found in the Southern parts of the United States. The President said he had taken every opportunity to call the attention of Palæontologists in this country and in Europe to this specimen, in the hope of obtaining such facts and opinions as would dissipate the doubt which existed in regard to it, and either restore it to the Old World, or establish it not as a native individual of the New.

The President exhibited two cards from the British Society of Natural History, containing proposals to supply subscribers with a certain number of objects of British Natural History at a fixed rate. He announced that he should subscribe on behalf of the Society for two or three years, and the Society would accordingly receive two hundred British tertiary fossils a year, for that period.

At the close of the President's remarks, Dr. Storer rose and said, that it was not usual for the Society to pass votes of thanks to its members for donations, but he felt that some acknowledgment was due to the President for the repeated instances of his liberality by which he had laid the Society under such lasting obligations. Although no formal vote might be passed, he begged to assure the President, and in doing so he felt that he was expressing the unanimous sentiment of the Society, that his constant and generous interest in its prosperity was most truly appreciated, and would always be most gratefully remembered.

Mr. Desor read a communication on the subject of Fossil Rain Drops, in reference to a paper of Sir Charles Lyell on that subject, and especially in defence of his own and Mr. Whitney's opinions on the subject, based on their observations at Lake Superior. While he was ready to admit the possibility of the occurrence of rain marks in some formations, he still contended, that the bursting of bubbles on the lake or sea shore would account for such impressions as occur in the Sandstones of that region.

Dr. Jackson said, that when engaged in the Lake Superior survey he had sought carefully for impressions of rain drops for the purpose of establishing the identity of the age of the Sandstones of that region with that of the Connecticut River Sandstone, but in vain. He had not seen the impressions mentioned by Mr. Desor; but on looking at his drawings it had occurred to him that they might have been produced by the pebbles of a conglomerate rock, which had been deposited above the Sandstone but had been subsequently removed, as may be seen in Roxbury. Last June he had had the opportunity, at the mouth of Peticodiac River, of studying all the effects of the sea on its shores. He saw marks of rain drops in the soft ooze, and frequently on highly inclined surfaces, precisely like those described by Prof. Hitchcock as existing in the Connecticut River Sandstone. On flat surfaces the drops caused an impression with a raised edge, which was never seen in the indentations made by bubbles bursting through the mud. If on an inclined surface, the impression was deepest on the lowest side and near to the edge in proportion to the inclination. The breaking of bubbles produced a shallow cavity, as described by Mr. Desor, but without a raised edge. Another appearance noticed by Dr. Jackson in the same locality, when the shores were left by the tide, was a number of small ridges of singular character. These he found covered cracks produced by shrinking of the mud on exposure to the sun and air. The return of the tide covered over the surface with a thin film of sediment, which was forced up a ridge by the confined air, under the pressure of succeeding waves upon the mud on each side. Occasionally the air burst through, producing a series of little explosions. In general, his observations went to confirm the views of Prof. Hitchcock.

Dr. Gould said that he had seen similar lines on Chelsea Beach, which he had found to be due, however, to a very different cause. At the end of each ridge, just beneath the surface, was a small crustacean, (a species of Idotea,) which had produced it, making its way along from one end to the other under the sand.

Dr. Jackson said that such a groove was much more superficial than the cracks of the Peticodiac mud, which were as deep, in many instances, as the length of a spade.

Mr. Ayres confirmed Dr. Gould's observations. He had also seen on Chelsea Beach lines, which were undoubtedly ripple marks.

Mr. Desor, in reply to Dr. Jackson's suggestion, that the superincumbent pressure of a conglomerate rock might have caused the appearances which he believed to be bubble marks, said that he felt confident specimens in the possession of Mr. Teschemacher would convince him that such could not have been their origin.

Mr. Ayres remarked, that his researches among the Echinodermata of our coast had shown the existence of a singular law of distribution.

Of the Holothuridæ very few species are identical with European forms or even closely allied to them. Among the Ophiuridæ a greater resemblance prevails; a larger proportion of the species inhabiting both shores of the Atlantic, and those which are confined to our coast more nearly representing the types of Europe; while among the true Star Fishes all the species yet discovered are either identical with those of Northern Europe or intimately allied to them.

Mr. Ayres also gave an account of the structure of the Ophiuridæ, and presented a description and drawings of a new species belonging to the genus *Ophiolepis*.

O. tenuis Ayres. This is a small and delicate species, the disc in the largest specimens being not more than a fifth of an inch in diameter; the breadth of the disc is contained nearly four times in the length of the rays. The lateral ray-plates bear each two to four slender spines not equalling the breadth of the ray. The superior and inferior ray-plates are broadly-ovate, somewhat angular laterally.

The superior surface of the disc is covered with small, smooth plates, the origin of each ray being marked by a pair of larger, oval plates, having their narrow extremity outward, and touching each other through their whole length.

The plates forming the angles of the mouth have but a small number of teeth or divisions, generally from five to seven. The inter-brachial plates are similar in form to the inferior ray-plates, but smaller.

This species inhabits Boston Harbor, being frequently found creeping over the stones, shells, &c. brought up in the dredge from the depth of three to six fathoms. It is of a dark grayish brown, with the border of the disc marked by five lighter spots, which are the pairs of plates at the origin of the rays. It is not difficult to preserve, and I may remark that none of our species appear to possess, in any great degree, the tendency to separation which characterizes those of Europe.

Ophiolepis robusta Ayres. This species is quite readily distinguished from any other American species yet known, by its proportions, the length of the rays scarcely exceeding the breadth of the disc. The spines of the rays are few and shorter than half the breadth of the ray to which they are attached. The lateral plates, which bear them, are greatly developed, meeting beneath the ray in such a manner as to separate the inferior plates widely from each other. From the general arrangement of the plates, each ray has the appearance of being loosely imbricated.

The superior surface of the disc is covered with small, smooth plates. The two plates which, in many species, mark the origin of the arms, are here with difficulty distinguished. A close examination shows a slight difference between them and the adjacent plates of the disc, but this species and the one to be next described give evidence that an importance has been, by some writers, attached to this character to which it is not entitled. Along that part of the disc bordering the base of each ray is a series of small spines or granules similar to the lateral ray-spines, but smaller.

The plates forming the angles of the mouth bear from seven to ten teeth. The inter-brachial plates are nearly circular.

This species I have not seen living. It inhabits Massachusetts Bay, and all my specimens I have taken from the stomachs of Cod and Haddock caught at the depth of sixteen to twenty fathoms. In the largest the disc is about four tenths of an inch in diameter.

Ophioderma olivaceum Ayres. The long, slender, lizard-tail rays of this species, its bright olive-green hue, and the activity with which it creeps over the sandy bottom, render it one of the most interesting objects in the localities which it inhabits. Unlike others of the tribe, it appears to shun deep water and is found abundantly near low-water mark, living in many places which are regularly left as pools by the receding of the tide. It prefers regions covered with eel-grass (*Zostera*) but confines itself entirely to sandy bottoms. I have studied its habits chiefly at Sag Harbor, Long Island, where it is abundant. It is found near to *Sclerodactyla briareus* Le S. but not in company with it, that choosing the mud and this the sand for a residence. And so marked is the preference that in certain localities the two animals live in great numbers within three yards of each other and yet neither ever encroaches upon the other's territory. It manifests very little disposition to dismember itself on being handled.

The disc, which is generally quite flattened, attains sometimes a diameter of seven tenths of an inch. It is covered with small spines or granules closely set over its whole surface, so that no plates are visible. When these granules, however, are removed, the disc is seen to be formed of minute plates, as in the previous species, (*O. robusta.*) Of the pair of plates, so often found at the base of each ray, no trace can here be discerned, even under a magnifier.

The length of the rays exceeds four times the diameter of the disc. The superior ray-plates are transversely elongated; the inferior are small, rounded; the lateral bear six to eight short, blunt spines, which, notwithstanding their number, are so inconspicuous as to detract very little from the smoothness of the ray.

The granules of the disc cover also the inferior inter-brachial spaces, in each of which the two pairs of genital openings are well marked. The inter-brachial plates are very regularly ovate. The plates forming the angles of the mouth bear fifteen to eighteen teeth.

Mr. Ayres also presented a cast of the new species of Star-fish exhibited by him at the previous meeting, in Gutta Percha. This was the first application, he said, so far as he knew, of this substance to such a purpose, and it made a much better cast than gypsum, bringing out many points which that would not exhibit at all, and being of great strength and durability. He presented the casts in the name of Mrs. Westfall, of Sag Harbor, to whom the Society was indebted for the use of the original specimen.

Mr. Stodder said, that he had taken casts of leaves in Gutta Percha, in which all the markings were shown with great distinctness.

Mr. Bouvé presented, in the name of Mr. Henry Rice, of Attleboro', numerous specimens of fossils from the Coal formation of Mansfield, Mass., some of which were very interesting.

Mr. Desor remarked, that the donation was a very valuable one, and that the specimens seemed, so far as their geological association was concerned, similar to those of the middle Pennsylvania series, or the lower layers of the Red Ash coal. He pointed out specimens of fruits, which are of exceedingly rare occurrence. He quoted the opinions of Prof. Brogniart, Dr. Lesquereux, and M. Corda, that the Stigmaria and Sigillaria were dicotyledonous trees.

Mr. H. R. Storer exhibited a *Lepidosyren* from South America.

The President presented, in the name of Robert G. Shaw, Esq., a Rhinoceros horn.

Dr. Storer presented a fresh specimen of *Mugil lineatus*, sent to him from Provincetown by Capt. Atwood, where it was cast on shore. It was the first specimen of this fish known to have been procured in Massachusetts Bay.

An articulated human skull, and a model of the human brain, were presented in the name of Dr. W. R. Lawrence; also a Seal, from Mr. G. H. Jackson, of Plymouth.

Dr. Cabot exhibited several specimens of birds recently received from California.

The thanks of the Society were voted to Mrs. Westfall, Messrs. R. G. Shaw, G. H. Jackson, and Henry Rice for their donations.

Messrs. Temple Prime and Eugene Batchelder were elected members of the Society.

July 2, 1851.*

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

Dr. Kneeland presented, in behalf of Mr. Charles Girard, a communication entitled, —

Descriptions of a new *Planaria* and a new *Nemertes* from the coast of Florida.

Thysanozoon nigrum Girard. General form elongated and oblong; length of the single specimen examined, an inch and a half; breadth nearly three fourths of an inch. Color uniformly black above and dusky white beneath. Upper surface of the body entirely and regularly covered with cutaneous appendages from one to two lines long, cylindrical, and of the same black color as the body itself. Cephalic tentacles proportionally short, black, and would scarcely appear different from the dorsal appendages, were they not flattened from their very base.

Meckelia atra Girard. Length of specimen about six inches. Body more or less depressed, apparently much less, however, than in *M. fragilis*, from New England. Anterior extremity more prominent than in the latter species and of a lighter hue, thus contrasting with the color of the rest of the body, which is of a uniform black throughout. Antero-superior opening pear-shaped, the narrower extremity turned forwards, whereas it is more or less circular or oval in our *M. fragilis*.

Both of the above species were collected last spring at Cape Florida, by my friend L. F. Pourtales. The specimens are preserved at the Smithsonian Institution.

Mr. H. R. Storer read some memoranda of facts observed by him, extending the geographical range of certain North American reptiles, as follows, namely: —

1. *Coluber vernalis* Dekay. Has been seen in Maine. Found by me on the Island of Grand Manan, Bay of Fundy.

* The publication of the Proceedings of the two meetings in July and the second meeting in August in their proper place was accidentally omitted; they are therefore inserted here.

2. *Tropidonotus distalis* Holb. Found throughout the United States, and by Agassiz near Lake Superior. Taken by Prof. Wyman and myself in Nova Scotia.

3. *Rana fontinalis* Le Conte. Thus far Maine has been its Northern limit. Found by us in Nova Scotia.

4. *R. halecina* Kah. Has been taken in Massachusetts,—by us in Nova Scotia.

5. *R. sylvatica* Le Conte. Taken in Massachusetts,—by us in Nova Scotia.

6. *Hylodes Pickeringii* Holb. In Massachusetts, and by Thompson in Vermont. Found by me among the White Mountains in New Hampshire, and in Maine, near Saco.

7. *Bufo Americanus* Le Conte. By Holbrook, in the interior of Maine, and by Agassiz at Lake Superior. I have taken it at Eastport, Me., and in Nova Scotia.

8. *Notophthalmus miniatus* Raf. (*Sal. symmetrica* Harlan.) Found in Vermont and Massachusetts, and by my father in Maine. By me at the White Mountains.

9. *Plethodon erythronotus* Baird. At Lake Superior, by Agassiz, and in Massachusetts. By Dr. Wyman and myself in Nova Scotia. By myself at White Mountains.

Dr. C. T. Jackson read descriptions of five new species of fossil fish, of the genus Palæoniscus, and notices of several specimens of fossil plants, from the shales of the coal formation at Hillsboro', N. B., and exhibited the specimens. He also showed specimens of bituminous coal from the same locality, with a highly polished surface, resembling sticks of black sealingwax.

Palæoniscus Alberti. This fish is the first one that was discovered by me at the Albert mine.

Description.—Fish, four diameters of its body long; head, obtuse or blunt, as if obliquely compressed on upper and front part; whole length, $3\frac{3}{10}$ inches; width, in middle of body, $\frac{85}{100}$ inch; *fins*, one dorsal, opposite anal, small triangular, $\frac{3}{10}$ of an inch at base, jointed, drooping, as if the fish was dead before it was inclosed in the mud, (now shale.) *Anal*, small, triangular, a little larger than dorsal; *Pectoral*, small, compressed into mass of scales of body of the fish; *Tail*, bifurcated, unequal, very long and tapering in upper division, which extends to a fine point. The *scales* run down on upper division of tail, and become gradually smaller to tip; *caudal rays* come exclusively from under side of upper, and from lower division of tail. Scales of body brilliant, rhomboidal, wavy, serrated on posterior margins, color light brown. This fish is embalmed and not petrified. No ridge of bone is seen to indicate the vertebral column, hence the bones must have been cartilaginous and compressible. The gill plates are too confusedly compressed to be dissected. I cannot find in any published book any figure of a fossil fish identical with this. It is evidently a Palæoniscus, and is probably a young individual, as seems to be indicated by its small size, and the delicacy of its scales. I shall name it, provisionally, *Palæoniscus Alberti*, in commemoration of its being the first fossil fish discovered in Albert County, in New Brunswick.

P. Brownii. This beautiful fish was found by Mr. Brown, the captain of the mine, subsequent to my first visit to Hillsboro'. It is one of the largest, or full-grown species. It was unfortunately broken in the operation of extracting it, but it still is a very valuable specimen. This being the first fossil fish found by the chief miner, I have named it *Palæoniscus Brownii.*

Description. — Fish nearly whole. It is one of the largest species yet found, and its length is three times the greatest width of its body; whole length, $5\frac{3}{10}$ inches; breadth, $1\frac{7}{10}$ inches; head broken off just in front of pectoral fin; extremity of tail broken; abdominal fin missing, it having been broken in getting out the specimen. Dorsal fin, a little behind middle of body, opposite to, or rather a little in front of anal.

P. Cairnsii. This is a perfect fish of the genus Palæoniscus which was found on the third of June last. In its general form and appearance it resembles the *Palæoniscus elegans* of Prof. Sedgewick, (*Lond. Geol. Trans.* 2d series, Vol. iii. Fig. 1,) and Agassiz, (*Recherches sur les Poissons Fossiles*, Vol. ii. Tab. 10, Fig. 5,) but it differs from that species in the striation of the scales, the striæ of the Hillsboro' species being parallel to the anterior and lower margins of the scales, and the shape of the scales differing essentially from Mr. Sedgewick's species.

Description. — Fish, long and slender, $4\frac{1}{2}$ diameters of its body long; length of head, a little less than the largest diameter of the body; the head has the shape of an equilateral spherical triangle; tip of nose, or snout, curiously tuberculated and dotted; gill plates cannot be dissected, they are so brittle and confused with the head; *fins*, pectoral a little behind gill plates, and extend below the fish $\frac{3}{10}$ of an inch, — it is a narrow-pointed fin, well marked with its rays. *Dorsal fin* far back towards the tail, a little anterior to anal; it is half an inch long and $\frac{2}{10}$ of an inch high, and is well marked with its rays. *Anal fin* somewhat larger than dorsal, a little posterior to it. *Abdominal fin* very small, situated a very little in advance of the middle of the body; tail unequally bifurcated or heterocercal; *scales* run down on it, becoming smaller and more and more acutely rhomboidal or lozenge-shaped as they recede; caudal rays come exclusively from under side of upper division of tail. *Scales* obtusely rhomboidal on anterior and middle of body, and are distinctly striated parallel to anterior and lower margins, while they are smooth and very brilliant towards and upon the tail; dorsal scales large and in form of obtuse spherical triangles pointing backwards towards the dorsal fin. This species is not described in any book I have examined, and believing it to be new, I shall take the liberty of naming it *Palæoniscus Cairnsii*, after the highly intelligent superintendent of the Albert coal mine, William Cairns, to whose active and unremitting labors I am indebted for so many specimens of these interesting fossils.

No. 4. This large and elegant fish was most unfortunately broken in splitting it out from the rock, only the posterior part of it having been saved in a fit condition for delineation. The whole length of the fish was originally fifteen inches. That portion which remains entire is $5\frac{1}{2}$ inches long; it was broken off through the posterior edge of the dorsal fin. It was an old fish, as is evident from the appearance of the scales, which are thick, heavy, and have their striations in part obliterated, while the serrations are extremely sharp and deep. The scales are elongated rhomboids, and have many striæ upon their surface which run parallel with their upper and lower margins. Caudal scales, acute lozenges. They run down on upper division, which is long and covered with them. Rays of tail come off very distinctly, exclusively from under side of the upper division, and the tail is unequal or heterocercal. Until we obtain an entire specimen, perhaps it will be prudent to abstain from giving a specific name. It is a species of the genus *Palæoniscus.*

No. 5. This species so nearly resembles the *Palæoniscus decorus* of Sir Philip M. de Egerton, as on first view to pass for it; but on examining the lines of striæ, we are forced to regard it as another species. The four great dorsal scales, anterior to the dorsal fin, exactly resemble in form those represented in Sir Philip M. de Egerton's plate. (See *Quarterly Journal Geological Society of London, for* 1849.) The scales of one specimen are striated, parallel with the superior and inferior margins, and are deeply and acutely serrated on their posterior edges. The lines of striation are worn away considerably, indicating, perhaps, that it was an old fish. It was, when entire, about eight inches long, and it is two inches in diameter from the anterior edges of the dorsal and anal fins. This specimen appears to be of the same species, or very near the species, last described.

No. 6 is a beautiful and perfect fish, found at the new pit of the Albert coal mine, by Mr. Wallace, Deputy Collector of Hillsboro', who kindly presented it to me. It is compressed vertically, or from the back towards the abdomen, and the head is also vertically compressed between the strata. The large dorsal scales, so characteristic, are seen along the middle of the fish.

Description. — Fish is $4\frac{1}{2}$ diameters of its body long; body $3\frac{1}{2}$ inches long; head in form of equilateral spherical triangle; gills open; back of head beautifully marked by tuberculations, or striæ and dots; dorsal scales oval-shaped and striated, the most pointed part of the scale being towards the tail, — they run along the entire back to the tail, excepting at the place where the dorsal fin is compressed; scales of body serrated on posterior margins, and striated parallel with their upper and lower edges, and wavy in middle. I am disposed to regard this individual as belonging to the same species as the one before described.

No. 7. This specimen was discovered by me in the shale of the new shaft of the Albert mines. It is peculiarly interesting on account of the entire preservation of its abdominal fin, and also on account of its association with a coprolite which seems to have belonged to this individual.

Description. — Fish, entire; length, $3\frac{7}{10}$ inches; width of the body, $\frac{7}{10}$ of an inch ; length of the head equal to the greates width of the body ; fish, four diameters of its body in length ; fins, one dorsal, opposite anal, situated in the posterior third of body,—anal fin little larger than dorsal; abdominal fin small, situated a little in advance of the middle of the body of fish ; pectoral fin a little larger than abdominal ; scales, large and brilliant, having a light-brown color striated parallel to anterior margins transversely, and longitudinally in middle, but finer than on anterior margins ; tail, more regular than the before-described species, but still unequal ; has scales in upper division. This specimen also presents another curious feature ; its tail having been amputated by a shift of the strata, and the fracture being polished and re-cemented a little out of place. Head more acute than any of the before described species, and very perfectly preserved, having the fine markings of the gill covers and the striæ and markings distinct, and also, what appears to be the impression of the tongue of the fish. The orbitar ring is also preserved, and is a horn-like circle, or ring, filled with bituminous shale or clay. A coprolite under the abdomen of the fish, is a cylindrical mass, rounded at each end, $\frac{7}{10}$ of an inch long, and $\frac{3}{10}$ of an inch in diameter. It is of an ash-gray color, and includes what appears to be small black scales of fishes.

FOSSIL PLANTS OF THE ALBERT COAL MINE.

My attention was so much occupied by the fossil fishes of this interesting mine, that I had omitted to look for the usual coal plants, when I was suddenly called by one of my companions to look at an impression which he had found in splitting a piece of the shale. The instant I saw it I recognized it as a perfect stem of a *Lepidodendron*, a well-known plant of the coal formation. The rock with the fossil plant was delivered to me, and I have both the stem and the imprint in the rock which contains it. This fossil rendered any further search into the geological age of the fish-bearing rocks of the mine unnecessary ; but wishing to obtain more specimens, numerous slabs were broken open, and large expanded leaves, resembling a species of palm, or a plant quite common in the coal formation of our country, were found, having all the delicate markings, cross veins or bands, and other characters of palm leaves, as has since been shown by Mr. Teschemacher.

Three specimens of this plant were also found in a specimen of the shale, which I obtained on my first visit to the mine. I found a perfect *Lepidostrobus*, a fruit of the *Lepidodendron*, according to Brongniart. A number of stems of plants were also found, and some of them, from their forms and delicate curves, appeared to have been succulent hollow stems, or aquatic plants of some kind. These have proved to be species of *Sphærædra.* (*Lindley & Hutton*, Vol. iii. Pl. 159.)

Nos. 1 and 2 are specimens of the *Lepidodendron* found in shale of the Albert coal mine. No. 1 is the stem of the plant, with its carbonized bark, having all the cortical scales which are so characteristic of the genus. On comparing this plant with the *Lepidodendron gracile,* in *Brongniart's Histoire des Vegetaux Fossiles*, Vol. ii. Plate 15, I feel no doubt of its close analogy with that species, which is a well known plant of the coal formation.

Nos. 3 and 3 bis. are specimens of the *Lepidostrobus* found by me in the shale of the Albert coal mine. No. 3 is the fruit in relief, and 3 bis. is the counter-print in the rock split from it. It is difficult to identify the species by comparison with Brongniart's drawings; but no one who compares it with the species of *Lepidostrobus*, in his plates, (Tome ii. Plates 22, 23, and 24,) will have any doubt of its belonging to that genus. It is probably the fruit of the *Lepidodendron gracile*, above-mentioned.

Nos. 4 and 5 are specimens of *Sphærædra* of the Albert mine.

No. 6 is our palm-like leaf. It is too wide to be the leaf of a *Lepidodendron.* Further researches may decide this question. I have *Lepidodendra,* with their beautiful foliage, from the shales of the coal mines on the Grand Lake, upon the St. John River, very closely resembling the plant figured in *Brongniart's Vegetaux Fossiles*, (Tome II. Pl. 17, Fig. 1.;) but none of the leaves have a width of more than half an inch, while these are more than two inches wide.

Mr. Ayres presented a new description of *Chirodota arenata* Gould.

This species is one of the most abundant in our vicinity. It appears to inhabit the shallow waters near Chelsea Beach in great numbers. After the memorable storm of April last, multitudes were found on the Beach, many of them living. They are commonly two to four inches in length, with their worm-like body much attenuated posteriorly. They vary from a bright red to a pale flesh color.

The surface has the appearance of being encrusted with grains of sand, thus, undoubtedly, suggesting the specific name adopted by Dr. Gould. This, under the microscope, is seen to consist of innumerable calcareous plates. The plates are nearly circular, pierced with nine to twelve holes arranged around a central opening which is itself sometimes quadrifid. The calcareous deposit is thus quite similar to that of *Stereoderma*, but less abundant.

Neither suckers or any other external organs of motion are discernible.

Tentacula twelve, short, slender, undivided in the greater part of their length, digitate near the extremity, not retractable, as in many species.

The oral circle has its parts so united as to constitute apparently one unbroken calcareous ring. This ring is simply crenulated anteriorly. Posteriorly it is marked by five broad, bifid projections, similar to those which present in the opposite direction in other genera. To these the very slender retractor muscles are attached.

The intestine, upon opening the body, seems without flexures. It is fastened to the lateral walls not by the usual mesenteric bridles, but by many muscular threads, like those commonly surrounding the cloaca. When these are separated the intestine is seen to be folded twice, but in a peculiar manner. The folds extend no further back than to the point where the caudiform part of the body commences. This point corresponds then to the cloacal region in other genera, as it is here we have the origin of the respiratory organs, and from this to the anus the intestinal and respiratory tube lines closely the cavity of the body. Entire length of intestine about twice that of the animal; without muscular stomach.

Respiratory trees three, with short branches, reaching nearly to the anterior extremity of the body.

The longitudinal muscles present the appearance of five pairs, each muscle being divided in its whole length.

Genital tubes slender, undivided. The pyriform sac is not largely developed.

The species in the tentacula, and the form of the body, resembles *Synapta*, near which the genus has been ranked, but in its mode of respiration differs widely, as well as in its oral circle and digestive apparatus. The posterior elongation of the body is a striking feature, since it is shown to represent simply the cloacal region, which is in other genera very short.

Having neither the hooks of *Synapta*, nor the suckers of other *Holothuridæ*, the species of this genus must move like many worms, only by successive contractions of the body.

Mr. Ayres stated that he had recently received from Dr. T. M. Brewer and H. R. Storer, Esq., a specimen of *Botryodactyla* from Grand Manan. The species is closely allied to *B. grandis*, but may be distinguished by the length and slenderness of the tentacula, and the smaller size of the oral circle and pouch. It may be called *B. affinis* Ayres; a full description is not given, for want of perfect specimens.

We have in this a very good illustration of the different depths inhabited by a single species. It has been brought by the fishermen from George's Bank in forty fathoms; it was taken in Massachusetts Bay in eighteen fathoms, and the specimen here noticed was in water so shallow as to allow of its capture with a hand net. It has been said that where the tide rises but a few feet, deep sea animals are often taken within the range of the tide, and apparent exceptions may thus occur. But to no locality can that argument apply with less force than to the Bay of Fundy.

The Committee chosen early in the evening to nominate Acting Curators, reported the name of Dr. T. M. Brewer as Acting Curator of Oölogy. Dr. Brewer was accordingly unanimously elected.

Mr. H. R. Storer presented specimens of *Bufo Americanus*, from Maine, *Hylodes Pickeringii*, *Salamandra symmetrica*, and *S. erythronota*, from the White Mountains, and a living specimen of *Emysaurus serpentina*, from Fresh Pond, Cambridge.

Dr. Gould presented, in behalf of the family of the late President of the Society, Dr. Amos Binney, his work on North American Helices, in two quarto volumes.

July 16, 1851.

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

Mr. H. R. Storer read from a letter from Dr. Burnett, some memoranda of observations made by him, during the past winter and spring at Aiken, Ga., on the Reptilia of that region, as follows:

Lygosoma lateralis is quite rare; I saw but a few specimens. I could ascertain nothing of its habits. It is found only in damp places. The breeding season there is the middle of March.

Tropidolepis undulatus is by far the most common of all the caudate Batrachians of South Carolina. It is even more common than the Common Toad, (*Bufo Americanus.*) Sunny days it is met with everywhere on rail fences, but seems to avoid wet or damp places. It appears to pass the winter beneath the bark of trees, and does not attain its adult condition until the second year at least. Its breeding season does not begin until April.

Anolius Carolinensis is much less common and more domestic in its habits, for it appears to delight in living about a house. Otherwise it is closely allied in habits to the latter, and breeds at the same season. It appears to reach its growth the first year. As far as I could ascertain, the bright green color seems to be due to a vascular turgescence, pressing the green dermis forcibly to the light. For when depressed by fear, a flabbiness of the integuments occurs, and the color recedes, giving place to the brownish aspect of the epidermis.

Ameiva sexlineata. Quite rare, and the most agile of this class of animals I have seen. They are found in pairs in dry places, about rotten trees. They do not breed until the last of April.

Elaps fulvius is rare.

Coluber guttatus is more common.

Psammophis flagelliformis equally so, although Holbrook speaks of having seen but one or two specimens, and says that it is quite rare in South Carolina. *Heterodon niger*, *platyrhinos* and *scimus* (?) are also common. All of these last breed in April. *Rana halecina* is rather common, and *Hylodes gryllus* is here what the *Pickeringii* is in New England. It exists in myriads, and breeds as early as January.

Plethodon glutinosus is rare, and like the Salamanders hibernates beneath wet logs, and goes into the water to breed in April.

Salamandra symmetrica is quite common. Its habits are like those of the last.

With regard to the geographical range of reptiles, Mr. Ayres remarked, that *Heterodon niger* has been generally considered a strictly southern species, not having been found north of South Carolina by any naturalist previous to himself. He had found a single specimen in East Hartford, Conn.

Dr. Storer said, that *Cistudo Blandingii* had not been observed by naturalists north of South Carolina until he saw a specimen in Bradford, Mass.

Mr. H. R. Storer alluded to the circumstance, that a specimen of *Salamandra symmetrica*, recently presented by Dr. Durkee was obtained in Canada, north of Lake Ontario. The great Lakes have usually seemed to constitute a natural boundary to the distribution of species.

Mr. Ayres stated some of the results of his investigations among the Holothuridæ of the coast of the United States, as presented at previous meetings of the Society.

Thirteen species have been described, included in eight genera. Of these, three genera and eight species are believed to be new. The following list gives, with the name of each species, the depths through which it has thus far been observed to range: *Synapta tenuis* Ayres — littoral to six fathoms; *Chirodota arenata* Gould — shoal water; *Sclerodactyla briareus* Le Sueur — littoral to four fathoms; *Thyonidium elongatum* Ayres — thirty fathoms to forty; *T. musculosum* Ayres — twenty fathoms; *T. glabrum* Ayres — thirty fathoms to forty; *Stereoderma unisemita* Stimpson — eighteen fathoms to forty; *Botryodactyla grandis* Ayres — seventeen fathoms to fifty; *B. affinis* Ayres — one fathom to fifty; *Cuvieria Fabricii* Duben and Koren — six fathoms to twenty; *Psolus lævigatus* Ayres — sixteen fathoms to twenty-five; *P. granulatus* Ayres — thirty fathoms; *P. phantapus* Lin. — sixteen fathoms to twenty.

A glance at this catalogue is sufficient to show that with a single exception, no European species is included in it. One type of the genus *Psolus* resembles so much the Linnean *Phantapus*, that until the point can be settled by direct comparison of specimens, it is not deemed advisable to impose a new specific name. Still, even here we shall probably find that they are only allied forms. Of the other species, but one can be said to exhibit much resemblance to European types. In this respect a marked contrast exists between the Holothuridæ and other divisions of the Radiata.

It will be noticed, also, that most of the species here designated inhabit deep water, and that of some the range is quite extensive. The depths, however, as given above, cannot at all be considered absolute; the numbers only represent the limits of our knowledge at the present time. Every additional opportunity for observation brings to light habits and localities previously unknown, and we have entire reason to believe that species hitherto obtained only in deep water will yet be found in other circumstances within the range of the tide. The species which still remain undescribed will also illustrate the same point.

Dr. Storer, in behalf of the Committee appointed to nominate Acting Curators, reported the name of W. O. Ayres as Acting Curator of the Crustacea and Radiata, and Dr. Silas Durkee as Acting Curator of Ichthyology in the place of Mr. Ayres. The report was accepted, and the gentlemen nominated were elected accordingly.

Mr. H. R. Storer presented a living specimen of *Salamandra fasciata* from the Blue Hills, Mass., — it being the second specimen only that had been seen by any naturalist in Massachusetts, — and a living *S. erythronota* from the same locality. Mr. Storer also presented, in behalf of Dr. W. I. Burnett, the following Reptiles from South Carolina, namely: *Elaps fulvius, Coluber guttatus, Psammophis flagelliformis, Heterodon niger, H. platyrhinos, H. scimus*(?), *Tropidolepis undulatus, Anolius Carolinensis, Ameiva sexlineata, Lygosoma lateralis, Rana halecina, Hylodes gryllus, Plethodon glutinosus, Notophthalmus viridescens.*

Mr. C. A. Spencer of Canastota, N. Y., was elected a Corresponding member.

August 20, 1851.

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

Prof. Wyman exhibited a preparation of the brain and spinal cord of the *Lophius Americanus* Cuvier, commonly known as the Goose-fish.

The spinal cord of this fish presents some interesting anatomical peculiarities, which have been quite differently described by different anatomists. In consequence of an early erroneous description having been generally copied without any attempt to verify it, it seems to have been very generally admitted that the spinal cord in these fishes is quite short, terminating in front of the middle of the spinal canal.

Wagner, in speaking of the spinal cord of fishes in general, says: " occasionally it is very short in those fishes, *Orthagoriscus, Lophius piscatorius*, that are provided with a short truncate vertebral column." (*Comp. Anat. Verteb. Animals*, p. 214.)

Arsaky, who may be regarded as an accurate anatomist, " has ascertained, (as stated by Longet,) that in the Baudroie, (*Lophius piscatorius*,) the spinal marrow contracts suddenly behind the third vertebra and disappears completely before the eighth; beyond this, only a cauda equina can be perceived, forming two bundles, each of which, composed of sixty-four filaments, contains the superior and inferior roots of thirty-two pairs of spinal nerves. (Longet, *Anat. et Phys. du Syst. Nerv. T. I.* p. 260.)

Prof. Owen, the most recent writer on the subject, says, "in *Lophius* a long cauda equina partly conceals a short myelon (spinal marrow) which terminates *in a point* at about the twelfth vertebra; in other fishes the myelon is very nearly or quite coextensive with the spinal canal, and there is no cauda equina or bundle of nerve roots in the canal." "In typical fishes it (the spinal cord) gradually tapers to a point in *Heterocercal* species, but swells again into a small terminal ganglion in most *Homocercal* species." "In some bony fishes (Trout, Blenny,) this caudal ganglion is not quite terminal, and is less marked than in the Cod and Bream, in which it is of a hard texture, but receives the last pair of spinal nerves. The absence of this ganglion in the Shark shows that it relates not to the *strength* of the tail, but to its *form*, as depending upon the concentration and coalescence of the terminal vertebræ." (Owen's *Lects. on Comp. Anat.* vol. ii. p. 122.)

With the description of neither of these writers does the present dissection agree. Wagner has fallen into a double error in describing the cord as being "*very short*," and the vertebral column as being *truncated*, neither of which statements are correct. Arsaky's error is the more remarkable, since he took the trouble to count the pairs of nerves, and it would seem scarcely possible that he should not have traced the cord to its termination, which he evidently failed to do. Prof. Owen has fallen into the same error with regard to length; and having particularly noticed the terminal ganglion in other fishes, that of the *Lophius* could not have escaped him, had he made a careful dissection. He expressly states that it terminates in a point.

The description of Cuvier is the only one which seems applicable to the specimen exhibited. "The spinal marrow in general," he says, "terminates near the end of the spine; it is so in *Lophius*, (Baudroie) as in the most of fishes." "These (the nerves) do not always escape from the vertebral canal opposite to the points from which they rise; in *Lophius*, for example, they escape much lower down; and the kind of sheath which they form for the marrow has caused the error of those anatomists who say, that this species is deficient in a spinal marrow." (*Cours d'Anat. Comp.* 3d edit. T. iii. p. 176.)

In the present dissection, the most striking peculiarity, on opening the spinal canal, was the existence of an immense number of bundles of nervous fibres, which so completely filled it that the spinal cord was wholly concealed; this was only exposed after the whole mass had been removed, and the bundles of nerves, united together by loose cellular tissue, carefully separated from each other; they formed, as Cuvier expresses it, a "sheath" around the spinal marrow. This last was traced as far as its termination, which was quite near to the tail, when it enlarged, as shown in the specimen, into a very distinct terminal ganglion. The cord below its anterior third is very much contracted in size, and presents a very remarkable contrast to the vastly greater bulk of nerve bundles by which it is surrounded. This disproportion does not seem to have attracted attention. It is not uncommon for a nerve to be increased as to its apparent size after leaving the spinal canal, in consequence of the addition of a thick sheath, so that the apparent bulk of a bundle of nerves, as of the trigeminus, is after its escape from the cranial cavity greater than before, and at the same time seems large in comparison with the vertebræ from which it is given off. In this case, however, the nerve bundles which are still in the spinal canal acquire great bulk and are out of the ordinary proportion to the cord itself. The opposite state of things exists in *Siren lacertina* among reptiles, where the bulk of nerve bundles in the canal is very much less than that of the cord, and the same is true of most fishes. Thus in the one case we have the sum of the nerves more voluminous than the cord which supplies them, while in the other extreme the volume of the cord is much larger than that of the nerves.

Dr. C. T. Jackson exhibited a daguerreotype of a fossil fish from Hillsboro', N. B. He suggested that the daguerreotype process would afford an excellent method of preserving a faithful likeness of such valuable specimens, whenever it might be necessary to send them to a distance, exposing them to the contingencies of travel.

December 3, 1851.

The President in the Chair.

Mr. Teschemacher exhibited a specimen of Anthracite coal, containing a flattened branch of Stigmaria, one foot in length, and three inches in diameter, with the usual markings of the cicatrices of foliage, two of which were very perfect.

He remarked that the knowledge hitherto promulgated of this fossil plant, so abundant in all the coal formations, had been chiefly obtained from specimens in the coal measures, but not from those in the coal itself; and that the opinions of its affinity to the families of plants of the present day varied much. The doubts respecting its nature he thought could only be dispelled by instituting close comparisons, and this he proposed to do between what was already known on the subject, the fossil specimens on the table, and our well-known native tree *Picea balsamifera*, of which he exhibited fresh specimens.

1. The cicatrix of the leaf, as shown in the perfect specimens on the coal, when examined with a good Coddington lens, agrees minutely with those of *Picea*, except in size, the fossil being one eighth, the recent, one sixteenth of an inch in diameter; the cicatrices of *Picea* are persistent even on old wood.

2. The form of the leaf of *Stigmaria*, as given in figures in the various publications, is linear, with an obtuse termination, a midrib, and thickness at the edges, produced by involution of margin; such, also, is the leaf of *Picea.*

3. In the fossil, the leaf is sessile, or without petiole, as in *Picea.*

4. In Göppert's work, Gatt: foss: Pfl: 1 and 2, tab. 10, fig. 10, is a figure of a forked branch of fossil Stigmaria, with the cicatrix of a leaf at the angle of the fork; this leaf may be seen in just that position in *Picea*, and existed in most of the branches Mr. Teschemacher had examined. This he considered a very striking resemblance.

5. The cicatrices of the leaves in the specimen on the Anthracite coal are seen to be placed on the stem in a spiral direction, from the right to the left hand, and the termination of each spiral, where one cicatrix is precisely over that beginning the spiral, is in the eighth turn round the stem. In *Picea*, as was seen in the specimens exhibited, the arrangement is also spiral, from right to left, and the spire terminates in the eighth turn. The number of leaves of the spiral also agrees in the fossil with the recent plant, although the cone of *Picea*, as the most normal exposition of this character, gives 21.

6. In the figures of Stigmaria, by Lindley and Hutton, copied by Göppert, the branches are represented as proceeding in one plane at right angles with the central stem, and at a short distance branching in forks; this is also the growth of the whorls of branches of *Picea*.

7. The woody structure of the *Coniferæ* is very characteristic; the central pith is cellular; there are few spiral vessels, but the chief mass is pleurenchyma or ligneous tissue with glandular markings. Specimens of charred pine wood compared with the charcoal on the Anthracite, showing a striking resemblance, particularly of the annual rings; had the lines on the fossil been made by vessels, as in leaves of Gramineæ, the impression of the vessels, or perhaps portions of the vessels, would appear as in numerous other specimens of leaves. These markings are what Göppert, in his Prize Essay, calls, the annual rings of Araucaria. Mr. Teschemacher observed that he could not measure the weight of evidence necessary to produce conviction in the minds of others, but he felt persuaded that the abundant Stigmaria was the fossil of a Coniferous tree nearly allied to *Picea*. In accordance with this view, he exhibited a specimen which appeared to him more to resemble the impression of a cone than of any Lepidodendron or Sagenaria hitherto figured; but as he had only found two specimens of this nature, he had not at all a decided

opinion on the subject, yet even in these the spiral direction was from right to left.

With respect to the existence of numerous fossil fungi in the Anthracite, he had already exhibited before the Society specimens of the rattan from Singapore (the Palm tribe) on the epidermis of which were fungi exactly resembling, both in appearance and mode of growth, those on the anthracite. With reference to these, he would remark, that when the globular masses from the coal (resembling *Sphæria*) were exposed to heat sufficient to burn off the carbon and other matters, much peroxide of iron remained. Sulphur is found oozing out in most of the specimens, and particularly on those containing fungi, and of all vegetable productions, fungi contain by far the largest proportion of nitrogen. Now, chemists are aware that if peroxide of iron, sulphur, and sal ammoniac, which contains nitrogen, are intimately mixed together, and heat sufficient to volatilize the nitrogen compound be applied, the result is bisulphide of iron in small brass colored cubes, precisely such as are seen in the specimens of fossil fungi exhibited. In the specimens of fossil fungi resembling the star-fish, a few of these cubes may be seen, but in others three or four times this size, the body is a mass of these yellow-colored metallic cubes.

Prof. Rogers said, that he agreed with Mr. Teschemacher as to the importance of an examination of numerous specimens of the fossils in question, particularly in their native beds. He had himself passed the last seven months in the coal region of Pennsylvania, and had seen many specimens of the *Sigillaria* in the coals. The *Stigmaria*, with their rootlets, were found in the under clay, except where the overlying strata were filled up with the broken fragments of both these fossils, together with Ferns, Lepidodendra, &c.

The President alluded to the circumstance, that the remains of the supposed food of the Mastodon giganteus had been examined by Prof. Carpenter, in London, and Prof. Gray, of Cambridge, and found to be composed of small branches of *Picea*.

Mr. Prime presented a number of new species of *Cycladidæ,* with descriptions.

1. GENUS CYCLAS.

Cyclas albula. C. testâ magnâ, forti, obliquâ, subglobosâ, tumidâ, complanatâ, subequilaterali, posticè acutâ, flavâ, striis concentricis instructâ, umbonibus magnis, non elevatis. Long. 0.50 ; lat. 0.41 ; diam. 0.33 inches. *Hab.* Lake Superior. (Agassiz.)

This shell resembles somewhat the *C. flava* Nobis, but is larger, less fragile and of a more greenish color. Found generally with beaks eroded. Cabinet of the Boston Society of Natural History.

Cyclas acuminata. C. testâ fragili, rhomboideâ, depressâ, inequilaterali, posticè abruptâ, albâ, nitidâ, striis concentricis instructâ, umbonibus parvis, depressis. Long. 0.52 ; lat 0.47 ; diam. 0.35 inches. *Hab.* Lake Superior. (Agassiz.)

This shell, somewhat similar to the *C. similis* Say, is less depressed, less elongated, and of a darker color. Cabinet of the Boston Society of Natural History.

Cyclas rosacea. C. testâ minutâ, tenui, fragili, tumidâ, ventricosâ, subequilaterali, posticè dilatatâ, striis concentricis tenuiter instructâ, nitidâ, rosaceâ, umbonibus parvis, perelevatis. Long. 0.28 ; lat. 0.23 ; diam. 0.16 inches. *Hab.* Pennsylvania.

This shell, found in the Schuylkill, seems to be closely allied to the *C. securis* Nobis, from Massachusetts, but the posterior is less abrupt ; the beaks are more tumid.

Cyclas detruncata. C. testâ ovatâ, complanatâ, truncatâ, elongatâ, inequilaterali, posticè abruptâ, anticè acutissimâ, umbonibus parvis non elevatis, epidermide olivaceo. Long. 0.48 ; lat. 0.36 ; diam. 0.24 inches. *Hab.* Pennsylvania.

This shell, likewise from the Schuylkill, is remarkable for the suddenness with which the marginal outline forms the anterior of the shell.

Cyclas flava. C. testâ compressâ, subovatâ, fragili, inequilaterali, epidermide flavâ, striis concentricis instructâ, posticè dilatatâ, umbonibus parvis, depressis. Long. 0.39; lat. 0.30; diam. 0.21 inches. *Hab.* Lake Superior. (Agassiz.)

This shell seems to bear no particular affinity to any other species, but is remarkable for its uniform yellowish gold color. Cabinet of the Boston Society of Natural History.

Cyclas emarginata. C. testâ magnâ, forti, globosâ, tumidâ, obliquâ, posticè subtruncatâ, inequilaterali, triangulari, epidermide olivaceo, tenuiter striatâ, umbonibus tumidis, magnis, marginibus abruptis. Dentibus fortibus. Long. 0.48; lat. 0.41; diam. 0.28 inches. *Hab.* Lake Superior. (Agassiz.)

Shell is remarkable for its triangular appearance, and finely striated epidermis. Color, olive green. Interior, bluish.

Remarks. This species seems to be very nearly allied to a shell from Lake Champlain, supposed, by Professor C. B. Adams, to be the *C. rhomboidea*, of Say; it is different, however, in being less oblique, and in being less heavily striated. Cabinet of the Boston Society of Natural History.

Cyclas gracilis. C. testâ magnâ, tenui, fragili, subglobosâ, complanatâ, subequilaterali, elongatâ, posticè brevi, albâ, nitidâ, tenuiter striatâ, umbonibus rotundatis, approximatis. Dentes cardinales parvi, laterales acuti, elongati. Long. 0.60; lat. 0.44; diam. 0.26 inches. *Hab.* Ohio. (Adams.)

Shell very fragile; epidermis, not heavy; color, light yellow, gradually growing darker from the margins upwards, merging on the beaks into light olive brown. The outline is somewhat similar to that of the *C. similis* Say, but otherwise the species are very distinct.

Cyclas tenuistriata.

Cyclas cornea Lamarck. Adams's *Catalogue of Shells in his Cabinet*, 1847.

C. testâ subglobosâ, complanatâ, brevi, subequilaterali, posticè dilatatâ, tenuiter striatâ, umbonibus perelevatis. Dentes parvi. Long. 0.40; lat. 0.35; diam. 0.26 inches. *Hab.* Tennessee.

Shell full, subequilateral, fragile, very finely and irregularly striated; color pale, greenish yellow. Remarkable for the slight difference existing between the outline of the two extremities.

Remarks. It is about the same size as the *C. cornea*, of Lamarck, but is less full, rather less fragile, more striated; the beaks are also larger and more tumid; the outline of the two extremities is rather angular, whereas, in the *C. cornea*, it is rather rounded than otherwise.

Cyclas mirabilis. C. testâ tenui, fragili, subovatâ, subequilaterali, posticè abruptissimâ, umbonibus parvis, elevatis. Long. 0.41; lat. 0.34; diam. 0.25 inches. *Hab.* Georgia. (Haldeman.)

Shell very delicate, posteriorly very abrupt, beaks small but tumid. Color light gray, striations not visible.

Remarks. Comparing this species with the *C. partumeia* Say, I find, that in the outline they are very similar; the beaks of the *C. mirabilis* are, however, smaller, though fully as tumid, and the whole shell is rather less inflated than the *C. partumeia.*

Cyclas Jayensis. C. testâ pellucidâ, fragili, brevi, globosâ, subequilaterali, transversè rotundatâ, posticè abruptissimâ, albâ, nitidâ, tenuiter striatâ, umbonibus magnis, elevatis. Long. 0.49; lat. 0.40; diam. 0.27 inches. *Hab.* Lake Superior. (Agassiz.)

Remarks. This shell has a slight resemblance to the *C. partumeia* Say, but is posteriorly more abrupt. Cabinet of the Boston Society of Natural History.

Cyclas gigantea. C. testâ maximâ, forti, solidâ, subovatâ, complanatâ, equilaterali, elongatâ, posticè abruptâ, umbonibus magnis non elevatis. Long. 0.70; lat. 0.56; diam. 0.39 inches. *Hab.* Pennsylvania.

Shell very large, probably the largest known, rather full. Color, dark chestnut brown, striations light but regular, generally found with beaks eroded.

Cyclas ponderosa. C. testâ magnâ, forti, solidâ, brevi, subglobosâ, inequilaterali, posticè acutâ, lineis incrementi fortiter instructâ, umbonibus rotundatis, approximatis. Dentes fortes. Long. 0.68; lat. 0.54; diam. 0.37 inches. *Hab.* Lake Superior. (Agassiz.)

Shell large, heavy, solid; lines of growth deep and irregular. Color dark brown, interior grayish white.

Remarks. With the exception of the *C. gigantea* Nobis, this is the largest species known. Hitherto single valves only have been found. Compared to the *C. gigantea* it is rather more inflated, the beaks are higher and it is not quite so truncated posteriorly.

CYCLAS SOLIDULA. C. testâ solidâ, brevi, forti, compactâ, subglobosâ, inequilaterali, posticè elongatâ, striis incrementi fortiter et regulariter instructâ, umbonibus rotundatis non approximatis. Dentes cardinales parvi, laterales acuti, fortes. Long. 0.60; lat. 0.44; diam. 0.26 inches. *Hab.* Ohio. (Adams, Agassiz.)

Shell heavy and compact. Color dark chestnut, striations deep and regular. Interior, bluish. Teeth strong and well developed.

Remarks. This species appears to be very common in Ohio, and has, as well as the *C. distorta* Nobis, been labelled *C. similis* Say.

Comparing it to the *C. similis*, found in Massachusetts, Vermont, and Pennsylvania, I find it is much more elevated, less elongated and stronger; the striations are also deeper and more regular. The hinge margin is rather spherical, whereas in the *C. similis* it is nearly on a straight line, the teeth themselves are less elongated and more robust.

It is unaccountable to me how this shell, which appears to be found very plentifully, can have remained undescribed. It has probably always been looked upon as the *C. similis*, or else it may be the *C. sulcata* of Lamarck. Cabinet of the Boston Society of Natural History.

CYCLAS DISTORTA. C. testâ globosâ, forti, solidâ, tumidâ, inequilaterali, transversè rotundato-ovatâ, posticè elongatâ, striis incrementi fortiter instructâ, umbonibus rotundatis et approximatis. Long. 0.48; lat. 0.36; diam. 0.26 inches. *Hab.* Ohio. (Adams, Agassiz.)

Shell heavy, short, solid: lines of growth strongly marked. Color reddish brown. Interior bluish; teeth well developed and strong.

Remarks. This species has likewise been confounded with the *C. similis* of Say: it is, however, very different from the *C. similis*, found in Massachusetts, being much more compact, heavier, and more inequilateral. The hinge margin is also more spherical than that of the *C. similis*. Cabinet of the Boston Society of Natural History.

Cyclas aurea. C. testâ magnâ, solidâ, forti, elongatâ, globosâ, complanatâ, subinequilaterali, posticè subtruncatâ, lineis incrementi fortiter instructâ, umbonibus magnis, perelevatis. Dentibus fortibus. Long. 0.61 ; lat. 0.46 ; diam. 0.40 inches. *Hab.* Lake Superior.

Shell large, strong, elongated. Color greenish yellow, interior blue. Striations not regular.

Remarks. The outline of this species somewhat resembles that of the *C. similis* of Say, but otherwise it is different. Cabinet of the Boston Society of Natural History.

Cyclas inornata. C. testâ subglobosâ, elongatâ, subequilaterali, posticè subtruncatâ, lineis incrementi irregulariter instructâ, umbonibus magnis, non tumidis. Long. 0.51 ; lat. 0.13 ; diam. 0.31 inches. *Hab.* Illinois. (Haldeman.)

Shell rather inflated, irregularly striated. Color light brown.

Cyclas simplex. C. testâ parvâ, fragili, compressâ, inequilaterali, posticè subtruncatâ, umbonibus magnis, elevatis. Long. 0.40 ; lat. 0.32 ; diam. 0.26 inches. *Hab.* Illinois. (Haldeman.)

Shell small and delicate: beaks high, rather inclined anteriorly. Color light yellow, striations fine.

Cyclas modesta. C. testâ tenui, complanatâ, inequilaterali, posticè dilatatâ, umbonibus magnis, elevatis. Long. 0.41 ; lat. 0.36 ; diam. 0.25 inches. *Hab.* Pennsylvania.

Shell rather fragile, somewhat elongated ; beaks very prominent. Color yellowish green, striations hardly visible.

Cyclas fabalis. C. testâ depressâ, forti, solidâ, elongatâ, posticè brevi et subtruncatâ, epidermide fuscâ, striis incrementi fortiter instructâ, umbonibus parvis, non elevatis. Long. 0.47 ; lat. 0.35 ; diam. 0.24 inches. *Hab.* Lake Superior. (Agassiz.)

This beautiful species is totally unlike any species heretofore known, but seems to be very nearly allied to the *C. castanea* Nobis, from the Wabash. Interior light blue. Teeth strong.

Cyclas castanea. C. testâ depressâ, brevi et subtruncatâ, inequilaterali, striis incrementi instructâ, epidermide fuscâ, umbonibus parvis, non elevatis. Long. 0.46; lat. 0.38; diam. 0.21. *Hab.* from the Wabash River. (Haldeman)

Remarks. This species differs from the *C. fabalis* Nobis, in being more compressed, and also less heavily striated; the beaks are less tumid. The hinge margin is somewhat more spherical, the teeth larger and more acute. The whole shell seems to be of a somewhat lighter texture.

Cyclas securis. C. testâ minutâ, rhomboideâ, complanatâ, tenui, fragili, subequilaterali, umbonibus magnis, elevatis. Long. 0.29; lat. 0.23; diam. 0.17. *Hab.* Massachusetts.

Shell very small and fragile, rhomboid form; beaks large and tumid. Color light straw; striations not visible to the naked eye.

Animal of a bright pink color, imparting a pinkish hue to the shell; syphons of about the same length, rather small, and of a pink color; foot long and very retractile.

Remarks. I have found this shell very frequently at Fresh Pond, and in the Cambridge Meadows during the summer months and at other seasons occasionally. It lives in company with the *C. truncata* Linsley, and the *C. elegans* Adams.

This species seems to be related to no other species, but the *C. truncata* Linsley, from which, however, it is distinguished by its rhomboidal form and in being more elongated and less inflated. The animal is very lively and crawls about like a gasteropod. Cabinet of the Boston Society of Natural History.

Cyclas cardissa. C. testâ globosâ, ventricosâ, tenui, fragili, subequilaterali, umbonibus magnis, rotundatis, approximatis. *Hab.* Massachusetts.

Shell very much inflated, beaks prominent and well rounded. Color yellow on the margins, but gradually merging into dark olive green on the beaks. Found in Fresh Pond, near Cambridge, and at Salem.

Remarks. This species is very nearly allied to the *C. truncata* of Linsley, but is different in being more especially inflated and having less prominent beaks: the outline is also different, the *C. truncata* being posteriorly more angular, than the *C. cardissa.*

Cyclas cœrulea. C. testâ tenui, fragili, subovatâ, subequilaterali, posticè abruptâ, umbonibus tumidis, non approximatis. Long. 0.31 ; lat. 0.29 ; diam. 0.19 inches. *Hab.* Massachusetts.

Shell delicate, posteriorly abrupt, beaks tumid. Color grayish blue, striations not visible.

Remarks. At first sight this species might be taken for the *C. partumeia* of Say, but it is much less convex, posteriorly less angular, and the beaks are less tumid ; compared to the *C. calyculata* of Draparnaud, found by Professor C. B. Adams, in Vermont, it is generally less angular, the beaks are less approximate, and it is also rather more convex. The animal is also different from that of the *C. partumeia* of Say, being of a much lighter red color.

I discovered this species this autumn very plentifully in a clay pit near Fresh Pond, Cambridge. Cabinet of the Boston Society of Natural History.

Cyclas tenuis. C. testâ minutâ, albâ, nitidâ, tenui, subovatâ, elongatâ, posticè subtruncatâ, umbonibus prominentibus, apiculatis, tuberculosis. Long. 0.26 ; lat. 0.19 ; diam. 0.15 inches. *Hab.* Massachusetts.

Shell small, fragile, elongated, rather ovate, posterior somewhat abrupt, anterior and inferior margins rounded, beaks situated towards the anterior, bearing a resemblance to prominent tubercles, hinge margin nearly on a straight line, teeth minute, surface smooth, striæ very fine ; color light brown, with a broad zone of yellow on the margins.

Remarks. This beautiful little species I discovered last spring in a small stream in the vicinity of New Bedford. In outline it somewhat resembles the *C. transversa* Say, but independent of the difference of size, it is less inflated, and the beaks are not as large, or as rounded.

2. GENUS PISIDIUM.

Pisidium obscurum. P. testâ magnâ, subglobosâ, tumidâ, tenui, fragili, tenuiter striatâ, posticè brevi, umbonibus magnis, elevatis. Long. 0.26 ; lat. 0.20 ; diam. 0.15 inches. *Hab.* Ohio. (Adams.)

Shell large, delicate; inferior margins well rounded; anterior somewhat abrupt. Striations hardly visible, color dark olive green.

Remarks. The outline of this shell would render it similar to the *C. minor* of Adams, but it is much more inflated, the beaks are more prominent, and the color is also different.

Pisidium ferrugineum. P. testâ ovatâ, complanatâ, subelongatâ, posticè rotundatâ, tenuiter striatâ, umbonibus parvis, elevatissimis, non approximatis. Long. 0.17; lat. 0.13; diam. 9.11 inches. *Hab.* Massachusetts.

Shell elongated, inflated; beaks very tumid, but small; margins abrupt; color pale yellow.

Remarks. This species is different from any other known; it is remarkable for the tumidity of the beaks, which nevertheless are very small and separate one from another. The specimens are generally found covered with a fine red mud, much the color of oxide of iron. Found at Salem, and rarely at Cambridge, in company with the *C. securis* Nobis. Cabinet of the Boston Society of Natural History.

Pisidium Kurtzii. P. testâ minutissimâ, compressâ, subequilaterali, posticè rotundatâ, umbonibus magnis, elevatis, approximatis. Long. 0.12; lat. 0.09; diam. 0.075 inches. *Hab.* South Carolina. (Lieut. Kurtz.)

Shell depressed, outline generally rounded, especially anteriorly; beaks very tumid and approximate; color pale yellow.

Remarks. This species somewhat resembles the *C. minor* Adams, in outline, but is more equilateral, smaller, and more depressed.

Pisidium zonatum. P. testâ magnâ, compressâ, elongatâ, inequilaterali, posticè rotundatâ, umbonibus parvis, elevatis, non approximatis. Long. 0.22; lat. 0.18; diam. 0.13 inches. *Hab.* Massachusetts.

Shell large, compressed, elongated, posteriorly rounded; beaks small but elevated; color light yellow with zones of white.

Remarks. The outline of this species is very like that of the *P. obscurum* Nobis, perhaps anteriorly, rather more rounded. The *P. obscurum* is nevertheless very different in its circumference, which is very much more inflated, its beaks are likewise more elevated ; the color is also different. Found very rarely at Fresh Pond, near Cambridge, in the spring.

Pisidium rubellum. P. testâ minutâ, compressâ, subelongatâ, albâ, nitidâ, tenui, posticè subtruncatâ, tenuiter striatâ, umbonibus magnis, complanatis, elevatis. Long. 0.17 ; lat. 0.14 ; diam. 0.10 inches. *Hab.* Lake Superior. (Agassiz.)

Shell small, fragile, compressed, somewhat elongated ; striations very fine ; color light yellow.

Remarks. This species is somewhat similar to the *C. minor* of Adams, but is much more depressed and elongated, the beaks are more prominent. Boston Society of Natural History.

Pisidium variabile. P. testâ minutâ, subovatâ, tumidâ, obliquâ, triangulari, posticè brevi et subtruncatâ, striis concentricis instructâ, umbonibus magnis, elevatis non approximatis, marginibus abruptis. Long. 0.21 ; lat. 0.18 ; diam. 0.179 inches. *Hab.* Massachusetts.

Shell small, stout and heavy, very oblique, rather inflated than otherwise, posteriorly subtruncated ; beaks large, prominent, but not approximate, margins rather abrupt ; color dark olive green, generally with a zone of yellow on the margins ; striations rather heavy for so small a shell.

Remarks. This species has hitherto always been looked upon, by collectors, as the *P. dubium*, but having compared it with the original shells described, as *C. dubia*, by Dr. Gould and with some *C. dubia*, from Westfield, Mass., sent to me by Prof. C. B. Adams, as well as with some other specimens sent to me from Philadelphia, by Prof. S. S. Haldeman, I have come to the conclusion that it is an undescribed species.

This species is not so elongated as the *P. dubium ;* it is more inflated, and the beaks are larger and more tumid ; it is also a smaller shell than the *P. dubium.* Say describes the *C. dubia* as being $\frac{5}{20}$ of an inch in length ; the *P. variabile* is not that by any means, and that it is a full grown shell, I presume by its general appearance. Compared to the *C. nitida* of Adams, it is much smaller and very much more inflated.

This species varies very much in the scale from the younger to the full grown ones, and I have thought the name of *P. variabile* would not be inappropriate. Found very abundantly in

Fresh Pond and its environs, at all times of the year, in company with the *C. truncata* Linsley, and *C. securis* Nobis. Cabinet of the Boston Society of Natural History.

Pisidium compressum. P. testâ minutâ, compressâ, perobliquâ, triangulari, posticè abruptâ, albâ, nitidâ, umbonibus parvis, apiculatis, non approximatis. Long. 0.16 ; lat. 0.14 ; diam. 0.9 inches. *Hab.* Massachusetts.

Shell small, oblique, compressed, posteriorly abrupt, very finely striated ; color very light gray with a slight and indistinct zone of yellow on the margins ; beaks small, very prominent, but not approximate.

Remarks. This species bears some resemblance to the *P. variabile* Nobis, but it is more compressed ; the beaks are smaller, and it is in general smaller ; the epidermis is also different. Found, sparingly, at Fresh Pond, near Cambridge, in company with the *P. variabile* Nobis.

Pisidium rotundatum. P. testâ minutâ, subglobosâ, tumidâ, posticè subtruncatâ, albâ, nitidâ, tenui, tenuiter striatâ, umbonibus magnis, tumidis, rotundatis, approximatis. Long. 0.95 ; lat. 0.75 ; diam. 0.08 inches. *Hab.* Lake Superior. (Agassiz.)

Shell small, somewhat globose, tumid, anterior and inferior margins rounded, posterior somewhat abrupt; beaks very large, tumid, rounded, approximate, removed slightly from the centre, and inclining towards the posterior, surface smooth, striæ very minute ; color yellow, somewhat darker on the beaks.

Remarks. This very small species bears some resemblance to the *P. ventricosum* Nobis, but is less inflated, more equilateral, the margins are more rounded, and the beaks are larger and more tumid.

General remarks. I have observed in the neighborhood of Fresh Pond three species of *Cyclas*, hitherto foreign to this State ; the *C. truncata* of Linsley, first found in Connecticut, and the *C. minor* and *C. nitida* of Adams, first found in Vermont.

The number of the species of *Cycladidæ* in Massachusetts amounts now to sixteen, ten of which belong to the genus *Cyclas* and the other six to the genus *Pisidium*. They are : —

Cyclas cardissa Nobis.
Cyclas cærulea Nobis.

Cyclas elegans Adams. B. J. N. H. III. 330, pl. 3, f. 11.
Cyclas minor Adams. B. J. N. H. IV. 39, pl. 4, f. 2.
Cyclas nitida Adams. B. J. N. H. IV. 39, pl. 4, f. 3.
Cyclas partumeia Say. Gould's Report, 73, f. 54.
Cyclas securis Nobis.
Cyclas similis Say. Gould's Report, 72, f. 53.
Cyclas truncata Linsley, Gould, Am. Jour., 1848.
Cyclas tenuis Nobis.
Pisidium compressum Nobis.
Pisidium dubium Gould. Agassiz's Lake Superior, 345.
Pisidium ferrugineum Nobis.
Pisidium variabile Nobis.
Pisidium ventricosum Nobis. Bost. S. N. H. Proc. IV. 68.
Pisidium zonatum Nobis.

Prof. Wyman said, that after the recent storm, he had found on Chelsea Beach numerous eggs of the Skate, containing the embryo at different stages of development. He had also found them in the spring, showing that there are two broods in a year. The same is true of the Dog fish.

Within the general envelope of the egg, the embryo, however small, was in no instance contained in any investing membrane. The yolk varied much in size, a small yolk being in some instances attached to a large embryo, and vice versâ. At one end of the parallelogram-shaped egg was a transverse fissure, which opened to allow the escape of the young fish when fully formed. This has been described as an opening for the admission of water to serve the purposes of respiration for the embryo. The true openings for this purpose are the orifices at the ends of the tubular prolongations, two of which project from each end of the egg.

Mr. Desor said, that in studying the development of Eolis and Doris, of which it was not uncommon to find four or five yolks in one shell, he had frequently observed one yolk much smaller than the others, but the individual to which it was attached was always proportionate to it in size.

Mr. Desor exhibited some of the proof-sheets of the illustrations to Messrs. Foster and Whitney's Report of the Geological Survey of the Mineral lands of Lake Superior. Among them was the representation of a slab of singular character, from the Clinton group at Green Bay.

It was a question, whether the markings upon it were the remains of a fossil body or the track of some animal. It had been maintained at the session of the American Association for the advancement of science at Albany, that it could not be the former, as there was no trace of animal substance or change in the grain of the stone. It had been suggested that it was the track of some marine worm with many feet. Mr. Desor himself thought it was more likely to have been made by an animal with four feet, possibly a reptile, although it was a matter of great doubt. Mr. Whitney had observed that the distance from the central groove to the outer edge of the double row of impressions on each side of it was greater at one end than the other, so that the whole impression was somewhat wedge-shaped, and he was therefore led to the conclusion that it could not be a track.

Dr. Cabot remarked, it was possible that the marks at one end might have been made by a different part of the foot from those at the other.

Prof. Rogers said, that Mr. Whitney and himself had found by measurement, that the distance from the central groove to the inner edge of the lateral markings at one end of the slab was to the distance at the other as two to one ; the distances to the outer edge being as three to two. This would seem to be an objection to the theory of its being a track. Another difficulty was the perfect regularity of interval between the lateral markings. It could hardly be supposed that the track of an animal with many feet could be made without some blurring of the first prints by the succeeding ones. Mr. Whitney had suggested that it might be the impression of a skeleton.

Dr. Gould remarked, that the impressions, if produced by a walking animal, would have been alternate ; if by a leaping animal, the tracks of the short legs which receive the plunge would have been deeper than the others, which is not the case.

Mr. Desor exhibited several other drawings of fossils. He also presented in the name of the Geologists of the Survey, a Geological Map of the Lake Superior district, and pointed out and explained its different features. He remarked that the immense Cedar swamps of that region would probably at some future day be of value for the sleepers of railroads, from the indestructible character of the wood.

Prof. Rogers gave his testimony to the great truth and value of the map presented.

Dr. T. M. Brewer presented two specimens of birds' eggs. Among them were the eggs of the two species of Hermit Thrush, exhibiting very different characters, the only perceptible difference between the birds being in the length of the legs. One species builds its nest on trees and has longer legs than the other, which builds on the ground. An egg of the thick-billed Guillemot was among those presented. The parent bird has been sometimes confounded with *Uria troile ;* the egg, however, is different, being of a uniform hue, while those of *U. troile* are not. An egg of Traill's Flycatcher, from Vermont, a rare specimen, was one of the donation.

A nest, with the eggs of the Yellow-breasted Chat, was presented in behalf of Mr. Theodore Lyman, it being the first known to have been found in New England.

Dr. J. M. Warren presented a small fish of the genus *Holacanthus*, usually considered a tropical genus, which had been found on the Beach at Newport, R. I. The specimen, from its ossification, appeared to be an adult, and was but little more than an inch in length.

A bottle containing the following specimens of British Reptiles was presented in the name of Sir William Jardine; namely, *Rana temporaria*, old and young, *Bufo vulgaris*, *Anguis fragilis*, and *Pelius Berus*.

Mr. H. R. Storer presented some curious hollow tin cones, about two thirds of an inch long, most of them with a spiral groove upon them, produced by pouring melted tin into cold water. He also presented a number of Reptilian eggs, from Maine, probably those of the Snapping Turtle.

Mr. J. M. G. Parker was elected a Resident member.

December 17, 1851.

The President in the Chair.

Dr. Cabot, referring to the statement of Dr. Brewer, at the preceding meeting, that the two species of Hermit Thrush differ only in the length of the legs, said he had noticed that one is of a reddish, the other of an olive color.

The President gave an account of the original discovery, in the south of France, of the remains of the *Deinotherium*, and of subsequent discoveries in different localities in Europe down to the present time. He exhibited a cast of a tooth and engravings of the cranium, &c., describing their structure. In comparing this animal with the *Mastodon giganteus* he alluded to the fact, that there are now in scientific collections five Mastodons of this species, three in America and two in Europe. He likewise exhibited the cast of a part of a fossil jaw of an unknown animal resembling the Mastodon, from the Himalaya Mountains.

Mr. Desor referred to a statement in the Annals and Magazine of Natural History, that the *Pedicillariæ*, which are found in Echini are parasites, and that they are also found in shells. He asked Mr. Ayres's opinion on the subject.

Mr. Ayres said, that he had noticed about the base of the arms in *Ophiuridæ* small worm-like projections, which he thought might be *Pedicillariæ*. He had never been able to detect in them a tubular structure. They always occur at the corners of the plates.

Mr. Desor said, that in studying the development of the Starfishes he had noticed these bodies and believed them to be suckers. They always occurred at the corners of the plates. The *Pedicillariæ* in Echini are scattered about without any regard to symmetry.

Prof. Rogers alluded to the fact, that Mr. Salter had recently demonstrated in London the fallacy of Hugh Miller's argument for the deterioration of species, based on the supposed existence of fishes in some of the older rocks of a higher organization than those of a more recent period. He remarked, that the only evidence remaining of the existence of Vertebrata in the Silurian system was a single occurrence of foot-prints in the Sandstone of the St. Lawrence Valley. With regard to the nodules like Coprolites occurring in the Barlow Limestone, he suggested that the same source which could supply Phosphate of Lime to Coprolites might supply it in the form of Concretions to the Geological formation itself; so that the occurrence of such nodules merely was not positive proof of the existence of fishes at that period.

Dr. Jackson said, that nodules of simple Phosphate of Lime are not unfrequently met with. Coprolites would contain bones, scales, &c., which would leave no doubt of their character.

Prof. Rogers inquired if Dr. Jackson, in his examinations of the Hillsboro' coal, had found any traces as of the motion of the mass in a soft, semifluid condition.

Dr. Jackson replied that he had not.

Prof. Rogers said that he thought he had himself observed it. Cannel coal breaks with a conchoidal fracture indifferently in all directions, with strict parallelism of lamination. The Hillsboro' coal on the other hand, shows in places appearances of having been solidified in the condition of thick tar or obsidian. He would recall to the minds of the Society his suggestion a year since, that the specimen then exhibited might have been taken from a mass extended and filling a fissure, not from the bed itself. He still had his doubts about its being a stratified coal.

Dr. Jackson explained, that in replying to Prof. Rogers's query, he supposed it to refer to the soft Asphaltic coal. A wavy structure does exist, even in the shales, indicating a process of disturbance during their deposition. The coal is found in the form of a true bed, with masses extruded. Dr. Bacon had distinctly demonstrated the existence of vegetable structure in the coal. The shales are of the same age as the adjoining coal, and are full of bituminous matter, so that they burn like coal.

Prof. Rogers said, that whether the coal were in its original bed or extruded from it, there was still evidence as of motion in the solidified mass. When a mass of lava fills a fissure, it hardens with a columnar structure transversely to the fissure; if on a plain, the columnar structure is at right angles to it. Such, also, is the structure of the Hillsboro' coal. May it not be suspected, therefore, that it may have been in a similar condition to lava, solidifying like lava in a columnar form? There are appearances also of crushing, in which this structure is broken up, which might be accounted for by the meeting of two opposed sets of joints.

Dr. Jackson alluded to a suggestion which had been made in another Society, that the Sienite of Nahant is a metamorphic rock. He expressed in the strongest manner his dissent from this opinion. He was followed by Prof. Rogers and Mr. Desor, who both concurred with him in opinion.

A specimen of Brain coral was presented in the name of Hon. Isaac Davis, of Worcester. The thanks of the Society were voted for the donation.

BOOKS ADDED TO THE LIBRARY UP TO DECEMBER 31st.

American Journal of Science and Arts. No. 34. Vol. XII. 2d Series. July, 1851. New Haven. *From the Editors.*

Terrestrial Air-Breathing Mollusks of the United States, &c. described and illustrated by Amos Binney. Edited by A. A. Gould. 2 vols. 4to. Boston, 1851. *From Mrs. Binney.*

Journal de Conchyliologie. Publié sous la Direction de M. Petit de la Saussaye. Nos. 2, 3, 4. 8vo. Paris, 1851. *From the Editor.*

Catalogue of Malayan Fishes. By Theodore Cantor, M. D. 8vo. Calcutta, 1850. *From the Author.*

Essay on the Classification of Nemertes and Planariæ. 8vo. Pamph. By Charles Girard. *From the Author.*

A Peep at Uncle Sam's Farm, &c. By P. Tocque. 12mo. Boston, 1851. *From the Author.*

Wandering Thoughts and Solitary Hours. By P. Tocque. 8vo. London, 1846. *From the Author.*

Proceedings of the American Philosophical Society. Vol. V. No. 46. From January to July, 1851. *From the American Philosophical Society.*

Transactions of the Entomological Society of London. Parts 4 and 5. Vol. I. New Series. 8vo. London, 1851. *From the Entomological Society.*

Notices of the Meetings of the Royal Institution of Great Britain. 12mo. Pamph. No. 6. London, 1851. *From the Royal Institution.*

Bulletin de la Société Géologique de France. 2ième Série. Tome VII. Feuilles 39–51 (3 Juin–1 Sept. 1850.) 8vo. Paris. *From the Société Géologique.*

Catalogus Universitatis Harvardianæ. Cambridge, 1851. 8vo. Pamph. *From J. L. Sibley.*

Reports. Notices of Public Libraries in the United States of America. By C. C. Jewett. 8vo. Pamph. Washington, D. C. 1851. *From the Smithsonian Institute.*

Proceedings of the Academy of Natural Sciences. Vol. V.

No. 9. pp. 201-234. 8vo. Philadelphia. *From the Academy of Natural Sciences.*

Historical and Statistical Information respecting the History, &c. of the Indian Tribes of the United States. By Henry B. Schoolcraft. Part 1. 4to. Philadelphia, 1851. *From the Commissioner of Indian Affairs.*

Smithsonian Contributions to Knowledge. Vol. II. 4to. City of Washington, 1851. *From the Smithsonian Institute.*

History of British Mollusca and their Shells. By Prof. E. Forbes and S. Hanley. 8vo. Parts 25-29. London, 1851. *From H. Cuming by Exchange.*

Proceedings of the Zoölogical Society of London. Part 1. January to April, 1850. *From the Zoölogical Society.*

Zeitschrift für Malakozoölogie. Herausgegeben von K. I. Menke und L. Pfeiffer. Nos. 10-12, 1849, and 1-10, 1850. *From H. Cuming by Exchange.*

Extrait de la Revue Zoölogique par la Société Cuvierienne. 8vo. Pamph. 1844. *From H. Cuming by Exchange.*

Joseph Leidy. On the Organization of the Genus Gregarina of Dufour. 4to. Pamph. Philadelphia, 1851. *From the Author.*

Thesaurus Conchyliorum, or Figures and Descriptions of recent Shells. By G. B. Sowerby. Part 12. 8vo. London.

System of Mineralogy. By J. D. Dana. 3d Edition. 8vo. New York, 1850. *From the Author.*

American Journal of Science and Arts. No. 39, for September, 1851. *Exchange.*

Bulletin de la Société Géologique de France. Tome VIII. Feuilles 10-20. (6 Janvier-7 Avril, 1851,) 8vo. Paris, 1850-51. *From the Société Géologique.*

Mineralogical Notices, No. 3. By J. D. Dana. 8vo. Pamph. 1851. *From the Author.*

Reconnaissances in New Mexico, Texas, &c. 8vo. Congressional Document. 1850. *From R. C. Winthrop.*

Annals of the Lyceum of Natural History of New York. Vol. V. Nos. 2, 3. 8vo. 1450-1. *From the Lyceum of Natural History.*

Foster and Whitney's Report on the Copper Lands of Lake Superior Land District. 8vo. (Congressional Document.) Washington, 1850. *From T. M. Brewer.*

Third Annual Report of the Regents of the University on the Cabinet of Natural History. Albany, 1850. 8vo. Pamph. *From T. R. Beck.*

Fourth Annual Report of the Regents of the University on the Cabinet of Natural History. Albany, 1851. 8vo. Pamph. *From T. R. Beck.*

T. Smyth on the Unity of Human Races. 12mo. New York, 1850. *From T. R. Beck.*

Fragments of the Natural History of Pennsylvania. By B. S. Barton. 4to. Pamph. Part 1. Philadelphia, 1799. *From T. R. Beck.*

Transactions of the Entomological Society of London. Vol. I. Part. 6. New Series. 8vo. Pamph. 1851. *From the Entomological Society.*

Memoires de la Société de Physique et d'Histoire Naturelle de Genève. Tome XII. 2de Partie. 4to. London, 1851. *From the Société de Genève.*

Proceedings of the American Academy. Vol. I. and pp. 1–232 of Vol. II. 8vo. Boston, 1848–50. *From the American Academy.*

Geological Surveys of Canada. 8vo. Montreal, 1845–50. *From B. Homer Dixon.*

History of British Mollusca and their Shells. By Prof. E. Forbes and S. Hanley. Part 40. Pamph. London, 1851. *Exchange with H. Cuming.*

Report of the Commissioner of Patents for 1850. (Congressional Document.) Washington, 1851. *From the Commissioner of Patents.*

Silliman's American Journal of Science and Arts. No. 36. New Haven, November, 1851. *From the Editors.*

Proceedings of the Academy of Natural Sciences. Vol. V. No. 10. pp. 235–259. Philadelphia, 1851. *From the Academy of Natural Sciences.*

Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften. 10 Nos. Wien, 1850. Pamph. *From the Akademie.*

Denkschriften der Kaiserlichen Akademie der Wissenschaften. Classe 2. Band 1, 2. 4to. Wien, 1850. *From the Akademie.*

Tafeln zu den Denkschriften der Kaiserlichen Akademie der Wissenschaften. 4to. Wien, 1850. *From the Akademie.*

Denkschriften der Kaiserlichen Akademie der Wissenschaften. 4to. Wien, 1850. *From the Akademie.*

Reports of the Council and Auditors of the Zoölogical Society of London. 1848 – 50. Proceedings of Zoölogical Society from page 123 for 1847 to page 80 for 1850. *From the Zoölogical Society.*

Bulletin de la Société Géologique de France. 2ième Série. Tome VIII. Feuilles 21 – 27. (7 Avril – 17 Mai, 1851.) *From the Société Géologique.*

Réponse à une Lettre de MM. Foster et Whitney sur le Lac Superieur. Par M. J. Marcou. 12mo. Pamph. Paris, 1850. *From C. T. Jackson.*

Report of the Commissioner of Patents for 1850. Part 2d. Agriculture. (Congressional Document.) Washington, 1851. *From T. Ewbank.*

Reports on the Coal of the Albert Mining Company. 8vo. Pamph. New York, 1851. *From C. T. Jackson.*

Notice of the Death of R. C. Taylor and Biographical Sketch. By I. Lea. 8vo. Pamph. Philadelphia. *From I. Lea.*

Received from the Courtis Fund.

Annals and Magazine of Natural History. London. Nos. 43, 44, 45, 46, 47, 48. Vol. VIII.

Graglia's Italian Dictionary. 4to. Boston, 1851.

American Almanac for 1852. 12mo. Boston, 1851.

Deposited by the Republican Institution.

Life and Works of John Adams. Vols. 3, 4, 5. 8vo. Boston, 1851.

History of the Siege of Boston. By R. Frothingham, Jr. 8vo. Boston, 1850.

Life and Letters of Joseph Story. Edited by his Son, W. W. Story. 2 vols. 8vo. Boston, 1851.

January 7, 1852.

The President in the Chair.

Dr. Kneeland read a communication on the subject of the Rhinoceros horn recently presented to the Society. The following is an extract.

"If we examine the structure of the horn of the Rhinoceros, we find that it is essentially made up of a collection of *hairs*, — that is, of a mass of long corneous cylinders, nearly parallel to each other; if, then, we define a hair as a corneous cylinder of variable length, we may regard nails, claws, hoofs, corneous horns, quills, &c. as merely confluent hairs. This horn at its base is evidently fibrous, being rough like the stump of an old brush; it belongs entirely to the skin, being in no way connected with the bones of the skull; so that, (as Burchell says in his Travels,) it is not improbable that the animal may have the power of moving it to a certain extent.

The length of this horn, measuring its convexity, is $37\frac{1}{2}$ inches; its circumference at the base is $21\frac{1}{4}$ inches; its weight $18\frac{1}{4}$ pounds."

Prof. Rogers presented in the name of Dr. Leo Lesquereux, some observations on the coal measures of Ohio.

On the Coal Bed of Zanesville. The only bed of coal which is mined at Zanesville, lies between two layers of unconsolidated clay, or soft Shale, in which the only fossil plants visible are some traces of half petrified stems, so brittle that it is not possible to preserve them for examination. The softness of these beds of clay is somewhat remarkable. In appearance they much resemble each other, that beneath the coal being, however, ordinarily thicker and more continuous than the other. The overlying or roof-bed is often replaced by a thick layer containing nodules of clay iron ore, resting immediately on the coal. At the very base of the ore-bearing bed, and in contact with the coal, occur many specimens of *Productus*, a marine shell, mingled with good specimens of half-carbonized Stigmaria. In this locality the Stigmaria appear always in the *roof.*

I could not detect any trace of them in the bottom shale, and so far as we can rely on the observations of the workmen, they never occur there. Except *Stigmaria*, no fossil plants are found in or near this bed of coal of Zanesville. But in the Sandstones above and below the position of the coal bed, we find many prints of well-preserved large Calamites and *Lycopodendra*, from which, however, the carbonaceous matter has frequently disappeared.

In one bed of coarse Sandstone, these prints are remarkably distinct, even in their minutest details. In a bed of white, soft Sandstone, below the coal, and also in a stratum of ferruginous Shale beneath the upper limestone bed, I found many fossil forms of the same species with those met with in the Anthracite Basins of Pennsylvania, namely, *Asterophyllites equisetiformis*, *Annularia*, *Neuropteris cordifolia*, *Pecopteris æqualis*, *Sphenopteris*, and others. The relative positions of these beds are shown in the accompanying Sections, taken around Zanesville.

FIRST SECTION.

1. The highest strata capping the hills, Sandstone and Shales.
2. Coal 4 to 6 feet thick, roof and bottom clays 1 to 2 feet thick.
3. Coarse shaly Sandstone with prints of Lepidodendron, 3 to 5 feet.
4. Ferruginous Shale 8 to 15 feet.
5. Limestone 1 to 2 feet, with Terebratula, underlaid by a bed of coal or black Shale 6 inches to 1 foot thick, containing prints of Calamites and Neuropteris cordifolia.
6. Sandstone 6 to 8 feet.
7. Limestone 1 to 2 feet.
8. Sandstone rather thick; this goes under the stream, west of Zanesville, on the banks of the Muskingum River.

SECOND SECTION.

1. Coal, traces of a bed capping the surface. A thin bed of soft, white Sandstone with many fossil plants.
2. Sandstone 15 to 20 feet.
3. Shaly Sandstone, Iron Shales, black and friable.
4. Limestone 1 to 3 feet thick.
5. Black slate and traces of a coal bed 6 inches to 1 foot thick.
6. Shaly Sandstone 15 to 20 feet.
7. Limestone 1 to 2 feet.
8. Hard Sandstone 30 to 40 feet.
9. Ferruginous Slates and Limestone passing under the water.

Except in the thickness of the beds of Sandstone the correspondence between the two sections is clear.

Marietta and Vicinity. Fifteen miles above Marietta, in the Muskingum Valley, there is a bed of coal, buried near the level of the river. It lies under a thick stratum of Sandstone, and between soft slates so easily decomposed that they crumble when exposed to the air. Though the coal here presents the same wood-fibrous texture with that of Zanesville, I found in it no traces of fossil plants. This coal cakes so readily on the fire as to be impeded in its combustion thereby. It exhales a strong odor, not like that of bituminous smoke, but like that of the smoke of *peat.*

At Marietta, between the thick strata of hard Sandstone, lies a bed of soft, Red Shale, resembling in its color, the Vespertine Red Shale of the Anthracite region. It is only from one to two feet thick, but I saw it in every direction around Marietta for ten or fifteen miles. It is remarkable for its abundance of fossil plants. Three miles west of Marietta, in a small cave which the waters of the Ohio River have cut in the soft Sandstone, and which Dr. Hildreth calls the "Grotto of Flowers," the slates are so much covered with the leaves of *Pecopteris æqualis*, that it is not possible to break the smallest piece without observing impressions, which are preserved in their most delicate details, even to the smallest remains ; but every trace of the original vegetable matter has disappeared, and there is no carbonaceous matter left. This is exactly as it is with the fossil plants of the Vespertine Red Shale.

At Barlow, ten miles west of Marietta, the same bed contains the same *Pecopteris*, with *Pecopteris arborescens*, and eight miles further west it is mingled with nodules of Iron ore, some of which contain in their centres, well-preserved fossil plants. There one finds not only, *Pecopteris æqualis*, and *P. arborescens*, but *Neuropteris cordifolia*, *N. heterophylla*, *Asterophyllites*, many specimens of *Sphenopteris*, and a fine new *Cyclopteris*, which I have named *Cyclopteris fimbriata.* All these species characterize also the upper beds of the Anthracite Basins of Pennsylvania.

At Pomeroy there is a Coal-bed extensively wrought. This coal does not cake in burning, and is well adapted to the grate. It is from foûr to six feet thick, and lies between thick beds of hard, shaly Sandstone. The roof-slate, between one and two feet thick, is hard and black and full of prints of ferns; the bottom slate is gray and softer, and without traces of fossils. As the mines in this Coal-bed contain but little timbering, and the roof-slate is left in its place exposed to view, this presents to the observer a fine opportunity for studying the fossil plants on its naked surface. These are remarkably numerous and distinct, looking like a painting of the surface of some luxuriant meadow, pressed down. Those who doubt that the long and slow accumulation of vegetables growing on the spot has formed these beds of combustible matter, should come and witness this manifest proof written on the rocks in indestructible language. Not only the trunks and leaves are preserved entire, but in many places you may follow a stem in its branchings to its smallest subdivisions, and most delicate thread-like processes. That the vegetation of the coal was sometimes very uniform over a large surface, perhaps the whole extent of a coal-bed, as affirmed by Humboldt, Brongniart, Lindley, and other good authorities, is here demonstrated; for though the mines are worked extensively around Pomeroy, I nowhere met with any but the three species which characterize the Tunnel Vein of Pottsville; namely, *Neuropteris cordifolia,* and its stems, *N. heterophylla,* finely-striated *Calamites;* the chief portion of which latter are but parts of the stems of ferns, though of the form described by many authors as *Calamites.*

Wheeling. The following is a section of the strata at Wheeling, above the Coal-bed there wrought. The thicknesses are only approximately correct.

1. A Sandstone forms the Capping-rock.
2. Cannel coal and Soft coal, 1 foot.
3. Sandstone, 10 to 15 feet, (not exact.)

4. } 5. } Limestone, 35 to 45 feet, hard above, shaly below.

6. Shales, 15 feet.
7. Hard Sandstone, 2 feet.
8. Limestone, 20 feet.
9. Shales, 2 feet.
10. Brittle coal, 1 foot.
11. Ferruginous Shales, 2 feet.
12. Limestone, 20 feet.
13. Shales, 2 to 3 feet.
14. Coal bed, wrought.

The bed, No. 2, is a thin seam of coal, which, in its superior portion, is a hard and compact true Cannel coal, and in its inferior part a mass of crowded *Calamites*, so loosely aggregated, that exposed to the wet, these separate into thin laminæ. This is a new and evident proof that the Cannel coal is not a peculiar formation, but owes its density to a more advanced state of decomposition of the vegetable matter.

The following is a section of the inferior members of the coal formation of Northern Ohio, as developed at Cuyahoga Falls, kindly furnished by Dr. Newberry, of Cleveland.

1. Highest stratum in Marine Limestone, 4 feet.
2. Red Sandstone, with Lepidostrobi and Sigillaria, 50 to 70 feet.
3. Shales, &c. 40 to 50 feet.
4. Coal, 3 to 6 feet.
5. White Sandstone, 50 to 70 feet.
6. Conglomerate, with Calamites, Calamodendron, &c. 150 feet.
7. Shaly Sandstone, 100 feet.
8. Worthington Shale, 300 feet.

The fossil plants of this locality agree very closely in species, and accord exactly in genera, with those of the base of the coal measures of England and France. They are, an abundance of large *Calamites*, of *Lepidodendra*, *Lepidostrobi*, *Trigonocarpi*, etc. while there is a complete absence of the species which abound in the Upper Strata, such as *Pecopteris æqualis*, *P. arborescens*, *Neuropteris heterophylla*, and others.

Dr. Jackson remarked, that it would be very interesting to trace such a wide-spread deposit to its original source. In New Brunswick, on the Peticodiac River he had found a hard, green slate with pieces of Sienite, Quartz, and occasionally of Trap Rock, the pebbles being but partially rounded. He had traced this deposit to a mountain of Sienite and Green Slate, fourteen miles to the west of north, known as Caledonia Mountain. The coal-basin of that region is made up of Sandstone with Limestone and White Gypsum. Above this lies a richly bituminous Shale, soft, even flexible, filled with remains of fishes. Dr. Jackson inquired of Prof. Rogers, if, in the widely-spread formation described by Mr. Lesquereux, there was any gradation of fineness in the materials, their fineness increasing in proportion to the distance from their probable source, indicating the action of water rather than ice in their distribution.

Prof. Rogers replied, that such is the case.

Dr. Jackson referred to the opinion of some geologists that the *Stigmaria* are the roots of *Sigillaria*. From his own study of them, he still had his doubts of this. At the New Brunswick coal-mines he had seen the trunks of *Sigillaria* imbedded in the rock; he had even passed beneath them in the coal-mines and seen their roots branching over his head, and they certainly were not *Stigmaria*. He had noticed, also, in the centre of the markings of *Stigmaria*, one, and sometimes two, little points. In the Mansfield coal-mines he had seen similar points in the adjacent rock. He was, therefore, inclined to the belief that these markings are leaf-scars. If the *Stigmaria* are roots, then their rootlets must have been deciduous.

Dr. Jackson also mentioned the fact, that at the South Joggins, immediately beneath the *Sigillaria* and coal, there are myriads of fossil marine shells of a mytiliform character.

The President exhibited a cast of a fragment of the left side of the lower jaw of *Mastodon longirostris*, from Eppelsheim, and explained the characters of the dentition.

Mr. Desor said, that some years since a European geologist, M. Bouchepon, had attempted to explain the different geological formations as due to changes in the axis of the earth. A year and a half since this gentleman had visited the drift deposit at Brooklyn, N. Y., in which Messrs. Desor and Pourtales had found drift shells. The deposit consisted of coarse drift containing scratched pebbles and shells, and were it not for the presence of shells, would probably have been ascribed to glacial action. Above it are strata of sand and clay. M. Bouchepon referred the strata of this deposit, as delineated by Mr. Desor, to three distinct epochs, in each of which the direction of the earth's axis was different. It would have been impossible, he said, for shells to have occurred in the coarse drift from the neighborhood of the pole. In reference to this subject, Mr. Desor submitted to the Society a letter from Mr. William C. Redfield, of New York, who was familiar with the locality. The letter was read by the Secretary. It confirmed Mr. Desor's statements of the existence of fossil shells in the coarse drift of Long Island. Some of them are of existing species and have been found at Bedford, two miles east of Brooklyn Ferries, at a depth of eighty feet. The letter concluded as follows: —

"You will perceive that my views, founded on the opportunities which have long been and are now constantly afforded for examining new sections of the drift in this vicinity, are quite different from those to which you have referred; and that I consider the greatly protracted period in which this drift was accumulated as posterior to the so-called post-tertiary deposits. I cannot, however, claim to speak authoritatively in these matters."

Mr. Desor said, that he dissented from Mr. Redfield's opinion as to the age of the deposit in question; he regarded it, as well as the deposit at Point Shirley, as only an exception to the common rule of the quaternary formation, and not enough to constitute a distinct epoch.

Dr. Gould stated, that Dr. Wood, of Portland, had recently discovered at Portland a deposit similar to that in Brooklyn.

Prof. Rogers asked whether the strata, containing shells at Brooklyn, are immediately over a scratched surface.

Mr. Desor replied, that he could not say positively, but he was satisfied in his own mind that such is the fact. It had been frequently asserted that the drift in the neighborhood of Boston is glacial. The fact of its containing shells is incompatible with this view. Near Milton, Mass., the coarse drift is *above* the clay; an arrangement similar to that of the Laurentian deposit.

Dr. Jackson said, that the most extensive deposit of marine shells that he had seen was near Portland, where they were found, of extinct species, associated with the shells of crabs. Many of the shells were very delicate, and their unbroken condition indicated a quiet deposition. The shells on the other hand on the islands, in Boston Harbor, are always broken.

Prof. Rogers said, he thought it was possible to reconcile the conflicting views as to the age of these formations. When the discoveries were made at Brooklyn, it at once occurred to him that they were in strict accordance with his theory of diluvial action. It was natural to expect that when the rush of waters from the north reached the margin of the sea, the drift falling into it would mix with the shells earthy materials, crushing some and sparing others, leaving here and there patches of clay and mud with their contained fossils, undisturbed and uninjured, — such a state of things as in fact exists. As to the question whether these deposits are to be considered tertiary or quaternary, according as they contain recent shells or not, there was no evidence which could prove that species supposed to be extinct might not exist elsewhere at the present time.

Dr. C. T. Jackson read a letter from Mr. W. J. Starr, of St. Johns, N. B., presenting a box of fossils from the Joggins Coal-mines.

Dr. Gould read a letter from Mr. Joseph Monds, of Norwich, Conn., presenting specimens of the animals of *Natica duplicata* and *Pyrula canaliculata*, from Saybrook, Conn.; also several specimens of *Donax* and animal, *Anatifa* and *Cineras* from the Greek Archipelago.

The thanks of the Society were voted to Messrs. Starr and Monds for their donations.

January 21, 1852.

The President in the Chair.

Mr. Desor said, that with the permission of the Society he would offer a few remarks on the difference of the climates of Germany and New England, although the subject was not directly relevant to the objects of the Society. In conversation with numerous German residents here, he had learned various interesting facts growing out of the remarkable dryness of the climate. One of the first things noticed by them was the rare occurrence of arborescent forms on the windows produced by frost. These appearances are regarded with peculiar interest in Germany, and are associated with many popular legends. They are of less frequent occurrence here from the circumstance that the dew-point is several degrees lower. Various differences noticed by artisans in the processes of their different callings are due to the same cause. Painters can finish their work in a shorter space of time. Cabinet-makers are obliged to use much thicker glue. Watchmakers have to use animal instead of vegetable oil. Articles of furniture made in Europe are found not to wear well. Inlaid wood floors are much more expensive, requiring to be made with much greater care. In the collections of Natural History in Europe, lime is necessary for the absorption of moisture, which would otherwise injure the specimens; none is needed here. It has been said, that the climate of New England is moister than that of Central Europe, because rains are more frequent. Humboldt made the same remark of the high Alps. This is not the case, however, for there is a very great change of hygrometric condition in the atmosphere immediately after rain. In the Northwestern parts of Europe and in England, a fall of one or two degrees only in the temperature causes rain. On the whole, Mr.

Desor regarded the climate of New England as more closely resembling that of the high Alps than that of any other part of Europe.

The President said, he agreed with Mr. Desor in his opinion as to the comparative quantity of rain in New England and Central Europe. He also alluded to the fact, that stimulants are much more exciting to the physical system here than there.

Mr. Desor added, that Germans observe that they lose flesh after their arrival in America.

The President said, he had no doubt foreigners lose flesh in coming to America, and that the Americans are, as a race, thinner than the Europeans. Formerly, this fact was attributed in New England to the large quantities of cider drank; but this opinion must have been erroneous, as this practice has almost died out and the fact remains. Possibly the dryness of the air may have something to do with it, from its constringing properties.

Mr. Briggs said, that he had noticed that English workmen, who had been accustomed at home to drink from four to six quarts of beer daily, are quite unable to drink that quantity in New England without intoxication. In Missouri, at a temperature of 120° and an atmosphere so humid that with a dew-point at 90° the roads were made muddy by the condensed moisture, he had noticed that men could drink very large quantities of stimulants without intoxication. On the other hand, at the present season of the year, the air of New England is so nearly anhydrous, that such articles as raw hides dry at a point several degrees below freezing, without being frozen.

Dr. Cabot said, that he had frequently heard it remarked by gentlemen from Europe, that they found the climate of New England very stimulating to the nervous system.

Mr. Bouvé thought that very many of the differences of custom between the English and Americans might be directly or indirectly traced to the differences of climate as the sole cause.

Mr. Briggs referred to a subject which had been discussed at a previous meeting of the Society, (see Proceedings of May 1, 1850, Vol. iii. p. 287,) namely, the oscillation of the sheet of water at Hadley Falls, which is accompanied by a loud noise and a jarring sensation, perceptible at a great distance. It had been attributed in part to the vibration of the timber of which the dam is constructed. He had recently observed the same phenomena at Trenton, where there is a dam of sixty feet in length, with a fall of twelve feet. Here the sheet, at certain stages of water, undulates forward and backward through a distance of three or four feet, and causes, by the jarring which it produces, great annoyance to the dwellers in houses in its vicinity. The dam is built of stone on a stone foundation up to within three feet of the top, which is constructed of timber. In this case, therefore, the oscillation cannot be properly attributed to the vibration of the dam. The phenomenon occurs when the water is about four inches deep on the dam, ceasing as it becomes deeper. Mr. Briggs found that by inserting a board at one end of the Fall, thus diminishing the width of the sheet, the oscillation immediately ceased. In fact, it was evident that it depended upon a relation between the width of the sheet, its thickness, and the air beneath it.

February 4, 1852.

The President in the Chair.

The Secretary presented, in the name of Mr. Girard, descriptions of two new genera and two species of Nemertes, as follows: —

Hecate Girard. General form elongated, linear, subcylindrical, tapering posteriorly. Head oblong, rounded, anteriorly truncated, continuous with the body; neck slightly contracted. Eyes four in number, as in Tetrastemma.

H. ELEGANS Girard. Blackish brown, with a yellowish line all along the back, from the snout to the tail, and dotted with black. A similar line, but rather whitish, is seen around the neck, forming a kind of ring. Length one inch and a quarter; breadth a sixteenth of an inch. From deep water in Boston Harbor. A marbled variety has been observed in the same locality.

POSEIDON Girard. Body cylindrical, tapering anteriorly and posteriorly, very contractile. Eyes very numerous, situated near the anterior extremity, distributed over two elongated areas. The body, when in a contracted state, exhibits transversal and annular wrinkles.

P. COLEI Girard. Uniformly yellowish red, with a few irregular and small whitish dots. Total length about one inch; breadth a tenth of an inch. Found in both Boston and Beverly Harbors, near low-water mark. This species we have dedicated to Thomas Cole, Esq., of Salem, Mass., as a tribute of respect and esteem.

No specimens of either of these two species are as yet preserved in any Zoölogical collection.

Dr. Kneeland read a communication on "The Leanness of the American People." His conclusion was, that the cause of this is an excess of oxygen taken into the system from the exceedingly dry air of North America, and the consequent too complete consumption of the carbon taken in the form of food. The means of obviating this would be the use of a greater amount of food containing the true elements of respiration, non-nitrogenized substances, such as starch, gum, sugar, fat, &c.

Dr. C. T. Jackson said, that he doubted if chemical analysis would show that moist air contains less oxygen than dry. In this opinion he was sustained by Prof. Rogers, who observed that all nations living in a dry air tend to thinness of flesh, such as the Arabs for instance, and the inhabitants of Central America. In the moist climate of Cuba the Spaniards show a tendency to corpulency, whereas in Mexico they are thin, like the Arabs. Similar differences are seen in all of the domestic animals under similar conditions.

Mr. J. H. Abbot thought that moral causes had a very powerful influence in producing the proverbial thinness of the New Englander. In no part of the world was there such general mental activity.

Mr. Desor mentioned the circumstance, that the *voyageurs* of the great western lakes and rivers are in the habit of eating very large quantities of sugar daily.

Dr. C. T. Jackson stated in confirmation, that the men of Dr. Locke's party, when he was engaged in his geological survey, were discontented because they received but one pint of sugar each, daily. Sugar has great heat-generating power, particularly grape sugar. Dr. Jackson had himself found, on a certain occasion when he and his surveying party were suffering greatly from cold, that eating a few raisins was sufficient to impart a glow to the whole system. The effect was probably due to the grape sugar they contained.

In answer to a question, whether he had noticed differences in the inhabitants of different parts of North America proportional to the different degrees of humidity in the atmosphere, Prof. Rogers replied that he had. The inhabitants of New Brunswick, which has a moist climate, are fatter than New Englanders generally. In travelling by the western steamboats, more stout men are usually to be found among the passengers than are seen among the same number of people in New England. The descendants of the Scotch and Irish in Virginia and the Carolinas, are much thinner than those living in Florida, or on the shores of the Gulf of Mexico and the Bay of Fundy.

Mr. Storer suggested, that the free use of ardent spirits might be one cause of the tendency to obesity among the New Brunswickers.

As an instance of the effect of the extreme dryness of the atmosphere of New England, the President stated that a tooth of *Mastodon primigenius,* which he had brought from Europe, on sawing it open crumbled to pieces at once.

The President exhibited a tooth of *Mastodon giganteus,* having upon its upper surface a layer of *crusta petrosa.*

Mr. H. R. Storer read a paper giving a botanical description and an account of the medical properties of *Cimicifuga racemosa,* Black Snakeroot of New England.

Mr. Wells exhibited a lump of pure Anthracite coal from the calciferous sandstone of New York. Dr. Burnett, from microscopic examination, had pronounced it to be fucoidal in its origin. The specimen was submitted to him without any statement as to the locality from which it had been taken.

Prof. Rogers said, he very much doubted the power of the microscope to demonstrate such a fact in such specimens of coal. He thought that in the process of the formation of such specimens, all traces of a vegetable origin must be lost.

Dr. C. T. Jackson said, that such specimens of Anthracite as that exhibited were not uncommon. At Vinal Haven, Maine, is a vein of this substance in the Old Silurian rocks, mingled with hornstone and old slate.

Mr. Bouvé said, that he had in his collection, quartz crystals from Herkimer county, N. Y., containing pieces of Anthracite of considerable size.

Dr. C. T. Jackson exhibited specimens of Cannel coal from Kentucky and Virginia, which were rendered highly electrical by friction. In a similar specimen from Scotland, this effect was not produced. The coal from Peticodiac River is highly electrical. It is remarkable for the large quantity of bitumen which it contains.

Dr. Cabot presented a male and female Smelt, *Osmerus viridescens,* from Lake Champlain. The specimens were interesting from having been obtained in fresh water.

Mr. H. R. Storer presented a specimen of the European Mackerel, *Scomber scomber,* taken by himself off the coast of Norway; also a new specimen of *Phyllobranchus.*

Mr. J. E. Cabot read, at the request of Mr. Desor, a translation of a portion of a letter received by the latter gentleman from M. Verneuil. It treated of various geological subjects; among others, of the fossil reptiles of Lebach and Canada, and gave an account of the geological labors of the writer during the spring of 1851.

February 18, 1852.

The President in the Chair.

Mr. H. R. Storer read a paper on the botanical characters and the medical properties of *Sarracenia variolaris.*

Prof. Henry D. Rogers made a communication in the joint name of Mr. E. Desor and himself, respecting the equivalency in geological age, of the coal formation of the United States, and the Anthraciferous strata of France, in the departments of Mayenne and Sarthe.

These last named deposits have been referred by the eminent French geologists, MM. de Verneuil and d'Archiac, as mentioned by M. Elie de Beaumont, in his very able essay on the Ancient Mountain Systems of Europe, to the date of the Carboniferous Limestone.

M. Elie de Beaumont, guided by his ingenious views of the identity in epoch of elevation of mountain chains coinciding with the same great circle of the globe, conceives that the coal strata of the Appalachian chain of the United States were uplifted and undulated into the flexures they now exhibit by the same great movement which disturbed and folded the Anthracites of the northwest of France; and he therefore deduces for the period of elevation of the former, the above-mentioned ascertained age of the latter; that, namely, immediately after the deposition of the Carboniferous Limestone and previous to the creation of the true coal strata of Europe. This is to assign, in other words, an earlier age by one great period, to the formation and elevation of the American coal rocks than to the European. In seeming corroboration of this view, there occurs, in the same quarter of France, as stated by M. de Beaumont, a group of coal-containing rocks, resting in horizontal position on the previously upturned edges of the folded anthraciferous strata, and therefore of a posterior age; and these he regards in his Essay as of the true period of the coal formation of Europe.

Now the chief object of the present communication is to call attention to two main points of geological evidence, which go rather to invalidate the conclusions of M. de Beaumont, and to refer the great coal deposits of the United States to the age of the true coal rocks of Europe. A first and almost conclusive argument is, the much closer accordance which subsists between the organic remains, both vegetable and animal, of the American and the European coal measures, than between those of the American coal and those of the European Carboniferous Limestone. The other fact is, the now ascertained Permian or even later age of the coal-containing strata unconformably overlying the Anthraciferous rocks of France, which may therefore, so far as any evidence from position is to be regarded, prove themselves to be the equivalents of the true coal formation of the west of Europe and not of the Carboniferous Limestone. Either the Anthracite beds of Mayenne and Sarthe are older than our American coal seams, and of a different date of elevation, despite the concurrence in the direction of their lines of upheaval, or else they are parallel in time, and the evidence presented by the skilful French Paleontologists, is imperfect and demands revision. The authors of the communication pretend not to decide this question, but content themselves with intimating, that in view of the obvious equivalency of the American coal strata with the European, as demonstrated by their fossils, and considering the grand scale upon which the American formation is developed, this great group of strata ought not, on grounds merely theoretical, to be regarded as pertaining to any period but that which is typical and characteristic of the main coal-deposits of the rest of the globe. Should the Anthracites of northwestern France prove, on a reëxamination, to be also of the same age, then, but not until then, will the ingenious hypothesis of M. de Beaumont, which assigns to these and the American coals the same epoch of disturbance and uplift, because of their coincidence in direction on the sphere, maintain itself unimpaired.

Mr. Desor called the attention of the Society to a passage in one of the last works of M. Elie de Beaumont, entitled "Notice sur les Systémes de Montagnes les plus anciens de l'Europe," in which the author formally discountenances the opinion entertained by some geologists, that the upheaval of each of the great mountain chains has caused the destruction of the whole animal and vegetable population of the globe. He refers especially to the elevation of the hills of Bocage, in France, and of the chain of the Pyrenees, as having occasioned no organic change whatever. In the latter case the same eocene species occur both in the uptilted strata of the mountains, and in those abutting horizontally against them. If it be thus proved that the elevation of such a gigantic chain as the Pyrenees, did not affect the animal world, what authorizes us to infer that the upheaval of other and lesser mountain chains should have caused the destruction of all living beings, as it is assumed in some of our text-books. Mr. Desor expressed the hope that the time may not be far distant when paleontologists will satisfy themselves that the changes which we witness in the history of past geological ages have taken place gradually, and are not the result of violent revolution.

Prof. Rogers gave an account of the general geological character of the Jura range of mountains. On a former occasion he had stated, that the force by which they had been uplifted had come from the direction of the Vosges, not the Alps. The whole chain rests on an inclined plane, rising towards the Alps, apparently showing the contrary to have been the case; but this circumstance is owing to the greater denudation towards the Vosges.

Mr. Stodder announced the discovery of *Iridium* associated with California gold. It occurs in the form of distinct grains, and is precipitated from that metal when fused, by its greater specific gravity. It is used for the tips of gold pens, and is worth, in the market, from thirty to fifty dollars an ounce.

Dr. C. T. Jackson presented the third plate of illustrations to his descriptions of Fossil Fishes, from New Brunswick, together with a copy of his Report on the Coal formation from which they were taken.

March 3, 1852.

The President in the Chair.

Mr. Wells read a paper giving the results of his analysis of the soils of the Scioto Valley, in the State of Ohio. He was of opinion that these soils are of drift origin. (For the Paper in full, see Journal of Boston Society of Natural History, Vol. VI. No. 3.)

Prof. Rogers remarked, that drift materials from the north might exist in the alluvium of the western rivers to some extent, but he questioned, whether they could be properly referred to the Secondary rocks. As to the absence of Carbonate of Lime in the soils analyzed by Mr. Wells, adduced by him as a proof that they were not the result of the decomposition of a Limestone formation, he would state, that the soil for many miles in the Scioto Valley, lies over Limestone, but nevertheless contains no trace of Carbonate of Lime, for the reason that it has been washed out by rains or destroyed by vegetable acids.

Mr. Wells replied, that he had been led to his opinion of the drift origin of the soils in question by the nature of the minerals contained in them.

Dr. Cabot read a letter from Dr. John Gundlach, Cardenas, Cuba, acknowledging the receipt of his diploma as Corresponding Member, and transmitting descriptions of five new species of birds and other Ornithological notes of Cuban species; also presenting in the name of Señor Juan Lembeye his work on the Birds of Cuba.

The thanks of the Society were voted to Mr. Lembeye for his donation.

March 17, 1852.

The President in the Chair.

Mr. H. R. Storer read a paper on the botanical characters and the medical properties of the family *Compositæ*.

Mr. W. O. Ayres read a description of a new species of Polyp from Long Island, allied to Tubularia, under the name of *Globiceps tiarella* Ayres.

The generic characters may be thus expressed. Polypidom rising from a creeping root, branched. Short stems from the branches, supporting each a single polyp. Polyp encircled by three rows of arms, basal, medial, and near the summit; the arms of the upper rows ending in globular heads. Polyp not retractile within the tube.

The peculiar form of the arms suggests a generic name — *Globiceps*. The species, from its triple crown of arms, may be called *G. tiarella*.

The Polypidom in luxuriant specimens is five or six inches in height, bearing from one hundred and twenty to one hundred and fifty polyps. It is of a dark, brownish horn color, with polished surface, looking at a little distance like horsehair, and when seen waving gently in the water, with its bright red polyps, it has the appearance of a beautiful flowering plant. The upper portion of each tube, (from which the polyps rise,) is surrounded with rings.

The body of the polyp, above the tube, is ovoid oblong. The mouth is undoubtedly at the extremity, though in numerous examinations with a high power I have been unable to detect it. Near the base is a circle of long, slender, nearly cylindrical arms. These on their exterior half show no trace of fibres but are crowded with oval cells containing in each an organ perhaps similar to one to be presently described in the upper arms. It is, however, so minute that a power of six hundred diameters fails to show its form. The interior half of the arm has none of these cells but is strongly marked with transverse lines of fibres ; that they are muscular is not proved. From within this circle of arms spring the ovarian vesicles, from which undoubtedly the medusa form of the polyp is developed, though this development has not yet been observed. They are ovoid, equalling the arms in length.

The arms of the second row are much shorter and of less number. Each consists of a slender pedicle surmounted by a large, globular head. The head is studded with numerous ovoid cells, with the broader end outward. The cells are seen to contain each a minute filament. On the application of pressure, the cell opens and the filament is protruded and at the same moment expanded into an exceedingly acute barbed arrow-head. The delicacy of this organ may be estimated from the fact, that the cell which contains it is less than one twentieth of a millimetre in length. The mechanism by which the animal is able to protrude and retract the dart is too much attenuated to be visible by any magnifying power I possess. The cell is lined with an extremely thin membrane, which possibly may assist in the operation, but it apparently would not be able to draw down the wide-expanded barbs and confine them to the shaft of the dart. A higher magnifying power may yet solve the question. The dart is similar in shape to that in Hydra. In one instance I saw four barbs instead of a single pair.

The arms of the third row are entirely similar in structure to those of the second; the pedicels are a little longer. They, as well as the second, are commonly not more than seven in number.

This species is found somewhat abundantly at Sag Harbor, L. I. It is found attached to Fuci, &c. both in still water and within the rapid flow of the tide where confined by bridges. My observations upon it, during two seasons, have been made only in August, and of course its metamorphoses I have not seen. The same species, or one closely allied, I have found in Boston harbor.

Mr. Ayres stated, that the South Shore of Long Island is generally sandy, with many stones of various sizes upon it beneath the water. He had noticed, in many places, generally under the deep water side of these stones, a cavity large enough to hold two or three quarts, in which a Toad fish was lying, nearly concealed. In this position the fish readily bites at any bait offered it. On driving out the fish, its young are found, several hundreds in number, clinging to the under surface of the stone by the yolk sac, which is still attached to the abdomen, and serves as a sort of sucker. The young are at this time from one and one fourth to one and a half inch long. When the yolk is absorbed they swim about freely in the water. It seems probable that the parent fish remains in the hole for the purpose of protecting her young, as she always returns to it after being driven out.

Dr. Storer alluded to the scientific name of this species, *Batrachus tau*, as being very badly chosen, since the character which gives it this name is not seen until after the death of the fish.

The donation was announced in the name of Mr. Uriah A. Boyden, of the Voyage au Pole Sud et dans l'Oceanie sur les Corvettes l'Astrolabe et la Zeleé, 16 volumes, 8vo, with folio plates.

On motion of Dr. Gould, seconded by Dr. Storer, it was voted, that the thanks of the Society be presented for the donation, and that Mr. Boyden's name be placed on the list of patrons.

Dr. Cabot presented, in the name of Mr. B. P. Poore, a male Peacock; also a specimen of *Clangula Americana*, from Mr. William Sohier; eleven Ornithological specimens from Mr. Theodore Lyman, and two from himself.

The thanks of the Society were voted to Messrs. Poore and Sohier for their donations.

BOOKS RECEIVED DURING THE QUARTER ENDING MARCH 31.

Silliman's American Journal of Science and Arts. No. 37. Vol. VIII. For January, 1852. *Received by Exchange.*

Journal of Agriculture. Vol. I. 8vo. Boston, 1851. *Received by Exchange.*

Archives du Muséum d'Histoire Naturelle. 4to. Tome IV. Liv. 4. Paris. *Received by Exchange.*

Memorias de la Real Academia de Ciencias de Madrid. Tome I. 1 Parte. 4to. Pamph. Madrid, 1850. *From the Academia de Madrid.*

Resumen de las Actas de la Academia Real de Ciencias de Madrid. 4to. Pamph. Madrid, 1850. *From the Academia de Madrid.*

Historical Sketch of Gordiaceæ. By Charles Girard. 8vo. Pamph. Philadelphia, 1851. *From the Author.*

Royal Institution of Great Britain. List of Members, Officers, &c. 12mo. Pamph. London, 1851. *From the Royal Institution.*

Contributions to Conchology. By C. B. Adams. Part 10. 8vo. Pamph. 1851. *From the Author.*

Transactions of the Entomological Society of London, Vol. 1. Part 7. New Series. 8vo. Pamph. London, 1851. *From the Entomological Society.*

Bibliotheque Conchyliologique, Chenu. Tome I. E. Donovan, Coquilles d'Angleterre. Tome II. T. Martyn, Conchyliogiste Universel. III. Leach, Conrad, Say, Rafinesque. Conchyliologie Americaine. IV. Montagu. Testacea Britannica. V. Transactions de la Soc. Linnéenne. 8vo. Paris, 1845. *From E. Desor.*

Bulletin de la Société Géologique de France. 2ième serie. Tome VIII. Feuilles 28 – 34. (19 Mai – 16 Juin, 1851.) *From the Société Géologique.*

Twenty-fourth Anniversary Address before the American Institute of New York. By C. T. Jackson, M. D. 8vo. Pamph. New York. *From the Author.*

Journal and Transactions of the Lower Canada Agricultural Society. Vol. IV. Nos. 1 – 12. 8vo. Montreal, 1851. *From J. A. H. Latour.*

Catalogue of Library and Museum of Natural History Society of Montreal. 8vo. Pamph. 1846. *From J. A. H. Latour.*

Report of the Superintendent of Education for Lower Canada, for 1846 – 7. 8vo. Montreal, 1848. *From J. A. H. Latour.*

Journal of the Academy of Natural Sciences of Philadelphia. New Series. Vol. II. Part 2. 4to. Philadelphia, 1852. *From the Academy of Natural Sciences.*

Proceedings of the Academy of Natural Sciences. Vol. V. No. 12. pp. 307 – 362. 8vo. Philadelphia, 1851. *From the Academy of Natural Sciences.*

Archives du Muséum d'Histoire Naturelle. Tome III. Livraison 4. Tome IV. Livraisons, 1, 2, 3; et Tome V. Livraisons 1 – 3. 4to. Paris, 1845 – 50. *From the Muséum d'Histoire Naturelle, by M. Vattemare.*

Catalogue de la Collection Entomologique. 2 Livraisons. Catalogue Méthodique de la Collection des Reptiles. 1 Livraison. 8vo. Pamph. Paris, 1850 – 1. *From the Muséum d'Histoire Naturelle, by M. Vattemare.*

Esquisse Topographique et Geologique du Mont Etna. Par L. Elie de Beaumont. (5 small maps.) *From the Muséum d'Histoire Naturelle, by M. Vattemare.*

Contributions to the Natural History of the Fresh Water Fishes of North America. By Charles Girard. 1. A Monograph of the Cottoids. 4to. Pamph. Washington, 1851. *From the Author.*

Aves de la Isla de Cuba, par Juan Lembeye. 8vo. Habana, 1849. *From the Author.*

Catologo de las Aves Observadas en la Isla de Cuba hasta Oct. de 1850. 8vo. Pamph. 1851. *From the Author.*

Transactions of the Academy of Munich. Vols. 28 – 31. 4to. 1849 – 50. *From the Academy of Munich.*

Voyage au Pole Sud et dans l'Oceanie sur les Corvettes l'Astrolabe et la Zeleé. 16 vols. 8vo. With Plates. Paris, 1843. *From Uriah A. Boyden.*

Transactions of the Linnæan Society of London. Vol. XX. Part 3. 4to. London, 1851. *From the Linnæan Society.*

Proceedings of the Linnæan Society. Nos. 34 – 46. 8vo. London, 1847 – 1851. *From the Linnæan Society.*

Description of a new genus of the Family Melaniana, &c. By I. and H. C. Lea. Also Descriptions of five new species of Anodonta. By Isaac Lea. 8vo. Pamph. London, 1851. *From the Author.*

Received from the Courtis Fund.

Annals and Magazine of Natural History, for December, 1851. No. 48.

Ray Society. Alder and Hancock. Nudibranchiate Mollusca. Part 5. 4to. London, 1851.

British Species of Angiocarpous Lichens, elucidated by their Sporidia. By Rev. W. A. Leighton. 8vo. London, 1851.

Annals and Magazine of Natural History. No. 49. Vol. IX. For January, 1852. 8vo. London.

Annals and Magazine of Natural History. No. 50. Vol. IX. For February, 1852. 8vo. London.

History of British Mollusca and their Shells. By C. Forbes and S. Hanley. Parts 41 – 43. 8vo. London, 1851 – 2.

Annals and Magazine of Natural History. No. 51. Vol. IX. From March, 1852. 8vo. London.

Deposited by the Republican Institution.

History of the Conspiracy of Pontiac. By Francis Parkman, Jr. 8vo. Boston, 1851.

North American Herpetology. By J. E. Holbrook. 5 vols. 4to. Philadelphia, 1842.

Cyclopædia of Anatomy and Physiology. Edited by R. B. Todd. Part XLII. 8vo. London, 1852.

History of the United States. By George Bancroft. Vol. IV. 8vo. Boston, 1852.

Municipal History of Boston during two Centuries. By Josiah Quincy. 8vo. Boston, 1852.

April 7, 1852.

The President in the Chair.

Mr. Teschemacher read a communication on the existence of numerous coniferous plants during the coal period, and on the general resinous nature of coal of all descriptions, as follows: —

The paper I last read before the Society advanced the proposition, that the Stigmaria, so abundantly and so universally found in the Coal formations, was a resinous plant identical with the genus *Picea.* I will now support this by evidence tending to show the existence of other coniferous plants at this period, as well as the general resinous nature of coal of all descriptions. The following specimens I would exhibit in illustration.

1. A slice of Southern Pine, (*Pinus australis*,) in which, owing to its resinous nature, the glandular vessels of the coniferous tribe are very clearly visible.

2. A slice of the same carbonized, in order to show the appearance of these glands when changed by this action.

3. A specimen of Anthracite, and one of Cumberland coal, in which these glandular vessels are extremely distinct. Such specimens are quite common in Pictou coal.

4. Impressions in the Shale from Carbondale, Pa. of the leaves of a species of Pinus.

5. A specimen of the same Shale, showing an impression of the base of a bunch of leaves and its sheath at the junction with the stem.

On comparing the latter with the accompanying specimen of the *Pinus australis* of the present day, its close resemblance is very evident, it fitting the impression almost as if moulded from it. On the side of the recent specimen, adjacent to the axis of the branch, is a protuberance formed by the vessels which penetrate the bark, and depressions on each side thereof, to which the impressions of those in the Shale, although faint, bear a close resemblance. In many of the leaves of the recent fir tribe there are rows of glands extending from the base to the summit, and, in some, very minute spines on each edge ; it cannot be expected that these microscopic characters should be visible in impressions on so coarse a material as the Shale, but no doubt they will be found when similar impressions are discovered in the coal itself.

Other impressions of leaves of Coniferæ are in my Collection, some in the Anthracite, but although I have no doubt of their being leaves, they are not so undeniable as to be exhibited as proofs. I pass on to the Chemical evidence. Lehmann, in his Physiological Chemistry states, that *formic acid* is found in coal during the process of decay (eremacausis) and also that it is found in the berries of the Juniperus and in the cones of several of the fir tribe. Redtenbacher finds formic acid in the leaves and twigs of the fir tribe during fermentation (incipient eremacausis.) A few years ago, Pelletier and Walther examined the tar produced by the distillation of resin, and found therein two substances, which they named *retinnaptha* and *retinnyle*, and then the well known napthaline.

The progress of Organic Chemistry has since shown the two former substances to be the Toluole and the Cumole of the present day. In 1849, Mansfield, at the instigation of Dr. A. W. Hoffmann, investigated the products of the distillation of the coal tar from gas works, chiefly, however, with the view of ascertaining the boiling points of the various educts. He tabulates the neutral results of his distillations as follows : —

1. Benzole, $C^{12} H^6$
2. Toluole, $C^{14} H^8$ the retinnaptha } of Pelletier and Walther.
3. Cumole, $C^{18} H^{12}$ " retinnyle } of Pelletier and Walther.
4. Cymole, $C^{20} H^{14}$

and then Napthaline.

I will now simply advert to the opinion of Göppert, in his prize essay. He supposes the origin of the coal to be from a fermentation and consequent eremacausis of vegetable matter; others suppose this vegetable matter to have been chiefly mosses, such as form the large accumulations of peat. My view is, that coal is chiefly composed of resinous trees, (Conifers,) and Oleaginous trees, (Palms,) these latter being in excess in the Cannel coal. I now wish to show, that all coal has been formed from nearly the same original materials, and probably nearly under the same circumstances, from the Anthracite to the most bituminous. This I propose to do by exhibiting these specimens, selected from many hundreds in my possession, of Anthracite coal from Pennsylvania, of bituminous coal from the Cumberland basin, and from Hillsboro'; specimens from Pictou and other localities might have been added. The comparison of these, the exact similarity in their structure, marks of organisms, and peculiar fracture, can leave but little doubt on the subject; they exhibit, however, but a small portion of the resemblances manifest on a minute and extended investigation.

From what cause then can arise the difference in various coals? At present only three characters of diversity are apparent.

Specific gravity, quantity of carbon, and quantity of hydrogen: to show this the descending scale may be used thus: —

	Hydrogen.	Carbon.	Spec. grav.
Asphaltum,	9 per ct.	18.10	1.063
Hillsboro' Coal,	——	——	1.09 to 1.12
Cannel,	5.66 to 6.00	81.00	1.28
Bituminous, various,	4.80 to 5.60	81 to 86	1.29 to 1.32
Anthracite,	2.40 to 4.20	89 to 92	1.34 to 1.47
Graphite,	none	99	2.27

The difference in specific gravity and carbon would seem to depend on the diminution of the hydrogen. How this has been separated, whether by a process of time, of pressure, of heat, or, as is most probable, by a process of which we are entirely ignorant, must be a subject for future investigation.

It must be obvious that the foregoing is but a very faint outline of some of the results of my yet imperfect examination of this subject, imperfect mainly because the means of a more perfect one are yet out of reach. The chemical analyses of coal have hitherto been undertaken chiefly with commercial views, and altogether to obtain ultimate principles. But the daily operations of the gasworks exhibit products showing that much has yet to be done in these analyses to satisfy the increased progress in the science of organic chemistry. My own experience has also led me to the conclusion, that much more remains yet to be accomplished in the study of the internal structure and contents of coal,* and that the vast and varied coal formations of this immense Continent are chiefly to be relied on as the fields for this study.

The consequences to geology, should the truth of my views be finally sustained, are obviously of importance, with respect to the present opinions on central heat, on the atmospheric state of these early periods, and on other points on which the present is not the proper time to enlarge.

Dr. C. T. Jackson expressed great interest in Mr. Teschemacher's investigations, and signified his concurrence in the views advanced by him.

Dr. C. T. Jackson read a letter from Robert Foulis, Esq. of St. Johns, N. B., addressed to the Corresponding Secretary, giving a description, with drawings, of a large Shark recently taken in the Bay of Fundy, with an account of its capture, as follows: —

On the 6th of August, 1851, as Captain Helms, of the coasting schooner Favorite, was approaching the western entrance to the harbor of St. John, and distant about eight miles, he discovered a large monster fish entangled in a number of fishing nets. As the creature was nearly exhausted with its exertions to get clear of the entanglement, it was easily captured and despatched. On clearing away the nets and bringing the fish along-side the schooner, the animal was found to measure forty feet in length.

* On the application of heat, many Anthracites separate into laminæ as thin as paper. These are alternate layers of hardened, resinous hydrocarbon, and of vegetable matter, often retaining in its state of ashes its original forms; this last is the first burned out, leaving the laminæ of the former exposed.

A chemical comparison of the ashes of the vegetable layers, selecting only that part where form permits no doubt, with the ashes of recent plants, particularly of Conifers and Equisetums, would be very interesting.

Captain Helms succeeding in cutting open the fish and extracting therefrom three hundred and twenty gallons of liver matter.* The crew afterwards separated the head from the body by making a division between the gill openings and the pectoral fins, and managed, after much exertion, to hoist it on board, although it was estimated to weigh over a ton. On hearing of this extraordinary capture, I hastened, on the arrival of the schooner into port, to view and procure the trophies, (the head and caudal fin,) by which I am enabled to furnish the following particulars.

The *Head*, as it lay on the deck of the schooner with the under jaw uppermost, measured between the posterior angles of the lips, five feet across from angle to angle, in a straight line. The upper or frontal portion of the head terminated in a smooth, round, conical, blunt pointed snout, the extremity projecting twelve inches beyond the opening of the mouth ; around this snout there were a number of regular lines of pores or papillæ that on pressure gave out a gelatinous secretion.

The *Eye* is situated fifteen inches from the point of the snout and only three inches from the verge of the lip, so that this animal must have been enabled to distinguish objects close to the entrance of the mouth or even inside its capacious jaws when they were open. The eye-ball projects from an oblong socket and is turned somewhat downwards.

The *Nostrils* are placed seven inches forward of the eye on the underside, from the interior of which some filaments project.

The *Gills* are five in number and nearly surround the neck. Each gill has imbedded in it a cartilaginous bone arch that terminates in ligaments attached to the Os hyoides and ethmoid, and there is, in the middle of the arch also, a ligament that answers the purpose of a joint. The gills seem capable of powerful muscular expansion and contraction. Each gill-opening is provided with a *cullender* or comb-like apparatus, apparently for retaining or preventing the smaller portions of food from passing through the gill-openings with the water received by the mouth.

* The stomach was opened but contained only a few remains of Molluscous animals.

The gills, I think, have a double action. When the mouth is shut and the gills expand, water will then rush in to fill up the vacuum and carry any food retained on the inside of the *cullender* apparatus towards the centre of the mouth over the tongue, where there are two temporal *blow-holes*, the valves in which will now open and allow the water to escape upwards, while the tongue holds the food and delivers it into the gullet. These temporal *blow-holes*, I conceive, act like safety or escape valves; thus causing the *cullender* apparatus, by a suction through the gill-openings, to discharge the contents they have retained from a previous mouthful, into the centre of the mouth, and bringing the food opposite the throat into a position where it can be most easily swallowed.

When the head was being hoisted ont of the schooner, and suspended by a tackle hooked through the under jaw, the gap looked fearfully large, and presented a space so capacious, that a gentleman who was present stepped between the jaws and stood nearly upright with his hat on. The *teeth* are small for the size of the animal; are placed in rows generally six and seven deep. They are shaped like a cone flattened on one side, and curved upwards. The cartilaginous bones of the jaws exhibit a membranous structure, the sheets or fibres passing transversely under each other in each alternate layer.

On making a longitudinal slit through the centre of the snout, I found that the knife passed into a large cavity, or chamber, filled with the gelatinous matter that was seen to ooze through the exterior pores. This gelatinous matter had the appearance of a solution of starch, and seemed to be attached to soft filaments which proceeded from secreting vessels. I could not discover any connection between this chamber and the olfactory apparatus.

The *Cranium* is very small, and in fact looks rather like an enlargement of the end of the spinal column. The bone seems to consist of a single piece, and to be placed well back in the head, so that the optic nerve must be of great length when we consider the situation of the eye. The auditory apparatus escaped my observation.

The *Caudal fin* vertical, the extremity of a crescent shape, the extremes being eight feet apart. From the medial line to the extremity of the upper lobe, four feet nine inches; to the extremity of the lower lobe, three feet three inches. The tail at the commencement of the caudal was twelve inches in diameter, with keels on each side; these keels seem to be sheaths, through which muscles pass to give motion to the tail fin. There are indentations on the upper and under terminations of the tail, which allow of an independent vertical motion of the caudal fin. This fin is thick and formed of membranes like those in the Cetacea; it seems to be very strong and tough, and only thins off at the extremities.

The *Skin* is of a bluish gray color and is covered with hard tubercles, which proceed somewhat in lines from the snout toward the temporal *blow-holes*. These *blow-holes* no doubt, besides serving the purpose I have suggested, have other functions to perform in connection with the branchiæ.

I have considered this animal as belonging undoubtedly to the Selachii family, and to the genus Selachus, and if it does not belong to the species *S. maximus*, (which I believe is the largest known inhabitant of the deep excepting the Cetacea,) it must belong to a species nearly allied to it. Although this species but seldom enters the troubled waters of our tidal Bay, yet I think we occasionally have visits from them. It is probable that it was an animal of this genus that some years ago, by getting entangled with a schooner's cable at anchor in St. Andrews' Bay, dragged the vessel some miles to sea with great velocity, to the great alarm of the mariners, who ascribed the whole cause of their unwilling transportation to the doings of the great *Sea Serpent.*

ADDENDA.

It is rather singular, that a few days after Captain Helms had made the capture related in the foregoing notice, the following adventure occurred on the eastern side of our harbor.

As —— Scovell was returning alone from fishing pollock on the eastern passage to this harbor, in a small boat, he was alarmed by feeling something whisk across the back of his head. On looking round, however, he could not see from whence it proceeded, and pondering on this strange circumstance, he resumed his occupation, but soon after received another unmistakable blow, and on looking round he saw the fin of a shark descending into the wave. The shark soon reappeared along-side the boat and gave evidence of a hostile intention, which much alarmed Scovell, who endeavored to drive off his assailant by blows with his oar, but the shark returned again and again to the charge. Scovell now in great alarm and trepidation, began to pull vigorously for the nearest landing, (distant about half a mile,) the shark following and making repeated blows at the boat with his tail. On reaching the shore he jumped out of the boat and ran up the beach to high-water mark, when he turned round and perceived that the returning surge of the surf had thrown both boat and shark up high on shore. It being ebb tide, Scovell, by means of an oar, had little difficulty in keeping his antagonist on terra firma, where he now became the assailant, and by administering sundry blows on the head of the shark he soon succeeded in vanquishing his daring antagonist.

Scovell had been baling out his boat, which was leaky, a short time previous to the first attack of the shark, and as the water thrown out was discolored by the blood from dead fish lying in the bottom of the boat, it is probable that this was the incentive that produced so bold and audacious an attack.

On examining this fish, I found it to be an individual belonging to the genus *Carcharias*, and the species *C. vulpes*, known as the Fox shark, or *Thresher*. It measured, in a straight line, fourteen feet, and in the curve fifteen feet in length.

This animal is occasionally seen in our Bay, but I have not heard of any other such daring attack being experienced from them by our fishermen. The stomach of this shark, when opened, was found empty.

Questions naturally are suggested, from the two captures happening so near each other in point of time. — Are we indebted to the same cause for these visits ? Do these animals roam and act in concert ?

Dr. Storer remarked, that from the great size of the fish it might possibly be the *Squalus Elephas* Lesueur, the *Selachus Maximus* L., of which one was exhibited in Boston some years since. The drawings, however, do not agree with his published figure of that species.

Mr. H. R. Storer read a medico-botanical paper on the Ranunculaceæ.

Mr. W. O. Ayres presented a description of a new species of Holothuria, brought from the coast of South Carolina, by Mr. Stimpson, to which he proposed to give the name of *Pentamera pulcherrima.*

The genus *Pentacta* — or according to many authors — *Cucumaria,* has, until quite recently, been made to include all the species whose suckers are arranged in five regular rows. It is, however, now found to comprise rather a family than a single genus, inasmuch as many types of quite diversified structure agree in the arrangement of their suckers. The present species has them in five rows, but cannot be classed with *Cucumaria*, as limited by Duben and Koren. They describe the oral circle as "nec sursum nec deorsum in longiores processus productus." Mr. Forbes says it has "nearly square plates." Our species has them nearly as in *Sclerodactyla.* With *Botryodactyla* it agrees in the rows of suckers but not in the oral circle, nor in the nature of the integuments, which are much more allied to those of *Stereoderma.* The tentacula are like those of *Sclerodactyla.* It appears necessary, therefore, to establish a new genus, which may be called

PENTAMERA Ayres.

It is thus characterized. Body ovate, elongate, with the extremities inclining upward. Tentacula ten, two less developed than the others, much branched; calcareous deposits in irregular perforated plates, like those of *Thyonidium* but much smaller. Anus armed with calcareous papillæ. Oral circle of ten pieces, shaped like those of *Sclerodactyla* (Proceedings of Boston Society of Natural History, Vol. IV. p. 102.) Suckers numerous, in five rows. Skin with abundant calcareous deposits, in numerous inseparable, perforated layers. Genital tube undidivided.

Adopting the specific name proposed in Mr. Stimpson's manuscript, the species will be called *P. pulcherrima.* Having only a single specimen for description, some parts of the internal structure cannot be studied.

The specimen is about two inches in length and nearly three fourths of an inch in diameter, in its contracted state. "Body between the rows of suckers of a beautiful bluish color, smooth, and shining, with light pink reflections. Suckers when contracted, fawn color; when extended, white." (St. MSS.) The suckers are somewhat numerous, in five well defined lines, each row being biserial, with a narrow space between the series. The sides of the suckers are supported by multitudes of minute, double-crested, perforated spiculæ very similar to those of *Sclerodactyla briareus*; the crests, with their triple points, project through the integuments, bristling the sucker in all directions. The terminal plate or disc is correctly represented by that of the species last mentioned. In one or two instances the suckers are bifurcate.

The oral circle is composed of ten pieces, each terminating in a short blunt point anteriorly. The alternate pieces, to which the retractor muscles are attached, are prolonged posteriorly in a slender bifurcation, an arrangement similar to that in *S. briareus*, though the parts have no such close union or soldering as in that species.

The form of the tentacula is sufficiently expressed in the generic characters. Their calcareous deposits are in very small quantity, chiefly confined to the main stem or lower branches, very irregular in shape.

The integuments contain calcareous matter in abundance, not in well-defined plates, as in *Chirodota arenata*, where the quantity is similar, but in delicate, superposed, laminæ, each layer thickly perforated, but no perforation extending through the entire deposit.

No opportunity having yet occurred to investigate fully the generative, digestive, or respiratory organs, or the papillæ of the anus, descriptions of them are for the present deferred.

This species was found near Fort Johnson, S. C. by Lieut. Kurtz, U. S. A. and Mr. William Stimpson. It was in shallow water, buried about two inches beneath the sand. But a single specimen was obtained. For the liberality which has placed this, as well as other species of the same family from that region, in my hands for description, I desire to express my grateful acknowledgment.

April 21, 1852.

The President in the Chair.

Dr. Kneeland announced the donation of a nearly complete skeleton of the great Chimpanzée, *Troglodytes gorilla*, by the American Board of Commissioners for Foreign Missions, and read a paper describing it, of which the following is an abstract.

It is a nearly complete skeleton, consisting of a fine skull, with lower jaw, and teeth complete; all the vertebræ, excepting the atlas; the pelvis; both scapulæ and clavicles; the arm and forearm of left side, the ulna of right side with radius and humerus broken; the femur, tibia, and astragalus of right side, and the head and upper portion of left femur; all the ribs, except two on the left side; a few bones of the hand and foot, and the upper portion of the sternum.

The cranium, of immense size and strength, measured in its internal capacity only twenty-seven cubic inches, eight inches less than another specimen belonging to the Society, and only half an inch more than a very young male *T. niger*. It is that of an old male, the crests being exceedingly developed.

The spinous processes of the cervical vertebræ are very long, the shortest being two and one eighth inches, the longest three and three fourths inches. The dorsal vertebræ are fourteen in number, the pairs of ribs being the same; the lumbar vertebræ are three only, less than in any of the higher mammals. The sacrum has a decided anterior concavity. The pelvis comes nearer than in any of the Quadrumana to that of man; it is very much larger, measuring sixteen and a half inches between the anterior spinous processes. The scapulæ, clavicles, sternum, ribs, all resemble the human; the humerus is three inches longer, and proportionally larger and heavier; the bones of the forearm are more curved; the femur and tibia are shorter than in man.

All the bones are very solid and heavy; many of them bear marks of fracture and bony growths, indicating that this was a veteran male, who had seen many a hard fight. The height of this specimen must have been nearly five and a half feet, and the breadth of the shoulders considerably over two feet; the hands extend a little below the knees; the abdomen, judging from the iliac fossæ, must be nearly two feet wide; the lower extremities are strongly bowed.

This is one of the most complete skeletons in this country; there is an entire one at the Jardin des Plantes, Paris, but of a smaller specimen. A more detailed description, with accurate measurements, will be given in the next number of the Society's Journal.

On motion of Dr. Cabot, seconded by Dr. Kneeland, it was

Voted, That the thanks of the Society be presented to the American Board of Commissioners for Foreign Missions for their valuable donation.

The Secretary presented, in behalf of Mr. Charles Girard, descriptions of two new genera and two new species of Planaria; also an account of a new species of Spatangidæ from the Atlantic coast of the United States.

During the winter of 1849, while studying the fauna of Boston Harbor, I met with several specimens of a minute species of a slug-shaped naked mollusk, which I referred at once in my notes to the natural order of Planaria, but belonging to a genus unknown to me. Anxious to ascertain whether the same generic form had not been seen and described by European naturalists, I abstained from giving it a name until I should have access to a paper of Oth. Fabricius on the Danish Planariæ, published in 1826. Having satisfied myself that the *Pl. limacina* of that naturalist is generically allied to the species I had from Boston Harbor, and finding that no generic name has been provided for either, I beg leave to offer it to the Society as a genus, proposing for it the name of

NIOBE Girard.

Body limaciform, smooth, convex above, flat below. There is a distinct foot as in the land and sea slugs, separated from the upper part of the body by a marginal groove or furrow. Head proportionally large and separated from the body by a contracted neck; provided with a single pair of eyes on its posterior or occipital region, if we may apply to mollusks the terms used in describing Vertebrata. Snout slightly notched. The body of the animal swollen and contracted, terminating posteriorly in a pointed tail.

For the Danish species I shall retain the specific denomination under which it has been made known, and call it henceforth *N. limacina*, the color of which is of a uniform greenish brown, paler beneath.

The species from Boston Harbor is less than a line in length; its body and head are not quite as much separated as in *N. limacina.* It has a pale, reddish hue, with transverse bands of white, which have suggested the specific name of *N. zonata.*

In the third volume of the Proceedings of the Society, p. 264, I have described, under the name of *Vortex Warrenii*, a species of marine Planaria, which, after mature reëxamination, I am satisfied constitutes a new genus, which I propose to call

FOVIA Girard.

Body elongated, sides linear. Anterior extremity subtruncated, posterior one rounded. The organization of this genus I shall illustrate in my monograph of these animals. I have already alluded (p. 363, Vol. III. of the Proceedings) to its peculiar mode of generation, which consists in bringing forth living young. The species I shall continue to designate under the name of *F. Warrenii.* It occurs abundantly on Chelsea Beach, Mass.

Vortex candida, described at the same time, has been redescribed since by Dr. Leidy,* under the name of *Bdelloura parasitica.* The genus Bdelloura I adopt, but the species must retain its prior name and be called *B. candida* Girard.

Among the freshwater Planaria, which I have seen in the vicinity of Washington, there is an undescribed species which ranges within the limits of the States of Pennsylvania, Maryland, and Virginia, and belongs to my genus *Dugesia.* I propose to call it

DUGESIA FOREMANII Girard. It is the largest species hitherto

* Proc. Acad. Nat. Sc. Philad. v. pp. 242, 289.

known to me of this genus, it being more than half an inch long, with a width of from two to three lines. The general form, when the animal is creeping, is oblong or oval. Body flattened, as usual. Anterior region obtusely triangular, much less acute than in *D. gonocephaloides;* posterior region likewise less acuminated than in the latter. The transparent cephalic spaces nearly circular. Color above generally of a deep and uniform black; sometimes, however, brownish black, but never maculated. Under surface of body always lighter, although of the same general hue as the upper one. Found in great abundance in November last in the small rivulets emptying into Tiber Creek. A few specimens were also obtained at Four Miles Run, between Alexandria and Washington.

This species is dedicated to Dr. E. Foreman, formerly of Baltimore and now a resident of the city of Washington. I am happy to have the opportunity thus afforded me of associating his name with a department of Natural History in which he is well known for his indefatigable zeal in collecting, and his disinterestedness in meeting the wishes of his friends.

The discovery of a living species of the genus Amphidetus on the American shores of the Atlantic must be regarded as an interesting fact in the history of our radiated fauna. This discovery might have been expected from the circumstance of the existence of a representative of that genus during the myocene period of the tertiary epoch in the southern part of our country.

The living species occurs under the same latitude, having been found by Lieut. J. D. Kürtz, at Folly Island, S. C. and by myself at Cape Fear, N. C.

Four recent species of Amphidetus are already known, three of which are common to the basin of the Mediterranean, the British Channel, and the North Sea, on the Coasts of England and Sweden; and a fourth, which has hitherto been found only in the Ægean Sea.

Four fossil species are likewise enumerated as having been found in the tertiary strata; one in Italy, two in France, and another just alluded to, in South Carolina. Perhaps a fifth species, from Maestricht, might prove distinct after a thorough comparison of its structure with that of the other species.

According to the data now on record, respecting the past history of the genus Amphidetus, the latter made its first appearance on the European continent, as early as the eocene period of the tertiary era. The living American species, the object of the present communication, I propose to call

AMPHIDETUS KÜRTZII Girard.

It is one of the largest species of the genus, the specimens in my possession measuring more than two inches and a half in length, being nearly as broad as long across the middle of the anterior half of the body. Its most remarkable feature consists in the great development of the ambulacral star, which, at the same time, is very much depressed. The ambulacra are situated each in a broadly open groove, the anterior and odd one deeper than the others, its groove extending to the inferior surface. Interambulacral spaces above convex and having a swollen appearance. Posterior ambulacra conical and tapering backwards for more than half of their greatest width. The anterior ambulacra have nearly the same width throughout their whole extent, being narrower, however, than the former at their base. They are slightly bent backwards along the sides, although their general direction is forwards. The odd ambulacrum is composed of exceedingly minute pores, which are, however, very conspicuous on account of their being very close to each other, and arranged in a double row. The series are parallel and nearly equidistant, but connected near the summit of the ideal axis of the animal by a gentle hemispherical curve in immediate advance of the four openings for the organs of generation, which are likewise very conspicuous.

The narrow and smooth tape-shaped zone which surrounds this ambulacrum, constitutes an elongated pentagon, the posterior angle of which is acute and reaches the summit of the posterior and odd interambulacral space. Its sides are parallel, whilst it is irregularly rounded anteriorly. The area between the series of pores and the triangular region behind the ambulacrum, is densely covered with minute tubercles. The so-called *smooth* zone itself is covered with still smaller tubercles, which escape detection by magnifying glasses of one and even two diameters.

The anal plates are small, polygonal, and covered with minute tubercles. The anus itself is nearly circular in shape and is not to be seen from an upper view, being placed on the upper part of a broad cavity at the posterior extremity. The buccal opening is hemispherical; the plates which cover its membrane are irregular in size, very much crowded, very thin and subconcave. The star-shaped and apparently smooth area which surrounds the mouth, is largely developed and the buccal star very distinct, although the pores are but few in number and irregular in shape.

The tubercles of the superior surface are generally very small and uniform amongst themselves. They increase in size on the lower half of the posterior extremity and below the subanal concavity, to acquire their maximum on the middle region of the inferior surface, on a cordiform and convex space behind the mouth.

The spines themselves I have not been able to study, as but few were left on the specimens in my possession, which may hereafter be seen at the Smithsonian Institution.

Mr. W. O. Ayres read a description of a new species of Synapta, under the name *Synapta pellucida,* Stimpson and Kürtz, Mss.

This species was brought from South Carolina by Mr. William Stimpson, having been taken in the Sandy-mud Flat of Fort Johnson, where it occurs in considerable numbers. It inhabits holes which " descend in a quadrant form, deeper than long, to about a foot in depth. A smooth, round hole indicates the position of each at low tide." (St. Mss.)

The animal attains a length of twelve inches (with a breadth of two fifths of an inch,) though it can seldom be obtained entire, as it detaches piece after piece of its body upon the least disturbance. This tendency to spontaneous division it possesses in a much more remarkable degree than our northern *S. tenuis*, resembling in that respect the European species. It is of a pale whitish flesh color, with the spaces occupied by the longitudinal muscles of an intense white.

The pieces constituting the oral circle are similar to those of *S. tenuis*, though perhaps a little more elongated; five of them are pierced with holes, as in that species, for the passage of water.

The calcareous plates of the surface are less regularly oval than in *S. tenuis*, besides being relatively of smaller size. The holes with which they are pierced are larger and are serrated interiorly. The characteristic hooks (*hameçons*) attached to the plates are similar to those of the species last mentioned, but the external surface of the base is sometimes grooved. The breadth of a plate in a full grown specimen is about two twenty-fifths of a millimetre.

The genital tubes present a singular feature among Holothurians of this form, in being much branched, more than even in the Thyonidia. A similar character has not yet been detected in any other Synapta. In consequence of a lack of perfect specimens, the internal organs cannot be fully investigated.

The twelve tentacula are longer and narrower than in *S. tenuis*, with five to seven branches on each side. They contain multitudes of exceedingly minute calcareous spiculæ, each having both extremities enlarged, with the enlarged portion in general deeply furrowed. These spiculæ differ strikingly in form from those of *S. tenuis*. The inner surface of each tentacle exhibits commonly six of the little tubercles called by Quatrefages *Ventouses*.

This species is allied to *S. inhærens* and *S. Duvernea* of Europe and to *S. tenuis* of our own coast. It has little resemblance to *S. Bachei* or *S. rotifera*, its more immediate geographical neighbors.

Mr. H. R. Storer read a medico-botanical paper on the Magnolias.

A number of shells were presented in the name of Mr. Nathan P. Rice. The thanks of the Society were voted for the donation.

Señor Juan Lembeye, of Cardenas, Cuba, and Rev. P. Tocque were elected Corresponding Members.

May 5, 1852.

ANNUAL MEETING.

The President in the Chair.

The President reminded the Society that this was the Annual Meeting, and he congratulated the members on the year that had passed. During that time, the meetings had been fully attended, and the Proceedings contained many interesting and valuable communications. The present condition of the Society must be very gratifying to all its well-wishers. He then called on the Curators for their Reports, who replied as follows: —

The Curator of *Botany* reported, that there had been during the year no additions in his department. His own engagements, and the state of his health, had prevented his devoting any time to it. He therefore begged leave to decline being considered a candidate for reëlection.

The Curator of *Ornithology* reported, that during the year about thirty specimens had been added to the Collection of Birds, and eight, one of them quite valuable, had been stolen. The Collection is in excellent condition.

The Curator of *Geology* reported, that the condition of the Cabinet under his charge is but little changed since the last Annual Meeting. Some improvement has been made in the arrangement of specimens, and the number of these has been increased by several donations, though fewer have been received than has usually been the case during the same period. The most important accession was that of a collection of Fossil Plants from the coal field of Massachusetts.

The Curator of *Icthyology* reported, that some valuable donations had been made to the Department. For these the Society is indebted to W. O. Ayres, Esq., Dr. Samuel Cabot, Dr. D. H. Storer, Mr. H. R. Storer, and Dr. J. Mason Warren.

The Curator of *Comparative Anatomy* reported as follows: — The Curator of Comparative Anatomy would respectfully report, that the additions to his department during the year have been few, but important, and all by donation.

At the head of the list stands the nearly entire skeleton of the Troglodytes Gorilla, which when mounted, will form one of the most complete skeletons of this animal in the country; this was presented by the American Board of Commissioners for Foreign Missions.

There have also been presented a very fine Rhinoceros' Horn, by Robert G. Shaw, Esq.; the skeleton of a Seal, by G. H. Jackson, Esq. of Plymouth; an articulated human Skull, and a model of the human Brain, by Dr. William R. Lawrence.

The Curator of *Conchology* reported, that the additions to his department during the past year had been few. A suite of the Cycladidæ of the United States has been received from Mr. Temple Prime. A collection of the animals of the shells of the American coast has been commenced, and increased by donations of some species from New England, by Mr. Joseph Monds, of Norwich, Conn., and the Curator, and those of the Southern States, by the Curator.

The Curator of *Herpetology* reported, that the collections under his charge had suffered much from previous unavoidable neglect when he took them into his hands, and that the specific names of scarcely any of the species represented had ever been ascertained; —

That he has devoted much labor towards preventing further destruction, and has in part succeeded; —

That he has arranged an almost complete series of the reptiles of Massachusetts; —

That he has detected, among the confusion of jars, specimens of a large proportion of the forms peculiar to North America; —

And that the Chelonians have all been systematically arranged, in accomplishing which, he has found occasion to use some notes kindly furnished him by the former Curator, Prof. Wyman.

He has experienced great difficulty in satisfactorily studying many of the foreign species, chiefly from the want of proper books of reference, and is inclined to suppose that the Society is in possession of several species that are as yet undescribed.

Many specimens have been added since the commencement of his Curatorship, of species both native and foreign, by the donation of Sir William Jardine, Drs. Cragin, Burnett, Durkee, and Storer, Messrs. Stimpson, Browne, Habersham, and Cary, and of the Curator himself.

A note was read from the Curator of Mineralogy expressing regret that he had not been able to prepare his Report in time for the meeting, and promising it on some future day. He concluded by tendering his resignation, if any member were willing to take his place, and promising another donation to the Society.

The Curator of the Collections of *Crustacea* and *Radiata* reported as follows: — When the department of Crustacea and Radiata was intrusted to me, a few months since, my first care was to put the whole, if possible, in a safe condition. By the attacks of insects almost all the specimens of Crustacea had been mutilated, limbs being detached, and in some cases lost, and of some very valuable species so few traces remained that scarcely any thing more was indicated than their former presence. Among the Radiata, owing to the nature of the specimens, the destruction was less, though the soft parts had been as completely consumed. To prevent further injury, all with which the course was practicable have been thoroughly saturated with corrosive sublimate in alcohol. This process will probably need repetition, especially with the larger specimens.

Of the sources from which the principal portions of the collection have been derived, I can obtain no information. A very valuable series of the Crustacea appear to have been brought from Florida by Mr. Bartlett, but beyond those the indications are very few.

Of Crustacea, we have sixty-six genera, comprising eighty-four species; of Radiata, twenty-two genera, comprising thirty-one species. Labels have been attached so far as time would allow; the remainder will soon be supplied.

The Librarian offered the following as his Eighteenth Annual Report: — Whole number of books in the Library, 3,180. This includes 53 bound volumes of the Society's Journal, and 34 of its Proceedings. It also includes 480 volumes deposited by the Republican Institution. The number of volumes and pamphlets received by donation during the past year is 134. The most valuable of these, "Voyage au Pole Sud sur les Corvettes l'Astrolabe et la Zelée;" 16 Vols. of text and 5 of plates, were given by Uriah A. Boyden, Esq. Seventeen volumes and parts of volumes have been purchased by the Courtis Fund.

The Librarian recommends a more liberal exchange of our publications with foreign Socities for the future increase of the Library. The communication with these Societies hitherto has been too expensive and difficult to justify the sending many copies of our Journal and Proceedings abroad; but the recent arrangements of the Smithsonian Institution, at Washington, will enable us hereafter to communicate with Societies in all parts of the world without difficulty, and at no greater expense than the cost of transportation to Washington. Of the two hundred Societies in correspondence with that Institution, at least one hundred publish works of value to us, which could easily be obtained in exchange for our publications.

The Treasurer reports that he has received on		
General Account, ...		$ 511 00
On acccount of Courtis Fund, .	$ 756 00	
To which add balance of last year,	986 25 —	1742 25
On account of Lloyd Fund, $0.		
To which add balance on hand, $361 . .		361 00
That he has paid on General Acc't,	$ 668 29	
To which add balance of last year,	843 20 —	1511 49
On account of Courtis Fund, . . .		275 54
On account of Lloyd Fund, . . .		72 46

Leaving $ 1000 49 due Treasurer on General Acc't.
" 1466 71 due Courtis Fund from Treasurer.
" 288 54 due Lloyd Fund from Treasurer.

In other words, the sum of $ 754 76 is in the hands of the Treasurer.

Dr. Gould alluded to the fact, that Mr. Teschemacher had declined being considered a candidate for the office of Curator of Botany another year. For fifteen years (he said) he had held that office, and the Society was under lasting obligations to him for the interest he had shown and the time he had devoted in the cause of science. He concluded by moving the sincere thanks of the Society to Mr. Teschemacher for his very valuable services.

The motion was seconded by Dr. J. B. S. Jackson, and unanimously adopted.

The amendment to the fifth Article of the Constitution, by striking out the word "eight" before "Curators," leaving a blank to be filled at any time by the action of the Society, was brought before the Society a second time, in accordance with a recent Act of the legislature, and adopted by a unanimous vote.

The Committee appointed at the previous meeting to nominate officers for the ensuing year reported the following list, and they were elected.

President,

John C. Warren, M. D.

Vice-Presidents,

Charles T. Jackson, M. D. and D. Humphreys Storer, M. D.

Corresponding Secretary,

J. Eliot Cabot.

Treasurer,

Nathaniel B. Shurtleff, M. D.

Librarian,

Charles K. Dillaway.

Cabinet Keeper,

Charles Stodder.

Recording Secretary,

Samuel L. Abbot, M. D.

CURATORS.

Samuel Cabot, Jr., M. D.	*Of Ornithology.*
Thomas T. Bouvé,	*Geology.*
Francis Alger,	*Mineralogy.*
Waldo I. Burnett, M. D.	*Entomology.*
Samuel Kneeland, Jr., M. D.	*Comparative Anatomy.*
William Stimpson,	*Conchology.*
Horatio R. Storer,	*Herpetology.*
Thomas M. Brewer, M. D.	*Oölogy.*
Silas Durkee, M. D.	*Ichthyology.*
Charles J. Sprague,	*Botany.*
William O. Ayres,	*Crustacea and Radiata.*

Mr. Bouvé exhibited the eggs of a Skate (*Raia ocellata*) containing the young fish with the yolk sac attached to it.

Dr. Gould presented a small collection of East India plants.

Dr. J. M. Warren presented a specimen of Horned Frog (*Phrynosoma cornuta*) from California, and a specimen of Holacanthus, from Newport, R. I.

Mr. Hermann J. Warner was elected a Resident member of the Society.

May 19, 1852.

The President in the Chair.

The Secretary read in behalf of Dr. Burnett, a paper on the *Anolius Carolinensis* or Chameleon of the Southern States. It contained notices of the habits of this animal, with an account of a microscopic examination of the skin and the structure on which its change of color depends.

Mr. H. R. Storer read a Medico-botanical paper on the Anonaceæ.

Mr. Stimpson presented a description of a new crustacean belonging to the genus *Axius*, of Leach, which genus had not been before noticed as occurring on our coast. For a perfect specimen he was indebted to Mr. S. Tufts, of Lynn, by whom it was taken in twenty fathoms, off Scituate. Fragments of the carapace, and the claws and legs, have frequently been found by Mr. Stimpson in deep water, but that of Mr. Tufts is the only perfect specimen yet discovered. It more nearly resembles the lobster (*Homarus Americanus*) than any of our known crustaceans, from which, however, it is at once distinguished by its compressed form and the non-articulation of the exterior caudal plates.

Axius serratus St. Carapax smooth, with few scattered hairs, much compressed, especially above posteriorly, where it is almost acute ; transverse suture deep ; rostrum small, rather elongated, with the medial carina sharp, and the lateral ones serrated, with about seven teeth on each ; the carinæ are continued, simple, less prominent, and diverging, for a little distance on the carapax. Interior antennæ nearly as long as the carapax. Exterior ones with very long peduncles ; basal joint compressed, concave, and slightly tortuous above, with a strong spine, its movable scale very slender. External maxillipedes very long and slender, with a small spine below near the end of the third joint. Feet much compressed, and hairy on their edges ; anterior pair with minute spines along the lower edges of the second and third joints ; hand with very long hairs, carinate above ; thumb strongly dentate on its inner margin ; finger with shallow grooves, serrate within in the left hand, but not in the larger right hand. The didactyle extremities of the second pair of feet are very compressed, short, broad, and ovate. The monodactyle extremities of the remaining pairs of feet are thickly clothed with short hairs. Abdomen one and two-thirds times the length of the carapax, rather broad, with the segments terminating bluntly below ; caudal segment with a single minute spine on each side of the medial furrow ; lateral caudal plates each with a small spine at its insertion with the abdomen, the interior ones sculptured with one, the exterior ones with two, longitudinal ridges. It inhabits the laminarian and coralline zones in Massachusetts Bay. The serration of the rostrum may be mentioned among other characters which distinguish it from *A. stirhynchus*.

Mr. Stimpson also made some observations on the remarkable worm *Chætopterus pergamentaceus* Cuv. which he had found in North Carolina, it having been previously known to occur only in the Antilles.

June 2, 1852.

The President in the Chair.

Dr. Burnett said, that he had recently had an opportunity, while in the Southern States, of examining the structure on which the extreme brittleness of the tail of the Glass Snake, *Ophisaurus ventralis*, depends.

It is a well-known fact that a very slight blow causes this reptile to break in small pieces. This seems to be the result of a reflex action from the spinal cord ; for after the tail is detached if the spinal marrow in this portion be irritated, it breaks into several pieces. On careful dissection, with the aid of the microscope, Dr. Burnett had found that the muscles rising from the vertebræ do not pass from one to another, but part of the fibres are inserted into the skin, while others running parallel with the length of the animal, terminate midway between one vertebra and the next, being dovetailed, as it were, between the fibres sent to meet them from that vertebra, and attached to them only by myolemma. When the division of the animal takes place, therefore, there is no rupture of muscular fibre, but a separation of one layer of muscles from the adjoining one. The detached portion is said to be reproduced in a year. Dr. Burnett had noticed the same phenomena in the Blue Tailed Lizard, *Scincus fasciatus*, of the Southern States, depending on the same cause. In all Lizards, during the breeding season, the tail is very liable to be broken off, and is reproduced within a year. The Blue Tailed species, however, seems to be uncommonly brittle.

Mr. Stimpson presented descriptions of two new species of *Ophiolepis,* from the Southern coast of the United States.

O. gracillima. Rays very long and slender. Disk very soft and flexible, pentangular, slightly projecting and emarginate at the insertion of the rays, covered above and at the sides with crowded, minute scales, except opposite the origin of the rays, where there are two prominent, narrow, elongated, sub-oblong scales, which are truncated at their outer extremities, touch each other along most of their length, but narrow, and hence diverge inwards. They extend to about half the distance from the centre to the edge of the disk, and around them the crowded scales are larger than elsewhere. Below, the plates forming the sides of the mouth-star, whose rays are short and broad, are three in number. The interbrachial plates are irregularly ovate.

The rays are in length twenty-four times the width of the disk, and taper only towards their extremities. They are somewhat carinated above, near their origins, and have sub-rhomboidal superior plates. The lateral spines are five in number in each row near the origins of the rays; this number decreases towards the extremities; the middle spines are largest and equal in length to two thirds the width of the ray. Length of each ray, 5.5 in.; width, 0.07 in.; diameter of disk, 0.23 in.

In the living animal the disk was dark gray above, with a dark fawn-colored spot in the middle, the plates at the origins of the arms being black. The first three segments of each arm beyond the disk were edged with black; the remaining segments were either light gray, dark gray, or black, generally alternating. In the middle of each segment was a white space, so that each ray appeared to have a median white line.

This is a very singular species, belonging to the same group with *O. filiformis*, of Europe. One of my specimens is a foot in diameter, while the rays are mere threads and the disk only a quarter of an inch wide. In each ray there are about three hundred and thirty joints. The disk is very soft and easily changed in shape by the animal who throws it off when disturbed. Most of the specimens found had lost their disks.

It was found by Lieut. Kurtz and myself at Fort Johnson, Charleston Harbor, in March. It lives at low-water mark, buried in the soft mud at the depth of six or eight inches, and extending one or two rays up to the surface.

O. atra. Disk large, very soft, convex, orbicular, lobulate, with a notch at the insertion of each ray. The pair of plates at the insertion of the ray are ovate, short and broad, and close together, separated only within by three or four minute plates. From the outer side of each of these large plates, a row of minute, transversely-elongated plates passes obliquely to the side of the disk, thus giving to the disk the appearance of being margined. The remaining upper surface of the disk is covered with minute crowded scales which are smallest about the centre. The sides and lower surface of the disk appear smooth to the naked eye, from the minuteness of the granules which cover them. The mouth-rays do not taper, but are abrupt and wide exteriorly, and have three or four teeth only at each side. The interbrachial plates are rhomboidal, the large one being always very prominent, swollen, and white. The rays are large at their insertion, from which they taper gradually to their extremities which are very slender. Each joint has three lateral spines on each side, which in length equal one half the width of the ray.

Length of each ray 4 inches; width at insertion, 0.13 inches. Diameter of disk, 0.4 inches. In measuring, the width of the spines is included in this and the preceding description.

When alive this species was of a very dark gray color, nearly black, except the white interbrachial plate. The arms were jet black above, except their extremities. The remarks as to frequent loss of the disk, made of the preceding species, apply also to this.

This species was first found some years since by Lieut. Kurtz on Maurice's Island, Charleston Harbor, and also this year by him and myself at Fort Johnson. It occurred at low-water, buried in the mud, as did the last species. Another, the *O. elongata*, (Say,) Müll. has the same economy, and being very abundant, gave me frequent opportunities of observing its mode of living. It is gregarious, living in companies of twenty or thirty. The existence of these groups is indicated at low water by spaces of about a foot in diameter covered with small holes, looking very much as if a charge of shot had been fired into them. If these spots are watched as the tide rises, from each hole an arm of one of the star-fishes will be seen to protrude and wave about in the water, with the red tentacular filaments, by which the respiration is effected, clothing the sides. Generally, each individual sends up one of its rays in this manner.

Adhering to the rays of this species, the *O. elongata*, were found several minute star-fishes, probably the young, which correspond to *Ophionyx*, M. T.

The femur, tibia, and tarsal bone, with the bones of one of the toes of a gigantic New Zealand bird, were presented in the name of Mr. Henry Cross. The bones were originally brought from New Zealand by a sailor, who reported that the natives of that Island declared that specimens of the bird are still living, twelve feet in height.

On motion of Dr. C. T. Jackson, it was

Voted, That the thanks of the Society be presented to Mr. Henry Cross for his very valuable donation.

Mr. H. R. Storer deposited in the Society's Collection a specimen of *Myristica officinalis* preserved in spirit.

A cast of the fossil tracks of *Sauropus primævus* was presented in the name of Mr. Isaac Lea, of Philadelphia.

June 16, 1852.

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

Dr. Burnett made a communication on some of the peculiarities of the economy of reproduction in certain insects.

His remarks had reference principally to this function as performed in very small insects, such as the very minute Mites or *Acaridæ*, living on the feathers of birds. The question would very naturally present itself, whether in such small animals the spermatozoa are proportionally small, and therefore proportionally numerous, or whether they are large and few. It is found that the size of these particles does not materially change with the size of the animal; that they are as large in the smallest lizard as in the largest alligator. It is therefore evident, that in the Acaridæ their number must be very small. Dr. Burnett had succeeded in counting them in some species, and found them to be from twenty down to ten, and even fewer in number. In the female he found the number of ova to correspond with that of the spermatozoa, leading to the inference that an ovum requires but a single spermatozoön for impregnation; a fact demonstrated by Newport by experiment in the case of Batrachians, but in the present instance by nature herself. The economy of reproduction is made as certain and effectual in this case as possible, by means of a prolonged act of copulation, the male being attached to the female by a pair of strong anal hooks. In the animal kingdom generally, the number of individuals of any given species is in proportion to their size. Now the number of the Acaridæ is incalculable. It would therefore seem that the procreative capacity of a species is not necessarily, as is usually supposed, in a direct but rather in an inverse ratio to its numbers. These facts tend to sustain the opinion of the plural origin of these insects.

Dr. Burnett referred to the observations which he had made, the results of which he had laid before the Society two years since, (See Proceedings, Vol. III. p. 262,) on some of the procreative peculiarities of the common Humble Bee, (*Bombus Americanus;*) namely, that the males die after impregnating the females in the autumn, while the females, after hibernating through the winter, bring forth three broods, the first of neuters, the second of females, and the third of males. Heretofore, these facts have been quite anomalous in this class of animals; but during the past two years, Dr. Burnett had noticed the same succession of events in the economy of other insects, namely, the *Buprestidæ*. These are the enemies so destructive to the

Southern Pines. Their larvæ are known as "Sawyers." After carefully examining great numbers of specimens in the spring, Dr. Burnett had not found a single male, and all the females were ready to deposit their eggs. There would seem, therefore, good reason to believe that the male dies in the autumn, leaving the female to continue the species, like the female Humble Bee.

Mr. Stimpson read a paper describing several new Ascidians from the coast of the United States.

ASCIDIA.

A. CALLOSA. Body depressed, usually oval or oblong, but varying in shape. Test, when free from the parasitic growth which usually covers it, of a light sepia, or pale bluish color, translucent, although thick and fleshy. Its thickness varies in different parts of the body from the character of the surface, which is very rugose, rising into irregular prominences and ridges. Apertures dark purple or reddish, situated on prominent warts; the seven-rayed branchial, which is largest, being terminal, and the six-rayed anal removed from it by a distance less than one half the length of the body. The branchial tube within has seven strong longitudinal ridges. Branchial sac finely reticulated. The inner tunic, where it covers the abdomen, is marked with crowded golden specks. Length often three inches; breadth two inches. This species is abundant in Passamaquoddy Bay, from low-water mark to thirty feet. It is usually found adhering broadly by the left side to the under surface of large stones.

A. TENELLA. Body oblong, somewhat elongated, flaccid, adhering by the base. Test or outer tunic soft, gelatinous, slightly wrinkled, transparent, showing beneath the folds of the branchial sac. Inner tunic pale yellowish. Orifices terminal, approximated, on short tubes, the branchial largest, with seven or eight lobes and the same number of red ocelli. The anal has six lobes and six red ocelli, which are much brighter colored than those of the branchial orifice. Length about one inch, breadth one third of an inch.

This species was dredged at the depth of thirty-five fathoms on a shelly bottom near Great Duck Island, Grand Manan. It adheres to fragments of shells and often to other Ascidians. It resembles a species which I received from Europe under the name of *A. mentula*, but does not agree with the descriptions of that species.

A. GEOMETRICA. Body adhering by a broad base, depressed, oval. Test thin, smooth, transparent, very pale greenish, with an almost peripheric, narrow, dark-colored line or ridge, like a fibre, from which other lines of the same character proceed, dividing the surface into ten irregular polygons, two of which, separated from each other by a third, contain the apertures. These two polygons are wheel-like, being radiated with six spokes from a centre, which is the sessile aperture. Proceeding from, and perpendicular to each of the dark lines, are bright straw-colored fibres, extending toward the centres of the polygons but not reaching them. Length, half an inch.

Dredged in forty fathoms on a muddy bottom off Long Island, Gr. Manan. One specimen only was found, which was adhering to a dead valve of *Pecten Magellanicus*.

MOLGULA.

M. SORDIDA. Body small, globular, usually covered with mud or sand; color, when clean, pale white. Test thick and smooth, except around the apertures, where it is wrinkled transversely, and provided with as many longitudinal ridges as there are rays in the aperture. Tubes prominent, near together. Branchial aperture provided with six tentacular filaments, projecting inwards, corresponding with its six rays. The anal tube is longest, and its four ridges, corresponding with the four rays of its aperture, are very prominent. Branchial sac with fourteen plications. Diameter half an inch.

This species is found at low water in Charleston Harbor, S. C. among the sediment and parasitic corallines and plants which incrust the rocks of the breakwaters.

M. PRODUCTA. This species is usually perfectly globular, while the apertures are on tubes often equal in length to the diameter of the body, which originate close together and diverge. The test is rather thin, pellucid, usually of a pale rose tint, and covered, the tubes included, with a thin coating of sand. The branchial aperture is rounded, with six short cirrhi within ; the anal is square. Diameter half an inch.

It occurred on a sandy bottom, in six fathoms in Boston Bay ; and also at low water on Bird Island. The tadpole-like young were ejected in August, and were of a bright vermilion color, which continued for a long time after their final detachment.

M. ARENATA. Body somewhat compressed laterally. Test thin, uniformly covered with coarse sand, which adheres very strongly. Apertures small, on very short tubes, far removed from each other. Length three fourths of an inch.

It inhabits the region of Nantucket and Martha's Vineyard.

GLANDULA, n. g.

Body globular, always free, and thickly coated with sand, mud, or other extraneous substances. Apertures on tubes, the branchial with four lobes, the anal square. Branchial sac with few, distant plications.

G. FIBROSA. Test thin, but very tough and leathery, covered with numerous fibres resembling cotton, which serve as a framework or attachment for the hard, thick coating of mud, in which this species is always found incased. Thus a ball is formed of about one inch in diameter, twice that of the body alone. The tubes extend only to the surface of the ball. It is an exceedingly tough, hard species, and when divested of its covering will bear the weight of several pounds without bursting.

Dredged in thirty-five fathoms on a muddy bottom, in the Hake Bay, off Gr. Manan.

G. MOLLIS. Body globular, but often considerably flattened, soft, and flexible. Test very thin, transparent, and thickly covered with loose sand. Diameter half an inch, usually less.

Dredged abundantly on a sandy bottom in ten fathoms, off Cheney's Head, Gr. Manan.

CYNTHIA.

C. VITTATA. Body oblong, somewhat arcuated, often laterally compressed. Test thick, cartilaginous, opaque, white, or pale yellowish, with large longitudinal wrinkles or furrows. Orifices square, on short, conical tubes, which have a pair of dark red, or purple lines descending on each of the four sides, and becoming paler and finally lost on the body. Branchial sac with about fourteen folds. Diameter two inches.

It is usually covered with corallines, and in its tunic *Mytili* are often imbedded. It was found in great numbers on Oak Island Beach, near Smithville, N. C. by Lieut. Kurtz, probably thrown up from deep water. It occurs in groups of several individuals, young and old, attached to each other.

C. PARTITA. Body oblong or subglobular, attached by the base. Test hard, strong, coriaceous, rugose, wrinkled in various directions, and of a dark purplish-brown color. Apertures square, on prominent eminences, opening widely, the branchial being largest. The tubes are very beautifully marked exteriorly by alternating triangular areas of white and purple, arranged as in the shell of a *Balanus;* the white ones having their bases, and the purple ones their apices, on the margin of the aperture. In one instance parallel stripes took the place of triangles. Diameter one inch.

It is occasionally dredged in Boston Harbor, west of Governor's Island, in four fathoms, among stones and shells.

C. SUBCÆRULEA. Body firm, hemispheric, adhering by the base. Test thin but tough, smooth, translucent, with a pale bluish tinge. Orifices small, sessile, not far removed from each other. Diameter one fourth of an inch.

This species I found attached to corallines thrown ashore on Oak Island Beach, N. C.

C. GUTTA. Body flat and disk-like, oval, adhering by a very broad base. Test strong, thin, smooth, opaque, deep red, expanded upon the surface of attachment so as to form a margin. Orifices small, square, slightly prominent. Diameter half an inch.

This species is very common in Boston Harbor, adhering to dead valves of *Mytilus modiolus*, on the shelly bottom between Bird Island and South Boston Flats, where the depth is from three to five fathoms. It resembles very much a drop of blood.

PERA, n. g.

Body pyriform, adhering by a very small base. Test gelatinous. Orifices sessile; the branchial six-lobed, the anal four-lobed. Branchial sac plicated.

P. PELLUCIDA. Body pear-shaped, the tunic at base often continued into a short stem. Test rather thin, hyaline, covered with small conical eminences or papillæ, especially about the orifices, which are very small, distant from each other, and difficult to distinguish. Branchial sac with ten folds. Length one inch.

Found adhering to bunches of *Sertularia polyzonias*, taken on St. George's Bank in thirty fathoms.

BOLTENIA.

B. RUBRA. Body arcuated, slightly compressed laterally, and tapering rather abruptly to the stem, which is slender, very hard and granulated. Test very rugose, especially on the dorsal surface, and of a deep red color. Anal aperture nearly sessile; branchial on a short tube which curves toward the stem. Total length one foot; length of the body one and three fourths inches; breadth seven eighths of an inch.

This species lives attached to rocks in from two to fourteen fathoms. I have found it in Massachusetts Bay, from Boston to Cape Ann; and also at Grand Manan, at the mouth of the Bay of Fundy.

Mr. Stimpson also remarked, that he was engaged upon a Monograph of the Tunicata of our coast, in which detailed descriptions of the above genera and species would be given, as well as of many others not here mentioned.

Dr. C. T. Jackson gave a detailed account of the process of Etherization as performed on a Puma belonging to Mr. Alger, for the purpose of performing the operation of cutting off its claws.

BOOKS RECEIVED DURING THE QUARTER ENDING JUNE 30.

Catalogue of the Mammalia in the Museum of the East India Company. 8vo. London, 1851. *From Dr. T. Horsfield.*

Proceedings of the American Academy of Natural Sciences of Philadelphia. Nos. 8 – 12 of Vol. IV; and Nos. 3, 11, 12 of Vol. V. *From the Academy of Natural Sciences.*

Notice of the Origin, Progress, and Present Condition of the Academy of Natural Sciences of Philadelphia. By W. S. W. Ruschenburger. 8vo. Pamph. Philadelphia, 1852. *From the Academy of Natural Sciences.*

Memoir of S. G. Morton, M. D. By Charles D. Meigs. 8vo. Pamph. Philadelphia. 1852. *From the Academy of Natural Sciences.*

Icones Piscium, or Plates of Rare Fishes. By J. Richardson. 4to. Pamph. Part 1. London, 1843. *From the Author.*

Cartes, Croquis, et Coupes Geologiques des Vosges. Par H. Hogard. Planches, Long 4to. Paris. Pamph.

Observations sur les Nappes et Cones d'Eboulement et sur les Lits de Dejection des Torrents. Par H. Hogard. 8vo. Pamph. Paris, 1850.

Sul Ciprino del Vulture, Memoria del Cav. Michele Tenere. 4to. 1838. Pamph.

Journal d'Agriculture. Vol. V. Nos. 2, 3. 8vo. Pamph. Montreal, 1852. *From L. A. H. Latour.*

Annals of the Lyceum of Natural History of New York. Nos. 4, 5, 6. 8vo. Pamph. New York, 1851 – 2. *From the Lyceum of Natural History.*

Nereis Boreali-Americana. By W. H. Harvey. Part 1. 4to. Washington, 1852. *From the Author.*

Congressional Report on Meteorology. By J. P. Espy. Long 4to. Washington, 1850. *From Theodore Parker.*

Congressional Report on Inundations of the Mississippi River. 8vo. Pamph. Washington, 1852. *From Theodore Parker.*

Fifth Report of the Regents of the Smithsonian Institution. 8vo. Pamph. Washington, 1851. *From Theodore Parker.*

Bulletin de la Société Geologique de France. Tome IX.

2ième Série. Feuilles 1 – 5 (3 Nov. 1851,) 8vo. Paris. *From the Société Geologique.*

Transactions of the Entomological Society. Vol. V. Part 3d. 8vo. Pamph. London, 1848. *From the Entomological Society.*

Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften. VI Band, 1 – 5 Heft. VII. Band, 1 – 2 Heft, Jahrgang, 1851. *From the Akademie der Wissenschaften.*

Denkschriften der Kaiserlichen Akademie der Wissenschaften. Mathematisch-Naturwissenschaftliche. Zweites Band. Wien, 1851. *From the Akademie der Wissenschaften.*

Proceedings of the Academy of Natural Sciences of Philadelphia. Vol. VI. No. 1. 1852. *From the Academy of Natural Sciences.*

Natural History of Ireland. Birds. 3 vols. 8vo. By William Thompson. London, 1849. *From the Author.*

Two Lectures, on the Connection between the Biblical and Physical History of Man. By Josiah C. Nott. 8vo. Pamph. 1849. *From the Author.*

Physical History of the Jewish Race. By Josiah C. Nott. 8vo. Pamph. Charleston, 1850. *From the Author.*

Chronology, Ancient and Scriptural. By Josiah C. Nott. 8vo. Pamph. Charleston, 1850. *From the Author.*

Diversity of the Human Race. By J. C. Nott. 8vo. Pamph. Charleston, 1850. *From the Author.*

American Journal of Science and Arts. Vol. XIII. No. 39, for May, 1852. New Haven. *From the Editors.*

Report of Lower Canada Agricultural Society. 8vo. Pamph. Quebec, 1852. *From L. A. H. Latour.*

Report on Education in Lower Canada. 1849 – 50. 8vo. Pamph. Toronto. *From L. A. H. Latour.*

Statutes relating to Elementary Education, &c. in Lower Canada. 8vo. Pamph. Quebec, 1852. *From L. A. H. Latour.*

Journal d'Agriculture et Transactions de la Société d'Agriculture, du Bas-Canada. Vol. V. No. 4. 8vo. Pamph. Montreal. *From L. A. H. Latour.*

Indian Almanac. 1852 – 3. 12mo. Pamph. *From L. A. H. Latour.*

American Zoölogical, Botanical and Geological Bibliography, for 1851. By Charles Girard. 8vo. Pamph. 1852. New Haven. *From the Author.*

Illustrations of the Birds of California, &c. by John Cassin and H. L. Stephens. 8vo. Part 1. Philadelphia, 1852. *From the Authors.*

F. A. G. Miguel, Oratio de Regno Vegetabili, &c. 4to. Pamph. Amsterdami, 1846. *From Prof. Asa Gray.*

Synopsis of the Family of Naiades. By Isaac Lea. 4to. Philadelphia, 1852. 3d edit. *From the Author.*

Gelehrte Anzeigen. Vols. 32, 33. 4to. München, 1851. *From the Munich Academy.*

Annual Report of the Trustees of the State Library. 8vo. Pamph. Albany, 1852. *From T. R. Beck.*

Trial of the Action of E. Desor *v.* C. H. Davis. 8vo. Pamph. Boston, 1852. *From C. M. Ellis.*

De Candolle, Prodromus Systematis Naturalis Regni Vegetabilis. Part XIII. 8vo. Parisiis, 1852. *Deposited by the Republican Institution.*

On a Fossil Saurian of the New Red Sandstone Formation of Pennsylvania. By Isaac Lea. 4to. Pamph. Philadelphia, 1852. *From the Author.*

On the Fossil Footmarks of the Red Sandstone of Pottsville, Pennsylvania. By Isaac Lea. 4to. Pamph. Philadelphia, 1852. *From the Author.*

Observations on the Genus Unio. By Isaac Lea. Vol. V. 4to. Philadelphia. *From the Author.*

Proceedings of the Academy of Natural Sciences of Philadelphia. Title-page and Index to Vol. V. Also pages 51 – 70 of Vol. VI. 8vo. Pamph. Philadelphia, 1852. *From the Academy of Natural Sciences.*

Proceedings of the American Philosophical Society. Vol. V. No. 47, pp. 211 – 244. 8vo. Pamph. Philadelphia, 1852. *From the American Philosophical Society.*

Transactions of the American Philosophical Society. Vol. X. Part 2. 4to. Pamph. Philadelphia, 1852. *From the American Philosophical Society.*

Journal d'Agriculture. Transactions de la Société d'Agriculture du Bas-Canada. Vol. V. Nos. 5. 6. *From L. A. H. Latour.*

Received from the Courtis Fund.

Figures of Molluscous Animals. By Maria Emma Gray. Vols. 2, 3, 4. London, 1850.

Annals and Magazine of Natural History. No. 52, for April, 1852. Vol. IX. 8vo. London.

Annals and Magazine of Natural History. Vol. IX. No. 53, for May, 1852. London.

Annals and Magazine of Natural History. Vol. IX. No. 54, for June, 1852. London.

July 7, 1852.

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

Dr. Kneeland read a paper on the bones of the lower extremity of a gigantic bird, from New Zealand, recently presented to the Society by Mr. Henry Cross, of Boston.

The size of the bones, which a very slight examination would determine to be the bones of a bird, must strike every one, they being very much larger than those of the largest Ostrich, the only bird with which they could be compared. It was only in 1839, that Mr. Owen determined, from the examination of a fragment of a thigh-bone, that a gigantic race of birds once existed in New Zealand; and in his Memoirs, in the Zoölogical Society's Transactions, he has since, from a large number of specimens, determined at least eleven species belonging to three distinct genera, ranging in height from two or three to twelve feet, or to nearly twice the height of the Ostrich. The genus to which Mr. Owen referred these birds, he called *Dinornis;* this he has since divided into three, adding *Palapteryx* and *Aptornis.* The name given them by the natives, is *Moa.*

These bones are not fossils, that is, they are not mineralized; in common with specimens analyzed in Mr. Owen's papers, they undoubtedly contain their full share of animal matter, and even more than is contained in the bones of the Ostrich, or from twenty-six to thirty-eight per cent. These bones have always been found in the beds or in the banks of freshwater rivers, buried in the mud or sand, and never on the solid dry land. In fact, every thing connected with the history of these birds, and the appearance of the bones, indicates that the race existed at no very distant period, and there are strong grounds for hoping that a few members are yet living in the more remote and unexplored parts of New Zealand. The density of the bones shows that they were birds of a terrestrial character; the wings being in a very rudimentary condition, and the lower extremities developed to a great degree: the relative lengths of the bones, compared with those of the Ostrich, show a greater sluggishness, but greater powers of scratching.

The *thigh-bone* is fourteen inches long, and six and five eighths inches in circumference in the middle, the corresponding measurements of the Ostrich being eleven and five inches. According to Owen, there is in Dinornis, and the allied genera, no opening in this bone for the admission of air; they forming, with the genus Apteryx, the only known exceptions to the rule that the thigh bone in terrestrial birds is filled with air; in Dinornis the medullary contents are retained in the bones of the extremities through life. The generic characters of this bone, besides the absence of air-holes and an air canal, are the great thickness of the bony wall of the medullary cavity of the shaft, the tuberosities on its posterior portion, the great size of the lower extremity, and the breadth of the cavity in which play the muscles which extend the leg.

The *tibia*, the only bone of the leg preserved, has its upper extremity wanting for about four inches, judging from the marks on the rest of the bone. The length of this mutilated bone is twenty-nine inches, the whole length would be about thirty-four inches; its circumference is six and three eighths inches, so that, long as it is, it is proportionally stouter than in the Ostrich.

The *metatarsus* bears the usual marks of formation from three originally distinct bones, united into a single one; these three bones are indicated by the persistent grooves extending the whole length of the bone. The upper portion of this bone is wanting for more than an inch, evidently corresponding to the *tarsus;* perhaps a natural separation of the epiphysis of an immature bird. On the inner edge of the posterior surface, on the lower half of the bone, is a shallow, rough depression, an inch long and half an inch wide, which Dr. Kneeland believed to be for the attachment of the metatarsal bone of the *fourth* or hind toe; this would remove the species from *Dinornis*, and place it in *Palapteryx*. The lower extremity divides into three articular surfaces for the three anterior toes. The length of this bone, entire, would be about seventeen inches; the breadth of the upper end is four and one fourth inches.

There are also two joints of the external toe, in length six inches. From the different appearance of these bones, Dr. Kneeland thought they did not belong to the same individual; they are all bones of the *right* leg. Dinornis comes near to the Bustard and the Grallæ. Palapteryx comes near to the Struthionidæ, and perhaps is intermediate between the Apteryx and the New Holland Emeu.

Dr. Kneeland believed some of the bones to be those of an undescribed species, to which he gave the name "*Major*," until it should be proved to be a species previously described. The height of the bird to which these bones belonged must have been about nine and a half feet.

The tracks made by these birds would be twenty-two inches long and six wide, considerably larger than the largest footprints in the New Red Sandstone of the Connecticut Valley, discovered by President Hitchcock in 1836, which he pronounced to be footprints of giga ic birds. The discovery of these gigantic birds in New Zealand, with their wingless bodies, and reptile-like condition of the respiratory apparatus from the non-permeability of the bones to air, adds strongly to the evidence that similar low forms of large birds existed in America at the remote epoch of the New Red Sandstone.

Though many of these bones are apparently to be regarded as of recent date, and though it is not impossible that the Dinornis, like the Apteryx, may still exist in the interior of New Zealand, still they undoubtedly belong to a certain extent to the class of extinct animals. Dr. Mantell thinks they belong to a period as remote in relation to the surface of New Zealand, as the diluvium containing the bones of the Irish Elk, Mammoth, &c. to that of England; and that the last of the Moas was destroyed by the earliest inhabitants of New Zealand, as the Dodo was extirpated by the Dutch colonists of the Mauritius, and the Irish Elk by the early British or Celtic tribes.

Prof. Wyman remarked, that so far as variations of form in particular bones are indicative of specific characters, the specimens in question appeared to belong to a hitherto undescribed species. In the *Troglodytes gorilla* recently presented to the Society however, the humerus differed as much from that of the specimen belonging to himself as from a human humerus. It is probable, however, that in birds there is less variation in individuals from the type of the species.

Dr. Cabot moved, seconded by Dr. Gould, that Mr. Cross, the donor of these valuable specimens, be elected a Patron of the Society. Voted unanimously.

Dr. C. T. Jackson read a paper containing an Analysis of the body and scales of a species of Palæoniscus from the Albert Coal-Mine, in Hillsborough, New Brunswick, with an account of the processes by which it was made.

The following results were obtained.

Animal matter,	0.0800
Carbonate of lime,	0.0980
Phosphoric acid,	0.2452
Lime,	0.1234
Magnesia,	0.0623
Silicious matter,	0.0040
	0.6129

The original amount of matter operated upon was 0.620 grammes. The loss of seven millegrammes took place in the solution of the phosphates that had been fused with Carbonate of soda, and could not materially affect the accuracy of the analysis.

The Secretary presented, in behalf of Mr. Temple Prime, a Monograph on the species of Pisidium, found in the United States. Referred to the Committee on Mollusca.

Dr. Gould introduced to the Society, Dr. Hunter, of North Carolina.

Dr. Hunter exhibited a native crystallized diamond, from the gold region of North Carolina. It was the second only that he had known to have been found in that State. Two had been obtained within his knowledge in Georgia.

Dr. C. T. Jackson said, he considered the discovery of diamonds in this country, in the gold bearing districts, as interesting, showing as it did the similarity of the deposits to those of other parts of the world. He had before only seen two small specimens from these districts.

Prof. Wyman exhibited several Alligators' teeth, for the purpose of showing the manner in which the new teeth press upon and produce absorption of the old ones in the process of dentition. This had been described in both Crocodiles and Alligators. The number of teeth in this animal is sixty. Prof. Wyman also exhibited pieces of wood taken from the stomach of a Florida Alligator. It is a popular notion at the South that these animals on the approach of winter are in the habit of swallowing various indigestible substances, such as wood, stones, &c. for the purpose of filling the stomach during the season of hibernation. In Florida, however, they can hardly be said to hibernate. He was inclined to think that these things are swallowed by the animal accidentally in seizing its food. The stomach he had found to be not so muscular as it is described to be, not so much so as to give it at all the character of a gizzard.

Mr. Ayres said, that it was a very common thing to find in the stomachs of fishes similar substances, even wool and shells. He had frequently found them in the stomach of *Leuciscus pulchellus*. He had seen a block of wood of the size of a cubic foot taken from the stomach of a Halibut, where it had apparently laid for a long time.

Dr. C. T. Jackson said, that he had recently observed in a pond near Plymouth, Mass. the Bream (*Pomotis vulgaris*) guarding its eggs. The nest was formed of gravel pasted together with the eggs, and over it the fish kept its watch. On driving it away, it constantly returned when the alarm had passed. It could be approached so as to be easily thrown on shore with the hands. On breaking up the nest, the fish disappeared. Similar facts had been noticed of late years in the habits of many fish, but Dr. Jackson was not aware that they had been noticed with regard to this species.

Dr. Gould presented, in the name of Rev. Mr. Walker, a box of land shells, some of which were new to the Collection, and some undescribed species, from forty to fifty in number, all from the Gaboon river, Africa. He also presented, in the name of Mr. J. G. Anthony, of Cincinnati, specimens of *Unio collinus* and *U. biangulatus*, and from Mr. Schäeffer of the same city, a bottle containing Reptiles.

A note was read from the Curator of Herpetology announcing the donation from Dr. C. C. Holmes, of Milton, Mass. of a specimen of Rattlesnake, (*Crotalus horridus*,) obtained in that town. The thanks of the Society were voted for the donation.

A letter was read from Mr. Isaac Lea, of Philadelphia, presenting a cast of *Sauropus primævus*, which had been laid upon the table at a previous meeting without any announcement of the source from which it had come. The thanks of the Society were voted for the donation.

August 4, 1852.

Dr. Durkee in the Chair.

Dr. Durkee exhibited a branch of *Morus alba* bearing fruit, taken from a tree which had sprung from seed grown on a graft of *Morus expansa.* The original *Morus alba* was cut off about six inches above the ground, and *Morus expansa* was grafted into it. The result was, a tree bearing the foliage of *Morus expansa* with the fruit of *Morus alba.* The tree growing from this fruit had all the characters both in foliage and fruit of the *Morus alba,* the ingrafted stock having entirely died out.

Dr. Durkee exhibited a specimen of Ascidia with an Alga, *Ptilota elegans,* growing from it.

Dr. Gould presented, in behalf of Mr. James G. Swan, of San Francisco, a daguerreotype by Shaw of San Francisco, of Chetz-a-mockaha or Duke of York, a chief of the Clalum Indians at Puget Sound.

Dr. Gould announced the donation of from 1,000 to 1,500 shells from the Eastern Seas in the name of Mr. Henry T. Parker.

Mr. Sprague presented a young Dog Fish, *Acanthias Americanus,* with the yolk bag attached, and a prepared skin of an Alewife.

Prof. J. P. Cooke, of Cambridge, was elected a Resident Member of the Society.

August 18, 1852.

Dr. A. A. Gould in the Chair.

The Secretary read a communication from Mr. W. O. Ayres, giving descriptions of two new genera and three new species of Holothuria, as follows.

During a recent excursion to Eastport, Me., I obtained several specimens of a Holothurian, which is apparently not only undescribed, but the type of a new genus. The generic characters are,— Body vermiform, not provided with either suckers or hooks, but having between the longitudinal muscles numerous small tubercles which contain very regular, minute, calcareous wheels. Tentacula ten, digitate. Oral circle of ten pieces, without projections either upward or downward, each alternate piece perforated. No muscular stomach. Genital tubes divided. Respiratory trees wanting.

The wheel-like deposits suggest the name

TROCHINUS Ayres.

The species, from its color, may be called *T. pallidus* Ayres.

The largest specimens yet seen are not quite five inches in length, with a breadth of half an inch. The surface presents five rows, more or less perfectly developed, of "warts," (Pourt.) which, when dry, look like small white scales. These, under the microscope, are shown to contain multitudes of beautifully regular wheels. Each wheel is perforated at the centre, and provided with six radiating, broad, bevelled "spokes;" the rim being strengthened with a waving ridge. The largest are about one tenth of a millimetre in diameter.

The *intestine*, of nearly uniform diameter, extends backwards, again forward, and returns straight to the anus, having a little less than three times the entire length of the body.

The *oral circle* resembles that of *Synapta* in the general form of its pieces, and in their perforation, but differs in the number (ten instead of twelve,) and in their exterior surface.

Of this the posterior border forms a ridge, which, in the pieces not perforated, extends to the anterior border in the *Shark-tooth* form, showing its analogy to the corresponding parts in *Psolus*, *Thyonidium*, &c. To this elevation the retractor muscles are attached.

The *tentacula* resemble those of *Synapta*, but differ in number (ten instead of twelve,) and in the greater elongation of the pedicel, thus allying their form somewhat to that seen in *Chirodota;* their digitations are generally eleven or thirteen. They contain calcareous spiculæ, consisting of a slender shaft with both extremities enlarged and commonly perforated or divided.

The genital tubes in their form, situation, and development, recall those of *Synapta pellucida* Stimp.

T. pallidus is of a very pale flesh color, having the walls of the body so thin that the inclosed organs are seen with much distinctness. It is not uncommon at Eastport, under stones, near low-water mark, though it should be mentioned that under the same stones were found Terebratulæ, formerly considered inhabitants exclusively of very deep water.

This genus, as at present known, includes two species, *T. pallidus* Ayres, and *T. rotiferus* (*Synapta rotifera* Pourt.) It forms an interesting link between *Synapta* and *Chirodota*, though perfectly distinct from each. In general appearance it so much resembles the former as to be readily mistaken for it.

In company with the specimens of *Trochinus pallidus* a single individual was found of an entirely different type, closely allied in many respects to *Thyonidium*, yet varying so much that a new generic division is required with the following characters.

Body elongated, covered with suckers, among which a slight tendency to separation into rows may be discerned. Tentacula twenty, ramose, arranged in pairs of unequal development. Oral circle of ten pieces similar to those of *Thyonidium*. No muscular stomach. Respiratory trees two. Genital tubes undivided, attached far backward.

It is proposed to name the genus, from the grouping of the tentacles,

DUASMODACTYLA Ayres,

the species on which it is founded being *D. producta* Ayres.

Two specimens only have yet come under my observation, the one already mentioned, and another in the possession of Mr. Stimpson, which was also obtained at Eastport by Mr. William Bridges. The larger is about five inches in length, with a breadth of three fourths of an inch.

The *suckers* are numerous, without order. They are destitute of calcareous support except the terminal, transverse, cribriform plate. The neck, for about half an inch behind the base of the tentacles, is nearly naked. A few suckers, however, are found on it, larger than those on the other parts of the body, without the terminal plate, but having their sides crowded with very irregular, perforated laminæ. The integuments here, also, unlike those of the other parts of the body, contain an abundant calcareous deposit, similar to that of the adjoining suckers, though the plates are smaller.

The *tentacula* are of very unequal development; two large, ramose, then two very small (scarcely exceeding one tenth of an inch,) two again large, &c. thus making ten pairs, an arrangement somewhat similar to that of *Orcula* Trosch. They have a few calcareous deposits, like those in the integuments of the neck.

The *oral circle* contains ten pieces, five of the *shark-tooth* form, the alternating five, to which the retractor muscles are attached, widely bifid.

The *intestinal canal* is between four and five times the length of the animal.

The *genital tubes* are gathered in one mass, at about half the length of the body backward. They are attached, not to the intestine, as usual in such forms, but to the inner wall of the body; along this and connected with the transverse muscles as it passes, the duct extends forward and opens near the base of the tentacula.

The *pyriform sac* is slender, nearly an inch and a half long. In *color* this species is of a pale yellow, the neck and tentacles being purplish.

Duasmodactyla has no similarity to *Holothuria*, *Bohadschia*, &c. which it resembles only in the number of tentacula, but is on the contrary closely allied to *Thyonidium*. It furnishes the only instance as yet of any species with twenty tentacula occurring on our northern coast.

Among the specimens brought by Mr. Stimpson from South Carolina are several of *Colochirus gemmatus* Pourt. obtained at Fort Johnson in shoal water. In accordance with the plan originally proposed in my notes on this family, the following description is annexed, specifying some points not mentioned by Count Pourtales.

The body is fusiform, with both extremities elevated, about five inches in length with a breadth of one inch, tapering more posteriorly than anteriorly. The surface is densely covered with minute, irregular, calcareous laminæ, each pierced with four or five holes. These, by their abundance, render the walls of the body so rigid as perhaps to prevent much change of form in the animal.

The *suckers* are numerous. Their sides are covered as thickly as the adjacent surface; the plates are much elongated, sometimes bent, widest in the middle, perforated. The terminal, transverse plate is quite small. The neck, about half an inch in length, is destitute of suckers.

The *tentacula* are ten, the two on the ventral side very small. The remaining eight are ramose, rather short, having their trunks and principal branches rigid with calcareous deposits. The laminæ are less elongated than those of the suckers, pierced with very numerous foramina.

The *oral circle* consists of ten pieces. Five are short, rounded posteriorly, and bifid anteriorly. The alternating five, to which the retractor muscles are attached, project further forward, and are also prolonged posteriorly each into two slender branches. Thus the entire circle presents the appearance of five short points forward (each slightly bifid,) and ten long ones backward.

The *intestinal canal* is of nearly uniform diameter, a little more than three times the entire length of the animal.

The *genital tubes,* undivided, are attached in a cluster to the intestine, at a point rather more than half the length of the body backward. The duct passes forward as usual.

The *pyriform sac* is slender, about three fourths of an inch long.

The *respiratory trees* are two, about equalling the body in length.

In *color* the animal appears to have been of a dark brown.

Five jars containing Reptiles, Insects, &c. were presented in the name of Mr. A. F. Preston.

The thanks of the Society were voted for the donation.

September 1, 1852.

Dr. Durkee in the Chair.

Dr. Burnett read a paper on the Crystalline Lens and its formation. After reviewing the opinions of previous anatomists on this subject, he gave the results of his own investigations as follows: —

1. In the Mammalian Vertebrates. In the embryo goat of two months, the crystalline lens is biconvex and made up of three parabolæ, the convexities of which point to the centre, leaving there a central triangular space. The central portion of the lens, extending to near the circumference, is opaque; and the opacity is most marked at the very centre.

The central portion is composed of minute utricles, which towards the circumference are seen to increase in size, until, on the border of the opacity, they appear as quite sizable vesicles, some of which are nucleated, in fact, are cells. Thus there exists in this opaque central portion an appearance of all the transitionary stages of minute utricles to large vesicles and cells, and this development has resulted from a mere expansion of these utricles, and not by the Schwann mode of cell-formation.

At the junction of the opaque portion with the clear border, there is perceived a tendency of the cells to arrange themselves into rows or serial, longitudinal groups, which rows are parallel with the long diameter of the parabola. Then, by the coalescence of these rows of cells, tubes are formed, and from these, fibres. Thus these fibre tubes have their origin *not* by the elongation of single cells, as Schwann had supposed, but by the coalescence of piles of cells into one continuous whole, as has been noticed by Barry and Toynbee.

2. In the Oviparous Vertebrates. In the embryo of the Chick the phases of formation are best studied about the eighth day. Here, as in the previous instance, the opaque central part is granular and cellular, and the peripheric portion tubular or soon to become so. The minute vesicles are observed gradually expanding, until they have reached a certain size, when they become nucleated ; thus presenting the appearance of nucleated and non-nucleated cells. When they have become nucleated they begin to arrange themselves into rows, one cell after another, and then by coalescence form a tube. There is this difference, however, in the process, as it takes place in the Goat and the Chick, that in the former several rows of cells form a tube, in the latter one row only ; and extended observation renders it probable that this difference between the Oviparous and Mammalian Vertebrates in the process of fibre-development is something more than a casual one. Afterwards the nuclei of these metamorphosed cells gradually disappear, and beautiful transparent fibres are the result.

By this description it will be seen that the phenomena of this metamorphosis are of the same character as those involved in the formation of muscular fibres ; that is, a kind of intus-susception, and not, as Schwann thought, an immediate fibre transition of cells.

Dr. Durkee remarked, that he had frequently seen numerous cells of various sizes, even in the adult human lens.

Dr. Burnett said, that these were probably *diaphanous vesicles*, without nuclei, known to microscopists generally, and mentioned by Schwann. They might have been nucleated cells, the nuclei of which were transparent and very near to the cell wall, making it extremely difficult to see them. The proper diaphanous vesicles might occur in any organizable fluids.

The Secretary presented, in behalf of Mr. W. O. Ayres, descriptions of two new species of Ophiuridæ with the names *Ophiothrix hispida*, and *Ophiolepis uncinata*, as follows : —

Several species of Ophiuridæ, brought by Mr. Stimpson from the coast of South Carolina, have been kindly referred to me for examination. Of these, two appear to be new.

The first is included in the genus *Ophiothrix* Müll. & Trosch., and is allied to *O. angulata*, (*Ophiura angulata* Say) but differs in the spines, the form of the ray-plates, &c. Its characters are thus expressed.

Ophiothrix hispida Ayres.

Disk pentagonal, with the angles between the rays somewhat prominent, about three tenths of an inch in diameter. Its entire surface, excepting the plates above the insertion of the rays, is thickly covered with spines, of different lengths, deeply dentate both at the point and on the sides. Above the origin of each ray is a pair of oval, naked plates, separated by a very narrow line of spines; their length is about one third of the diameter of the disk.

The *rays* are a little more than an inch in length. The *dorsal* plates are small, occupying only about a third of the breadth of the ray. They are angularly ovate, with the broader end outward, the narrower being concealed beneath the preceding scale. The *inferior* plates are nearly square, separated from each other by an intervening space. The *lateral* plates are larger, almost meeting above. Their free border projects outward beyond the base of the succeeding plate, so that the side of the ray appears notched. Each supports five or six spines, longer than twice the breadth of the ray, sharply dentate in their whole length, pierced with numerous minute holes. The number of spines of course diminishes toward the tip of the ray. The general appearance of the animal, from these long ray-spines and those of the disk, suggests very readily the specific name *hispida*.

The plates which separate the bases of the rays beneath are small, broadly ovate. Those forming the border of the mouth (Mundspalten) are oblong, with parallel sides destitute of teeth, and terminate very abruptly. Each has a large oval foramen near the outer extremity.

Mr. Stimpson's specimen was obtained at Fort Johnson, in shoal water. In the collection of the Society are two or three others which were probably brought from the Tortugas by Mr.

Bartlett. This locality is inferred from their being packed with other specimens of that region.

One of the most common species of the Carolina coast, judging from the numbers of them collected by Mr. Stimpson, is *Ophiolepis elongata* (*Ophiura elongata* Say.) Adhering to these, commonly on the lower surface, are found many individuals of a minute species, (the second of the two mentioned at the commencement of this paper,) which is referred with some doubt to the genus *Ophiolepis.* The species may be called

O. UNCINATA Ayres.

Disk of the largest about one twentieth of an inch in diameter, smooth, covered with a few large scales, commonly one in the centre surrounded with five or six others. The pairs of plates, usually found above the origin of the rays, are not discernible.

The *rays* are a little more than one tenth of an inch long, so that the animal, expanded, covers a breadth of three tenths. The *dorsal* and *inferior* plates have about the same form and size. They are imbricated with the lateral, so as to be in a degree covered by them. Their exposed portion is rounded on the outer border, pointed on the opposite. The *lateral* plates cover the greater part of the ray, meeting both above and beneath. Each bears one or two short, sharp spines or hooks, which are curved backward.

The plates, separating the bases of the rays beneath, are broadly ovate. Those forming the border of the mouth are oblong, tapering, perfectly smooth.

Should this even prove to be an immature type, it can yet scarcely be the young of any previously established species, and the description will still be of service. The absence of teeth on the mouth-plates, and the peculiar form of the lateral ray-spines would scarcely place this species under *Ophiolepis,* but as it approaches that genus most nearly, it is perhaps better in the present state of our knowledge concerning it, to class it there.

Mr. C. J. Sprague exhibited a specimen of *Araujà sericofera*, and read a description of the structure by which this plant captures insects that feed on its honey, as follows: —

The *Arauja sericofera* of Brotero (Linn. Soc. Trans. Vol. XII. p. 69, t. 4, 5,) is a Peruvian plant, belonging to the natural order, *Asclepiadaceæ.* It was received from Peru by Brotero under the name of *Apocynum Peruvianum,* according to Dow, who describes it in his System, Vol. IV. p. 149. It is also described in De Candolle's Prodromus, Part 8, p. 533, and also by Martius and Zuccarini, Vol. I. p. 53, t. 32, the last authors giving it under the name of *Physianthus albens*, with an admirable figure. It was named Arauja, after a Portuguese botanist of some celebrity, Antonio de Araujo.

The general descriptions of these writers give an accurate account of its various parts, but the space allowed to it, or perhaps a want of knowledge of the growing plant has not permitted them to describe the curious trap which it offers to the insects which feed on its honey. The tube of the corolla is swollen at its base and constricted in the middle in a star-like form. The five diverging cavities are exactly over the approximate horns of the anthers. The horns are directly over the nectaries, so that when the insect inserts its proboscis into the cavity, it is very naturally thrust between these horns, which are hard and inflexible. On attempting to withdraw its proboscis, it becomes wedged in between the anthers so tightly that the largest insects are frequently held until they die and hang pendant from the flower. There is no sensitiveness in the flower itself. The insects catch themselves, and so often does this occur that a gentleman in New York has obtained butterflies, bees, and a great variety of other insects, enough to fill a large case, from the flowers of a plant growing in his garden.

De Candolle describes four species of the genus Arauja, one of them being the *A. albens* of Dow, which is different from the *Physianthus albens* of Mart. & Zucc. This latter now takes the name of *A. sericofera*, and has a leaf quite smooth on the upper surface, while the *A. albens* is beset with scattered hairs, with a downy corolla. The specific name of *albens* is scarcely applicable to any one plant of a genus which is always whiteflowered.

September 15, 1852.

Dr. Durkee in the Chair.

Dr. W. I. Burnett said, that the fibres of the crystalline lens in man, which had been the subject of discussion at the previous meeting, so far as he had examined them, are always straight; he had never been able to detect any of the serratures described by anatomists. The same he had found to be the case in the Tortoise, the Cat, and the Squid. He thought that the serrated appearance described might have been produced by a laceration of the fibres. Since the last meeting he had had an opportunity of examining the diaphanous vesicles then spoken of, and found that they would expand by the imbibition of water and then take any shape by pressure.

Dr. Durkee said, that the results of his observations on the fibres of the human crystalline lens differed from those of Dr. Burnett. He had examined subjects of all ages, and had found the digitations described by anatomists. He was satisfied in his own mind, that they were intended to fit into each other.

Dr. Durkee exhibited, under the microscope, a human lens showing numerous cells, such as he had described at the previous meeting.

Dr. Burnett said, he regarded them as accidental formations, produced by a thin coating of albumen on a drop of oil, forming a cell, which was afterwards enlarged by Endosmosis.

Dr. Burnett read a paper on the Coloration of Cephalopoda. His observations had been made on the common Squid, *Loligo illecebrosa.* The results obtained were as follows: —

1. The coloring matter is composed of a single layer of granules, deposited in the dermis, between the muscular fibrillæ

which enter into its composition. It is deposited here and there, in spots, of various shades of brown, throughout the skin.

2. The splendid, changeable colors of the surface are due, not to the pigment spots alone, but to the intervening tissue; and the surface color *over* the pigment spots is subject to the same variations. These facts may be tested by placing a small portion of the skin on a plate of glass, and introducing a little water under it, the evaporation of which, by changing the surface conditions, generally produces a variety of colors.

3. The varying hues of the animal are due to the contraction of the muscular fibrillæ of the dermis, which changes the surface of the skin; and not, as Mr. Owen has thought, to the conjunction and disjunction of two layers of pigment placed one above the other. By the action of these fibrillæ, the most varied shades of surface can be rapidly produced.

Prof. Wyman stated, in confirmation of these views, that he had noticed large patches of color on the Squid, which at times entirely disappear. This would not be the case if this color were due to pigment.

Mr. Girard remarked, that in the embryo Squid, before it escapes from the egg, he had seen the same changes of color as in the adult.

Dr. Gould, in behalf of the Committee on Mollusca, to whom had been referred the paper of Mr. T. Prime, on the genus *Pisidium*, reported in favor of its publication in the Society's Journal.

Dr. Burnett presented a Collection of Reptiles from the Southern States, of the following species.

Anolius Carolinensis, *Tropidolepis undulatus*, *Ameiva sexlineata*, *Scincus quinque-lineatus*, *Scincus fasciatus*, *Ophisaurus ventralis*, *Trigonocephalus contortrix*, *Trigonocephalus piscivorus*, *Coluber constrictor*, *Coluber guttatus*, *Coluber punctatus*, *Coronella getula*, *Brachyorrhos amœnus*, *Rhinostoma coccineum*, *Psammophis flagelliformis*, *Heterodon simus*, *Heterodon niger*, *Heterodon platirhinos*, *Hylodes gryllus*, *Engystoma Carolinense.*

A Collection of twenty species of *Anculosa* and *Melania* was presented in the name of Mr. J. G. Anthony, of Cincinnati; also Cuba shells, from Señor F. A. Sanvalle, of Havana.

Capt. Stansbury's work, containing the Report of his Survey of the Salt Lake region, was presented in the name of the author. The thanks of the Society were voted for the donation.

BOOKS RECEIVED DURING THE QUARTER ENDING SEPTEMBER 30.

Sixty-fifth Annual Report of the Regents of the University of the State of New York. 8vo. Pamph. Albany, 1852. *From the Regents of the University.*

Fifth Annual Report of the Regents of the University on the Condition of the State Cabinet of Natural History, &c. 8vo. Pamph. Albany, 1852. *From the Regents of the University.*

Review of Geological Relations, &c. of the Albert Coal Mining Company, as written and compiled by C. T. Jackson, M. D. By a Fellow of the Geological Society of London. 8vo. Pamph. New York, 1852.

American Journal of Science and Arts, for July, 1852. Vol. XIV. No. 40. New Haven. *From the Editors.*

Proceedings of the American Academy of Arts and Sciences. Vol. II. 8vo. Pamph. 1852. *From the Academy.*

Bulletin de la Société Géologique de France. 2ième Serie. Tome IX. Feuilles 5 – 10. Paris, 1852. *From the Société Géologique.*

On the Osteology of the Head of Hippopotamus, and a Description of the Osteological Characters of a new genus of Hippopotamidæ. 4to. Pamph. By Joseph Leidy, M. D. Philadelphia, 1852. *From the Author.*

Journal d'Agriculture et Transactions de la Societé d'Agriculture du Bas-Canada. Vol. VI. No. 7. 8vo. Pamph. Montreal, 1852. *From J. A. H. Latour.*

Annals of the Lyceum of Natural History of New York.

Vol. V. Nos. 7, 8. 8vo. Pamph. New York, 1852. *From the Lyceum.*

Fossil Remains of Reptiles, and Chelonian Foot-tracks, from the Devonian Strata of Morayshire. By L. Brickenden and G. A. Mantell. 8vo. Pamph. London, 1852. *From the Authors.*

Description of a Skeleton of Mastodon giganteus of North America. By John C. Warren, M. D. 4to. Boston, 1852. *From the Author.*

Zeitschrift für Malakazoölgie. Herausgegeben von Dr. Karl J. Menke and Dr. L. Pfeiffer. 8vo. Pamph. Nos. 6 – 12. For 1851, and 1, 2, for 1852. Cassel.

Forbes and Hanley, History of British Mollusca. 8vo. London, Nos. 44 – 46, 1852. *Exchange with H. Cuming.*

Smithsonian Contributions to Knowledge. Vols. 3, 4. 4to. City of Washington, 1852. *From the Smithsonian Institution.*

Proceedings of the American Association for the Advancement of Science. 8vo. Washington, 1852.

Description of new Species of Marginella, with Notes on sundry Species of Marginella and Cypræa. By J. H. Redfield. 8vo. Pamph. 1852. *From the Author.*

Proceedings of the Academy of Natural Sciences of Philadelphia. Vol. VI. No. 3. pp. 71 – 116. 1852. *From the Academy of Natural Sciences.*

Annals of the Lyceum of Natural History of New York. Vol. V. Nos. 9 – 14. 8vo. Pamph. New York, 1852. *From the Lyceum of Natural History.*

C. B. Adams. Catalogue of Shells, collected at Panama, with Notes of their Synonymy, &c. 8vo. New York, 1852. *From the Author.*

American Journal of Science and Arts. Vol. XIV. No. 41. New Haven, September, 1852. *From the Editors.*

Exploration and Survey of the Valley of the Great Salt Lake of Utah. By Howard Stansbury. 8vo. Philadelphia, 1852. *From the Author.*

Received from the Courtis Fund.

Annals and Magazine of Natural History, for July, 1852. Vol. X. No. 55. London.

Annals and Magazine of Natural History, for August, 1852. Vol. X. No. 56. London.

Annals and Magazine of Natural History, for September, 1852. Vol. X. No. 57. London.

October 6, 1852.

The President in the Chair.

A letter was read from M. Vattemare, accompanying a letter of thanks from the Professors of the Museum D'Histoire Naturelle, for the donation of the Shark presented to that Institution by the Boston Society of Natural History. The letter expressed great satisfaction at the prospect of opening an exchange of objects of Natural History between the two Institutions, begged to be informed what specimens this Society would be most pleased to receive, and stated that their own Collection of Fishes and Reptiles of the United States was quite incomplete. Among the latter class, the fresh water Turtles, particularly the Emydes, were most desirable to them.

The President presented a very perfect cast of the Cranium of *Felis Smylodon*, which he had recently received from Paris, and gave a historical account of this extinct species as known to Naturalists, with a general description of its most striking anatomical features, comparing them in detail with those of the Cat family, as follows : —

First, the head is long and narrow ; the cranium is remarkably narrow through the temporal fossæ, in this respect not agreeing with the carnassial character of the hypothesis of Gall. The teeth, like those of the Cat, are divided into four classes, incisors, canines, or cuspidati, false molars or premolars, and true molars. The incisors are six in number in each jaw ; the four middle in both jaws are smaller, more simple ; the two outer larger in the crown, more complicated ; in number they agree with those of the Cat. Then come the formidable canines, cuspidati, chisels of Dr. Lund. These canine teeth, compared with those of the Cat and the different members of its family, may be said to be of immense size in the upper jaw ; they extend from above downward, and from behind forward in an arched form, their convexity being forwards and crowned with a fine serrated edge, their concavity backwards and also having a serrated edge. The anterior edge is thicker than the posterior, which gives to the prehensile and cutting part a much greater power of division than that of the anterior edge. The same formation exists in the Cat, for example in the Tiger, Hyena, &c. The sides of these canine teeth are flattened, whence the name of *Stenodon,* or narrow tooth, applied as a specific name by some describers. The entire length of this tooth is twelve and a half inches, of which the root occupies more than a third, and has been suspected to be anchylosed with the jaw, as in the Saurians, but such is not the fact. The extremity is sharp pointed, so as to penetrate readily the flesh of its victim.

Now, if we consider the length of this tooth, its curved form, its narrowness, (like that of a sword,) its pointed extremity, its serrated edges, its deep implantation in the socket, we shall see in it one of the most formidable weapons of attack, which nature has invented. If its bodily strength harmonized with this organization, we may believe that the lion, tiger, and even the great bear, might fall easy sacrifices to the Smilodon.

The premolars of the upper jaw are two on each side, one less on each side than in the Cat. The first premolar is small ; the second is the sectorial, laniary, or carnassial tooth. There is a small tuberculous molar behind the premolars.

The *Lower Jaw* is remarkable in two points: 1st, the smallness of the coronoid process and of the angle which it makes with the horizontal branch ; an arrangement which would diminish the power of the temporal muscle, and thus weaken the operation of the lower jaw in the act of incising the food. The loss of this power is compensated by the movement of the head and upper jaw, which enables it to transfix its prey by the great canines, and then cut or tear it by a movement of the head backwards — an action which would not require the coöperation of the lower jaw. So we may believe, that while the upper jaw has a power much greater than that of other carnivorous animals, the lower jaw has actually less.

A second peculiarity of the lower jaw is the great depth of the chin, which has given rise to the name *Megantereon*, in which character it is more remarkable than any other animal of the Cat kind. The long, contracted space between the lower canine and first premolar seems destined to give room for the movement of the point of the large upper canine.

The teeth of the lower jaw correspond generally with those of the other members of the family. There are three incisors, one small cuspidatus or canine, two premolars, and one molar on each side.

Prof. Wyman called the attention of the Society to several points in the specimen presented which attracted his observation. The zygomatic arches were remarkable for their great narrowness, not being laterally wider than those of the Tiger, while the vertical width was much greater, for the attachment of the masseter muscles; for the insertion of which there was also a marked depression in the lower jaw.

Dr. Burnett read a paper on the development of the Spermatic Particles in decapod Crustacea, and exhibited several diagrams, representing their singular forms. His observations were made on the common Lobster, (*Astacus marinus*,) *Pilumnus*, *Grapsus*, and several other genera. He had found that the particles in question are produced from the nuclei of cells inclosed within a parent cell. This nucleus is at first spherical, then oblong, and subsequently three tail-like processes spring from one end. Thus these Spermatozoa are found to follow the same general law of development as those of other animals, and do not furnish exceptions to the general rule, as supposed by Kölliker and Wagner, who regard the processes as the true Spermatozoa. This latter opinion Dr. Burnett ascribed to the fact, that when immersed in fresh water the ray-like processes detach themselves from the oval body, and are seen moving irregularly about ; whereas in salt water, the medium in which they naturally exercise their function, they remain adherent. It is probable that observers, not being aware of this fact, have used fresh water as a medium in making their microscopic researches. Kölliker also regarded some of these bodies as nucleated; an opinion which Dr. Burnett attributed to an optical illusion, produced by a cavity such as is found at one end in the Spermatozoa of the Lobster. In that of Pilumnus a similar nucleated appearance is produced by a thin membrane, often seen around one of the ray-like processes, which refracts the light and produces this effect.

Dr. Burnett exhibited a number of round, fleshy bodies, taken from a sheep, in which animal they frequently fill the entire space between the kidneys and the anus.

He was of opinion that they are vascular sanguineous glands, analogous to the Thymus, and Thyroid, and the Supra-renal capsules, and like them perform some function connected with the regeneration of the blood. Their direct connection with the system is simply vascular, and their internal structure is quite like that of the Supra-renal capsules. They are about as large as a wild cherry. As to their origin, he thought them the remains of an accidental embryonic structure ; in other words, blastodermic remains. This view he thought the correct one, from the fact, that *Goodsir* (Philos. Trans. 1846) has shown that these Supra-renal bodies, and in fact the other organs of this nature, are embryonic remains of the blastodermic membrane.

Dr. Burnett thought that these bodies situated about the kidney might, and probably do, have the same origin ; which view would also be supported by their similar structure, and the fact that they are nearly always seen in young animals alone. He considered the subject an interesting one in connection with the embryonic function of this class of organs, as aiding the formation of blood, and a nutritive material.

Dr. Jackson said, that he had recently had an opportunity of examining a second time the deposit of Eupyrchroite, near Lake Champlain. It occurs in a trap dike, and in such condition as to indicate that it is of the same origin, and therefore igneous. This was an important geological fact in his estimation, as tending to show that Phosphorus is an element in the interior of the globe. In Europe, its conjunction with igneous minerals would point to the same conclusion. The deposit at Lake Champlain was, he said, of great value, as it contained eighty-three per cent. of Phosphate of Lime in mass.

Prof. Wyman exhibited three fragments of a beak of a fossil fish, (*Isthiophorus*,) resembling the Sword-fish, from the tertiary deposit at Richmond, Va. Such a specimen had never before been found in the United States. It is an interesting fact, that it occurs in company with fossils similar to those found in the London clay, associated with similar specimens. It is probably an undescribed species.

Dr. Storer presented several round masses of matted straw and grass, found at the bottom of a pond in Lincoln, Mass. It was a question, what had formed them. Dr. Gould said, he had examined them, and he was inclined to think they had been formed by the motion of the water, beating on the shore, acting on the dry grass, which had become felted together.

Dr. Jackson presented, in the name of MM. Elie de Beaumont and Dufrenoy, the second volume of their "Explication de la Carte Géologique de France." The thanks of the Society were voted for the donation.

Dr. J. M. Warren presented a large Stalactite from a Cave in Bermuda.

Mr. Sprague presented, in the name of the Historical Society, a Collection of more than two thousand dried plants, made up by the late Prof. Peck, and many years since presented to that Society by Thomas H. Perkins, Esq.

The transfer was made with the consent of that gentleman. The thanks of the Society were voted for this valuable donation; and it was voted, that Col. Perkins be notified of the value the Society attach to the Collection, and of their sense of the interest he has so constantly manifested in institutions for objects of public benefit.

Dr. W. E. Deering, of Augusta, Ga., was elected a Corresponding member of the Society.

October 20, 1852.

The President in the Chair.

The President called the attention of the Society to some casts of immense eggs which he had recently received from Paris. During the past year these eggs had been brought to France by Capt. Abadie, from the Island of Madagascar, and deposited at the Garden of Plants, from which Institution the casts had been obtained. Two entire eggs and one broken one were carried to France. These are casts of two eggs, one ovoid in shape, the other more elliptical; the former measures thirteen inches in its long diameter, and a little more than eight in its lateral diameter, and has an internal capacity of nine quarts, equal to about six Ostrich eggs; the latter was about twelve inches in length and eight in width; from the broken specimen the thickness of the shell was found to be one tenth of an inch.

These large eggs were known as long ago as 1831, and have been occasionally seen by travellers since then, many of whom are of opinion that the bird to which they belong is still in existence in the interior of the island. They were first thought to be Saurian eggs; but Geoffroy St. Hilaire has referred them to birds belonging to a genus called by him, Epiornis; accompanying bones also prove that they belong to birds.

Mr. Charles Girard, of Washington, said he had just returned from the Upper Lakes of the Androscoggin, where he had made some Ichthyological observations, a part of which he would now communicate to the Society.

He had often been told by anglers that the trouts of these waters (*Salmo erythrogaster* and *S. fontinalis*) are subject to considerable variations, making it probable, in their opinion, that there were more than two species. Visiting the locality he had an opportunity of seeing and comparing large numbers of individuals. He satisfied himself that all the varieties spoken of are mere *varieties of color*, all referable to either *Salmo fontinalis* or *S. erythrogaster*.

He was told, however, that about the 10th of October, another trout, smaller in size than the common brook trout, and inhabiting the deep water of Moosemegantic Lake, would make its appearance near shore and ascend in large numbers the Eastern inlet, called Kenebago. This actually took place, and the trout, on examination, proving to be very different from *Salmo fontinalis* and other species of Salmo, he regarded it as a new species, and proposed for it the name of

SALMO OQUASSA Girard.

"It is from eight to ten inches in total length. The body is subfusiform, slender, and the most graceful in the trout family. The head is proportionally small, conical, coregonoid in shape. The mouth is smaller than in *S. fontinalis*. Differences are likewise observed in the structure of the opercular apparatus. The fins have the same relative position as in the brook trout, but are proportionally more developed, with the exception of the adipose, which is considerably smaller; their shape is alike, except that of the caudal, the crescentic margin of which is undulated instead of being rectilinear. The scales are somewhat larger, although they present the same general appearance as those of the brook trout. The lateral line is similar in both of these species. A bluish tint extends all along the back from the head to the tail, so that when seen from above, the fish appears entirely blue; hence the name of *Blue Back*, given to it by the settlers of that neighborhood. The sides and abdomen are silvery white in the female, and of a deep reddish orange in the male, spotted in both sexes with orange of the same hue as the abdomen. The dorsal and caudal fins are brownish blue, bordered with pale orange in the male, the pectorals, ventrals, and anal, of a fiery orange, blackish blue at their base, with their margin of the purest white. When just taken out of the water it is impossible to imagine any thing more beautiful and more delicate in the way of coloration in fishes of the temperate zone.

"The abode of the 'Blue Back' is, as stated above, the Moosemegantic Lake, in which it is concealed during the greatest part of the year; but about the 10th of October, it comes near shore and ascends in shoals the Kenebago for the purpose of spawning. Half a mile above its mouth, the Kenebago receives the outlet of Lake Oquassa; the trout there leaves the Kenebago to the left and runs towards Oquassa Lake, where its voyage comes to a close. After the middle of November it goes back into Moosemegantic Lake and is seen no more until October of the next year. The 'Blue Back' having hitherto received no systematic name, that of *Salmo oquassa* is proposed for it."

The flesh of this fish is highly flavored, and more delicate than that of the brook trouts in Europe and America. It resembles that of *S. umbla*, of the Swiss lakes, both in the peculiarity of its habits and its delicacy. *Salmo umbla* is a lake trout, an inhabitant of the deep, making its appearance near shores in January and February to spawn, and never ascending the brooks or rivers, tributaries of these lakes.

Dr. W. I. Burnett read a paper on the "Origin, development, and intimate structure of the Renal organs throughout the Vertebrata."

The renal organs appear under two forms, — the embryonic or so-called Wolffian bodies, and the permanent or true kidneys. The temporary Wolffian bodies are found in all Vertebrata, excepting the fishes and amphibia, and they persist as active organs in an inverse ratio to the grade of the animal. With the exception of the heart they are the first organs formed in the abdominal cavity; they appear first as a simple tube, from which are formed diverticula, from without towards the vertebral column, each of which becomes a uriniferous tube; these tubes are soon dilated into an infundibuliform body, in the interior of which blood-vessels are formed from epithelial cells arranging themselves in a linear manner, and the coalescence of their walls, which communicate with the general circulation, the whole constituting the Malpighian body. The receptacle of the urinary secretion by the Wolffian bodies is the Allantois. What Müller calls Wolffian bodies in Amphibia, and which are generally called Müller's bodies, Dr. Burnett thinks are not such, as he was able to find in them none of their structural characteristics, no direct vascular connection, and no Malpighian bodies; they seem to be tubes terminating in tuft-like extremities, which are blind sacs.

The form of development of the permanent or true kidney is a branching out indefinitely of a primitive tube, the future ureter; the terminal portions of these branches forming direct vascular connections, either by Malpighian bodies, or a delicate network of blood-vessels. The mode of formation is, therefore, *arborescent*, the ureter being the main stem, and the numerous ramifications constituting the whole structure of the kidney. In birds the branching tubes do not terminate on the edge of the plume, (the branching of the tubes resembling the plume of a feather,) but loop and return, and when near the shaft they dilate into Malpighian bodies; they do not terminate by anastomoses. In the Ophidians Dr. Burnett was able to find but few Malpighian bodies, the uriniferous tubes terminating usually in blind extremities. The complete paper will soon be published, with illustrations.

Dr. C. T. Jackson presented some specimens of Eupyrchroite from Lake Champlain, containing eighty-five per cent. of phosphate of lime. Besides the compact Phosphorite, he also presented the Botryoidal Phosphorite, and the Trap, Quartz, and flesh colored Feldspar occurring in the mine at Crown Point, N. Y., and a specimen of the Phosphate of Lime from Hurdstown, N. J. These deposits are of great value for the manufacture of porcelain and phosphorus, and especially for agricultural purposes.

Mr. Alger presented some fine minerals from Grafton, N. H., a piece of Beryl, (*aqua marina*,) from a crystal weighing two and a half tons, occurring in a bed of quartz, in a gneiss formation, interspersed with beds of white felspar containing thirteen per cent. of potash. Specimens of the quartz and felspar, of trapezohedral garnet, and of copper pyrites with garnet, were also presented; and sheets of prismatic mica containing compressed crystals of garnet and tourmaline. Mr. Alger alluded to another magnificent crystal of beryl, on land belonging to him in that locality, weighing over five tons, and measuring two feet eight inches in its greatest diameter, the largest crystal of any substance ever described.

Dr. C. T. Jackson drew the attention of the Society to the compressed crystals of tourmaline, as they were compressed in the very direction necessary for a perfect polarization apparatus, for which purpose, in the microscope, they were admirably adapted and were considerably used. Crystals of quartz were also found of exceeding thinness, like plates of glass. This interpenetration of the minerals indicates that they were once all plastic, and had crystallized simultaneously. Sir C. Lyell inquired, if these crystals had at first their natural form, and, if so, how they were afterwards compressed. Dr. Jackson replied, that they must have either assumed this form while in a plastic state, or have been thus flattened by aggregation of particles at the sides, where there was least pressure.

Dr. C. T. Jackson gave a detailed account of the geology and mineralogy of the mine of red oxide of zinc in Sussex County, at Franklin, N. J., and described the various processes employed in the manufacture of the white oxide, or zinc paint.

November 3, 1852.

The President in the Chair.

Dr. Kneeland read a paper on a Flat-head Indian skull, from Florida, where it was found imbedded in an artificial deposit of shells. He believed it to be the skull of a Natchez Indian.

This skull was obtained from the midst of a deposit of shells about eight miles above Apalachicola, Florida; nearly the whole skeleton was thus found, all but the skull either having been broken by the carelessness of the workmen, or having soon crumbled on exposure to the air; it was found about five feet below the surface of the ground; the shell deposit is a bed of Gnathodons, a shell living in brackish water. There are hundreds of these beds all along the Gulf shore, sometimes several hundred feet in extent and ten or twenty feet thick; they are generally supposed to be artificial, having been thrown into heaps by the Indians after eating their contents; similar beds of oysters are also seen, in which are occasionally found Indian bones, pottery, charred wood, and similar Indian remains.

The high cheek bones, the large quadrangular orbits, and the breadth between them, the anterior projection of the upper jaw and slanting direction of the teeth, and, (apart from the manifest distortion,) the prominent vertex and vertical occiput, taken together, sufficiently indicate that this is an Indian skull, and the distortion would show it of considerable antiquity, compared with the existing Indian tribes. From its locality it could not belong to the existing Flat-heads of the North-West Coast.

The head to which this comes the nearest is the Inca Peruvian, though it is more distorted even than that; in the latter the sharpness of the superciliary ridges and the prominent nasal bones would indicate that the pressure anteriorly was above the orbits, while the flatness of these regions in this skull would indicate that the pressure was also applied over these ridges and even to the upper part of the face. The flatness of the frontal bone is quite remarkable, its outline, with the exception of the upper two inches, being not at all curved; the right frontal protuberance being much the most prominent; the zygomatic fossa, from the pressure, has its anterior limit on the frontal bone more brought forward, with a flattened direction of the frontal ridge, and a considerable depression between the frontal protuberance and the external angular process. Over a zone, on the top of the head, comprising the anterior inch of the sagittal suture, there is a marked depression; posterior to this, instead of gradually rounding off downwards, the skull is much elevated for the space of about two inches, without great lateral expansion, and then suddenly becomes quite perpendicular on the posterior surface. There is a remarkable flatness of the occipital region, both of the parietal and occipital bones — there is no occipital protuberance on the median line, in the usual place, but rather a concavity — but there is a protuberance, about an inch to the left of the median line, at the height of the usual occipital prominence, corresponding with the oblique direction of the pressure which must have been exerted on this head. The flatness of the occiput is such that it seems to rise immediately from the great occipital foramen.

The nasal bones are very flat, and present a remarkable form at their upper portion; the suture between them and the ascending branch of the superior maxillary bones, instead of being nearly straight or with a slight curve outwards, has a lateral wing-like process extending outwards at its upper portion, which is received into a corresponding irregular concavity in the superior maxillary bone; so that these bones are, as it were, dovetailed into, and suspended upon the superior maxillary, by these ear-like processes. The whole skull is irregularly quadrangular; the occipital portion so compressed that the parietal bones, instead of forming a regular curve, form with their upper and posterior portions considerably less than a right angle. The sides are but slightly swelled out; the forehead very retreating. The skull is unsymmetrical, both in front and behind; and the pressure was not applied exactly in the antero-posterior diameter, but in a line passing nearly from the left frontal protuberance to the right mastoid process; consequently the right frontal region, and the left occipital are considerably more prominent than the opposite sides at the same points. The face does not seem to be much distorted, though there appears a slight deviation from a perpendicular to the right.

The custom of artificially moulding the head is an old custom; the modern Indians, except on the North-West coast, do not generally practise it. It was practised by the Inca Peruvians from the eleventh century to the Spanish Invasion, and almost to the present day; and it was also a custom before the arrival of the Incas in Peru. It seems to have been principally practised among the branches of the Toltecan family of the American aborigines, to which belong the semi-civilized nations of Mexico, and Peru, Yucatan, Nicaragua, &c., and the ancient mound-builders of the Ohio and Mississippi valleys. The only nations to which this skull can be referred, from the locality in which it was found, and its evident comparative age, seem to be either the *Natchez Indians*, a branch of the great Toltecan family, who are supposed to have found their way to the Mississippi and even to Florida, about the time of the migration of the Toltecan family from Mexico to Peru, or the Choctaws, who also had the custom of flattening their children's heads by a bag of sand placed on the forehead. Unlike the other natives of Florida, the Natchez had the custom of moulding the heads of their children by strapping them into the cradle by bands of deer-skin over the forehead. The Natchez Indians were almost exterminated by the French, in 1730, in revenge for the massacre of a French colony the year before; — a remnant of the nation not long since lived on the Talipoosa River, in Alabama; they appear now to be extinct. The Charibs, both insular and continental, also had the custom of flattening the forehead, but in such a manner as to increase the antero-posterior, without increasing the vertical diameter; neither had they the very flat occiput of this skull. Moreover, the Charibs were not natives of Florida, but of the southern continent, whence they extended to the West India Islands. In the Charib skull, a great portion of the brain is posterior to the occipital foramen, so that the head naturally preponderates backwards; in this skull, on the contrary, from the perpendicularity of the occiput, almost none of the brain is situated behind the great foramen.

Without presenting the remarkable conformation figured in

Dr. S. G. Morton's Crania Americana, Plates 20 and 21, this skull much resembles one figured in Plate 54, a skull from a mound on the Alabama River; he is in doubt whether it is a Natchez or a Choctaw skull, but he is inclined to think it the latter; the locality and apparent antiquity of this skull would indicate it to be rather a Natchez than a Choctaw. There are Indian mounds in the vicinity of the spot where this was found, which contain skulls like that figured in Plate 54.

The following measurements are taken according to Dr. Morton's method; the internal capacity having been measured by Canary seed, as the skull was not strong enough to bear the weight of shot.

MEASUREMENTS.

		Toltecan average.
Longitudinal diameter	6.5 inches	6.5
Parietal diameter	5.75 "	5.6
Frontal diameter	4.8 "	4.4
Vertical diameter	5.8 "	5.3
Inter-mastoid arch	15.7 "	14.9
Inter-mastoid line	4.75 "	4.1
Occipito-frontal arch	14.2 "	13.6
Horizontal periphery	20. "	19.4
Internal capacity	90. Cubic inches	76.8

From these measurements it will be seen, that the longitudinal, parietal, and frontal diameters are about the same as Dr. Morton gives as the average of Toltecan skulls, from fifty-seven specimens, while the vertical diameter exceeds it by nearly half an inch, showing that the pressure applied to the skull, without enlarging it much laterally, or flattening it from before backwards, caused a considerable upward elongation, very few skulls, not even what he calls a Natchez, Plate 54, having a vertical diameter of 5.8 inches. This is also shown by the very great inter-mastoid arch, occipito-frontal arch, and horizontal periphery. These dimensions are very unlike those of a Choctaw skull, as given by Dr. Morton, in his Catalogue, No. 408; so that it is extremely probable that this is a Natchez skull.

From the great circumference and elevation of the skull, we should expect a large internal capacity; and we find it ninety cubic inches, very large for an Indian skull, and exceeding the average of Caucasian crania.

Dr. Gould presented some specimens from the Mississippi Valley, near Red River, consisting of travertin, fossil oysters, and an artificial mineral, composed principally of silex; this mineral clogs the furnaces for boiling sugar, in which the canes are burnt, and is evidently formed from the silex in their cortical substance. Dr. C. T. Jackson remarked, that the canes contained both silex and potash, so that this mineral was a true glass, colored probably by oxide of iron.

Mr. Bouvé announced the arrival from New Brunswick, in good condition, of portions of the trunks of large fossil trees, presented by Mr. Moses B. Perley; the thanks of the Society were voted for the donation.

November 17, 1852.

The President in the Chair.

Dr. Brewer read a paper on the distribution and habits of the Cliff Swallow, *Hirundo lunifrons*, giving data of its appearance in different parts of New England, where it had only been seen within a few years. As the paper was intended for publication in the Smithsonian Contributions to Knowledge, an abstract was not taken.

Mr. Ayres said, he had seen this bird in Hartford, Conn., as long since as 1833, and had heard of it in that town two years before. Dr. Pickering, also, had noticed it in the vicinity of Wenham Lake, several years since, where it was a new comer. Dr. Brewer remarked, that wherever this Swallow makes its appearance, the Barn Swallow gradually disappears, receding before it. He had noticed on the nest of this latter species, on one side, near the top, a shelf of the same materials as the nest, on which one bird sits much of the time, while the other sits on the eggs. As the young increase in size the shelf is occupied by both the parent birds. At night one of these birds is constantly on the watch to prevent surprise.

The Secretary presented, in behalf of Mr. Temple Prime, a paper on the genus Cyclas, as follows: —

Notes on the Species of Cyclas found in the United States; by TEMPLE PRIME.

Several species I have not as yet been able to identify to my satisfaction. Say's original specimens in the Cabinet of the Acad. of Nat. Sciences of Philadelphia having been destroyed, the only means left to be sure of his species are to collect them in the original localities.

The shell known in Massachusetts as *C. similis* Say, and described and figured as such by Dr. Gould, is found in many different localities through the country; but never having received it from the Delaware River, where Say found his shell, and having, moreover, compared it with Say's figure, from which it differs, I am unwilling as yet, without further investigation, to consider it definitively as the *C. similis* Say.

The *C. edentula* Say, and Lamarck's three species, I have sought for in their respective localities, but as yet no success has attended my efforts.

The *C. lasmampsis* Rafinesque, I hope to have an opportunity, before very long, of examining in the Cabinet of C. A. Poulson, Esq. of Philadelphia, in which are deposited all Rafinesque's original specimens.

1. Cyclas rhomboidea *Say.*

Jour. Ac. Nat. Sci. II, 380. De Kay, 225. Pl. XXV. Fig. 263.
Cyclas elegans Adams. Bost. Jour. Nat. Hist. III. Pl. III. Fig. 11.
Gould's Report, 74. Fig. 55. De Kay, 224.

Cabinet of the B. S. N. H.

Animal. Siphons reddish yellow. Foot large.

Shell. Vide Gould's Rep. 74.

Localities. Mass., Vt. (Adams.) Lake Champlain. (Say, Budd, Benedict.) Herkimer County, N. Y. (Lewis.) Rockland County, N. Y. (Budd.) Cleveland, O. (Anthony.) Greenwich, Washington County, N. Y. (Ingalls.)

This shell has long been known as *C. elegans* Adams, and been labelled thus in cabinets. It, however, answers Say's description of *C. rhomboidea*, in all points, even to the dimensions, so that I have no hesitation in considering it as Say's long lost species.

Compared to the *C. tenuistriata*, it is found to be more full at the posterior extremity, as also more abrupt; the beaks are less tumid and more rounded; the coloring and sculpturing are different.

This species has hitherto been collected but sparingly. Mr. T. J. Whittemore, however, in the autumn of 1851, found it in great abundance in the environs of Cambridge, Mass. It lives in running brooks, buried in the mud, and in the grass. I suppose the animal to breed all the year round, having found the young in company with the adult at all seasons.

Found in company with *Pisidium variabile*, and with *C. similis.*

2. Cyclas tenuistriata *Nobis.* Bost. S. N. H. Proc. iv. 156.

Cyclas cornea Lamarck. Adams's Cat. 1847, 29.

Cabinet of T. Prime.

Shell. Vide Bost. S. N. H. Proc. iv. 156.

Localities. Tennessee, (Adams.) Alabama, (Ingalls.)

This species is distinguished from all American ones of its size, by its smooth and polished surface. Compared to *C. cornea*, it is less globose, laterally more angular, the beaks are rather more tumid, but less rounded ; lastly, it is more solid and differently colored.

This shell seems, as yet, to be but very little known ; besides the specimen I possess, I have seen but one other, which was kindly sent to me for description by Prof. C. B. Adams.

3. CYCLAS FABALIS *Nobis.* Bost. S. N. H. Proc. iv. 159.

Cabinet of the B. S. N. H.

Shell. Vide Bost. S. N. H. Proc. iv. 159.

Localities. Lake Superior, (Agassiz.) Tennessee, (Budd.)

The only species to which this shell is allied is the *C. castanea ;* it differs, however, in being less inflated, the posterior margin is more abrupt, and the beaks are not quite as depressed ; the coloring and size are not only different, but it is also more elongated.

4. CYCLAS CASTANEA *Nobis.* Bost. S. N. H. Proc. iv. 160.

Cabinet of the B. S. N. H.

Animal. Siphons of a medium size. Color crimson-red.

Shell. Vide Bost. S. N. H. Proc. iv. 160.

Localities. Wabash River, (Haldeman.) Ohio, (Anthony.) Owasca L. (Redfield.) Tenn. (Budd.) Greenwich, N. Y. (Ingalls.) Chuck River, Virginia, (Anthony.)

Shell very rare. I have found it at the roots of plants in company with *P. compressum*, *P. dubium*, and *P. variabile.* The animal, when in confinement, I have observed to exhibit considerable activity.

5. CYCLAS DETRUNCATA *Nobis.* Bost. S. N. H. Proc. iv. 155.

Cabinet of T. Prime.

Shell. See Bost. S. N. H. Proc. iv. 155.

Locality. Schuylkill River, (Richard.)

This shell is remarkable for the sudden narrowness to which its anterior extremity is brought.

Compared to the *C. fabalis*, this shell is more inflated and the beaks are dissimilar.

Found in company with the *C. rosacea*.

6. Cyclas gracilis *Nobis*. Bost. S. N. H. Proc. iv. 156.

Cabinet of Prof. C. B. Adams and of T. Prime.

Shell. Vide Bost. S. N. H. Proc. iv. 156.

Locality. Ohio, (Adams.)

In outline this shell is not very different from the *C. similis;* otherwise, however, they are not at all alike.

The foreign analogue seems to be the *C. rivicola* of Europe. One specimen of this species was kindly lent to me by Prof. C. B. Adams for description; subsequently I obtained one myself through Mr. Whittemore; it seems to be quite rare.

7. Cyclas constricta *Anthony*. Anthony Cat. 1853.

Cabinet of the B. S. N. H.

Shell. Somewhat inflated, elongated, anterior margin rounded, posterior one abrupt, inferior one straight, broken in the middle by a stricture in the valves, causing a furrow up the better half of the shell; beaks somewhat prominent, not large; lines of growth very light and regular. Color greenish yellow. Hinge margin very straight. Cardinal teeth united, prominent. Lateral teeth not prominent, rather elongated. Interior light blue.

Lat. 0.55; long. 0 40; diam. 0.30 inches.

Locality. Ohio, (Anthony.)

This species is distinct from any on account of the peculiar break in the outline of the inferior margin. Compared to the *C. gracilis*, the beaks are less prominent and the margins are less rounded. It differs from the *C. transversa* in being less broad and in the more equal proportions of the anterior and posterior extremities.

8. Cyclas transversa *Say*. Descrip. of Terr. and fluv. Shells. 1829, 30, 31.

Cabinet of the B. S. N. H.

Shell. Transversely oblong, subovate subinequilateral, anterior margin decidedly more widely rounded than the posterior margin; beaks obviously elevated above the general curvature; cardinal teeth double, distinct. Say. Des. terr. fluv. shells. Hinge margin nearly on a straight line; anterior cardinal teeth the larger and more prominent; lateral teeth not very prominent; inferior margin well rounded; striæ very fine; color light yellow.

Long. 0.65; lat. 0.45; diam. 0.19 inches.

Localities. Kentucky, (Say.) Columbus, O. and Arkansas, (Anthony.) Mohawk, Herkimer County, N. Y. (Lewis.)

This shell is more transverse than even the *C. similis* Say.

Its outline is somewhat similar perhaps to the *C. detruncata;* it is otherwise, however, widely different, being not only more transverse, more inflated, but also of a different and more fragile texture.

9. Cyclas sphærica *Anthony*, Mss.

Cabinet of J. G. Anthony.

Shell. Small, globose, not elongated; posterior and inferior margins rounded; beaks inclined towards the anterior, very large, prominent, and well rounded; anterior extremity somewhat rounded, very much narrower than the posterior one; lines of growth fine and regular. Epidermis glossy; color greenish brown; hinge margin curved; cardinal teeth double, small, but distinct; posterior cardinal teeth prominent; anterior one nearly obsolete; interior light blue.

Long. 0.29; lat. 0.25; diam. 0.20 inches.

Locality. Loraine County, O. (Anthony.)

This rare species is not much like any of our American species; it approaches nearer the *C. nucleus* of Europe than to any other shell: it differs much, however, not only in size but also in globosity.

Compared to the *C. cardissa*, it is more inflated, the margins are less spherical, and the beaks are more prominent. It is less equilateral and more inflated than the *C. ovalis,* and less elongated and more inflated than the *C. rosacea.*

10. Cyclas ovalis *Nobis.* Mss.

Cabinet of the B. S. N. H.

Shell. Small, pellucid, fragile, transparent, equilateral, somewhat elongated, not much inflated; outline of the valves oval; beaks small, rounded, not prominent; lines of growth light and regular; color in some specimens of a light yellow, in others of a greenish yellow; hinge margin very gently rounded; teeth small; cardinal teeth double.

Long. 0.26; lat. 0.24; diam. 0.17 inches.

Localities. Oswego and Greenwich, N. Y. (Ingalls.) Columbus, O. (Anthony.)

This seems to be a common shell. I have frequently received it from Ohio, as the *C. partumeia*, with which shell it is not possible to confound it. Its very oval form renders it not only attractive but also distinct from any other species. Compared to the *C. cardissa*, it differs in being less globose and in being more elongated. Compared to the *C. truncata*, it is less inflated, more elongated, and the margins are more rounded.

11. Cyclas securis *Nobis.* Bost. S. N. H. Proc. iv. 160. Annals of the N. Y. Lyceum of N. H. v. 218, pl. 6.

Cabinet of the B. S. N. H.

Animal, of a bright pink color, imparting a pinkish hue to the shell; siphons of about the same length, rather small, and of a pink color; foot long and very retractile.

Shell. Vide Bost. S. N. H. Proc. iv. 160.

Localities. Cambridge, Mass. (Nobis.) Groton, Mass. (Lewis.) Vermont, (Adams.)

This species is allied to the *C. truncata*, and to the *C pellucida;* under the description of *C. truncata* we have compared it with that shell. Compared to *C. pellucida*, it is smaller; it differs in color; it is less deep, less broad; the posterior extremity is less broad, and the anterior one is more narrow; the beaks are a little larger. Compared to the *C. rosacea*, the margins are more spherical, the valves are more full, the hinge margin is more straight, and the beaks are larger. I have found this shell very frequently at Cambridge during the early summer months, in company with *C. truncata* and *C. elegans.* The animal is very lively and crawls about like a gasteropod.

12. CYCLAS ROSACEA *Nobis.* Bost. S. N. H. Proc. iv. 155.

Cabinet of T. Prime.

Animal, light pink.

Shell. Vide Bost. S. N. H. Proc. iv. 155.

Locality. Schuylkill River, (Richard.)

Compared to the *C. securis*, this species is less elevated, more elongated ; the posterior extremity is not so abrupt, the anterior extremity is less full, the whole shell is rather more tumid, and the beaks are not as large. Found in company with *C. detruncata.*

13. CYCLAS CARDISSA *Nobis.* Bost. S. N. H. Proc. iv. 160.

Cabinet of T. Prime.

Shell. Vide Bost. S. N. H. Proc. iv. 160.

Locality. Massachusetts, (Prime.)

Compared to the *C. truncata,* this species is more globose, less elongated, and the margins are more rounded. Compared to the *C. sphærica*, it is also more globose, and the margins are more rounded.

14. CYCLAS PELLUCIDA *Nobis.* Stimpson, N. Eng. Moll. 16.

Cabinet of the B. S. N. H.

Cyclas calyculata DRAP. Adams, Amer. Jour. xl. 277.

Shell. Transparent, compressed, somewhat rhomboidal, slightly elongated, fragile ; posterior margin abrupt, inferior and anterior ones well rounded ; beaks central, rising like small tubercles, yellow ; lines of growth not visible ; color light gray ; hinge margin nearly on a straight line ; teeth all small ; cardinal teeth united.

Long. 0.34 ; lat. 0.28 ; diam. 0.18 inches.

Localities. Vermont, Maine, (Adams.) Canon's River, California, (Anthony.) Greenwich, Washington County, N. Y. (Ingalls.)

Professor Adams, the discoverer of this shell, thought proper to refer it to the *C. calyculata*, of Europe. I have compared specimens from Vermont with the *C. calyculata* from England, Germany, and Switzerland, and truly striking as is the similarity, I am inclined to believe our shell to be distinct; it is a little more elongated, more compressed, and anteriorly more rounded.

Compared to the *C. partumeia*, it is much less inflated, the beaks are smaller but more tumid, as also much smaller. It is less inflated than the *C. securis*, and also a little more elongated. Found plentifully in running brooks under stones. *Mighels.*

15. Cyclas partumeia *Say*, Journ. Ac. Nat. Sci. ii. 380.

Cabinet of the B. S. N. H.

Cyclas cornea, var. Lamarck, vi. 268.
Cyclas orbicularia Barratt. Linsley's Cat. of Con. Shells, Amer. Journ. xlviii; De Kay, 223, pl. 25, f. 262.
Cyclas mirabilis Prime. Bost. S. N. H. Proc. iv. 157.
Cyclas cærulea Prime. Bost. S. N. H. Proc. iv. 161.

Animal. Siphon light pink.

Shell. Vide Gould's Report, 73, fig. 54.

Localities. Maine, Vermont, (Adams.) Massachusetts, (Gould.) Connecticut, (Linsley.) New Jersey, (Richard.) Pennsylvania, (Say, Anthony.) Whitehall, N. Y. (Ingalls.) Ohio, (Jay, Ingalls.) South Carolina, (Ravenel.) Georgia, (Haldeman.)

The general resemblance of this shell to the *C. cornea*, of Europe, is very close. Its size, color, and tumid form are the same. But that species has the beaks much less elevated, is broader from side to side, and the two ends are almost precisely alike, without any angle or any widening behind. Our shell is on the whole more delicate. The young and old differ both in shape and color. The young are less tumid and larger, and the disparity of the sides is much greater than in the adult. They have, also, a light honey-yellow color, and green transparency. They would scarcely be recognized as the same species, except by being found in company, and also by being actually found within the adult shell. Gould's Report, 73. This species is very common all through New England, and is generally found buried in the mud. Dr. Mighels has found it in Maine, living mostly in crevices of decayed timber floating in ponds.

The prolificity of this species surpasses that of all others, especially in the warm months. Mr. Hyde took fifty young ones out of a single specimen. *Say.*

16. Cyclas Jayensis *Nobis.* Bost. S. N. H. Proc. iv. 157.

Cabinet of the B. S. N. H.

Shell. Vide Bost. S. N. H. Proc. iv. 157.

Locality. Lake Superior, (Agassiz.)

This beautiful and rare species somewhat resembles the *C. partumeia;* it is, however, less inflated, the posterior extremity is more abrupt, and the anterior one less rounded. In outline it has some affinity to the *C. pellucida*, but the beaks are larger, and the valves are more inflated.

17. Cyclas eburnea *Anthony.*

Cabinet of the Ac. Nat. Sc.

Shell. Compressed, fragile, nearly equilateral; posterior extremity abrupt; anterior one somewhat rounded, much narrower than the posterior margin; inferior margin rounded; beaks not large, like tubercles, slightly inclined towards the anterior; lines of growth very fine and regular; color light gray, interspersed with yellow, a narrow zone of yellow round the margins; beaks yellow, faint perpendicular lines of the same color running from the discs to the inferior margin; hinge margin nearly straight; cardinal teeth united, small; lateral ones not prominent.

Long. 0.40; lat. 0.37; diam. 0.20 inches.

Locality. Arkansas, (Anthony.)

This species is somewhat allied to the *C. Jayensis;* it differs, however, in being much less inflated; the posterior margin is less abrupt, and the anterior one more rounded; the beaks are smaller and less prominent, and the hinge margin is straighter.

Compared to the *C. partumeia*, it is less full; the beaks are less prominent, the margins are generally less rounded; it is broader and more equilateral. Compared to the *C. pellucida*, it is less elongated, more inflated; the beaks are not so distant, and the whole shell is of a different texture. This is a beautiful species, as yet very rare, however.

18. Cyclas dentata *Haldeman.* Proc. Ac. Nat. Sc. i. 103.

Cabinet of the Ac. Nat. Sc.

Shell. Large, ventricose, somewhat equilateral; inferior and anterior margins rounded; posterior one somewhat angular; beaks large, well rounded, distant, not very prominent; hinge margin nearly straight; cardinal teeth single, well visible; lateral teeth not prominent, of growth not deep, regular; color olive-green, with a dark streak, of little width, some distance above the inferior margin.

Long. 0.50; lat. 0.40; diam. 0.36 inches.

Locality. Oregon, (Nuttall.)

The young shell differs from the adult; it is much more elongated and more heavily striated; it is less inflated; the beaks are neither as large nor as tumid; the color is the same. This species bears a strong resemblance to the *C. albula*, but it is somewhat more full; the posterior extremity is not so angular; its anterior extremity is more rounded, and the beaks are more large and tumid. It is rather more full and less heavily striated than the *C. acuminata.* It differs from *C. similis*, in being shorter, more equilateral, less heavily striated, and of a different color; the young is more full and less elongated than that of *C. similis*.

19. Cyclas elevata *Haldeman.* Proc. Ac. Nat. Sc. 1841, 53. De Kay, 225.

Cabinet of the Ac. of Nat. Sc.

Shell. Ovate, orbicular, nearly spherical, strong, cavity large, equilateral, margins well rounded; beaks central, slightly inclined towards the anterior, lapping over the outline of the shell, large, tumid, approximate; hinge margin slightly curved; cardinal teeth united, prominent; lateral ones elongated, large; surface smooth, striation light and regular; color brownish olive, greatly varied by zones of a lighter shade, a zone of bright yellow bordering the inferior and part of the lateral margins.

Long. 0.55 ; lat. 0.50 ; diam. 0.33 inches.

Localities. New Orleans, La. (Haldeman.)

This beautiful species is, by its spherical form, totally different from any other known shell. Prof. Haldeman, who discovered this species at New Orleans, has found but one single valve.

20. Cyclas furcata *Rafinesque.* Mss.

Cabinet of the Ac. Nat. Sc.

Shell. Ovate, full, somewhat orbicular, strong ; posterior extremity somewhat angular ; anterior and interior margins rounded, nearly equilateral ; beaks large, well rounded, but not prominent, having a tendency towards the anterior ; hinge margin very much curved ; cardinal teeth small ; two united in one ; lateral ones large, sharp ; surface heavily and regularly striated ; color uniform dark chestnut-brown, interior bluish.

Long. 0.49 ; lat. 0.43 ; diam. 0.33 inches.

Locality. Ohio ? (Rafinesque.)

The specimens from which this description was made, kindly sent to me by Prof. Haldeman, were labelled by Rafinesque's own hand, but I have not been able to find their species in any work, and conclude it must have been in manuscript.

21. Cyclas staminea *Conrad.* Amer. Journ. xxv. 342.

Cabinet of the B. S. N. H.

Shell. Oval, ventricose, inequilateral, with numerous regular, prominent, concentric lines ; beaks prominent ; anterior and posterior ends nearly equally rounded ; hinge margin curved ; cardinal teeth nearly obsolete ; lateral ones distinct and prominent ; interior dark blue.

Long. 0.39 ; lat. 0.34 ; diam. 21 inches.

Locality. Alabama, (Conrad.)

This is a well marked species, not easily to be confounded with any other.

22. Cyclas solidula *Nobis.* Bost. S. N. H. Proc. iv. 158.

Cabinet of the B. S. N. H.

Shell. Vide Bost. S. N. H. Proc. iv. 158.

Localities. New River, Va. (Anthony.) Black River, Highland County, O. (Anthony.)

This species is very common in Ohio, and as well as the *C. distorta* is frequently labelled *C. similis.* Comparing it, however, to *C. similis*, it is much more broad, less elongate, and stronger; the striations are deeper and more regular. The hinge margin is curved; whereas, in *C. similis* it is nearly a straight line; the teeth themselves are more robust.

23. Cyclas gigantea *Nobis.* Bost. S. N. H. Proc. iv. 157.

Cabinet of the B. S. N. H.

Shell. Vide Bost. S. N. H. Proc. iv. 157.

Localities. Tuscarora Creek, Franklin County, Penn. (Haldeman.) Cassadaga Creek, Chatauque County, N. Y. (Redfield.)

This is our largest known American species, and is as yet but rare.

Compared to the *C. similis*, it is found to be more full, less elongated, broader, the margins are more rounded, the cardinal teeth are stronger, more heavily striated, of a heavier texture, and of a different color.

24. Cyclas ponderosa *Nobis.* Bost. S. N. H. Proc. iv. 157.

Cabinet of the B. S. N. H.

Shell. Vide Bost. S. N. H. Proc. iv. 157.

Locality. Lake Superior, (Agassiz.)

With the exception of the *C. gigantea*, this is our largest known American species. Hitherto single valves alone have been found. Compared to the *C. gigantea*, it is rather more inflated, the beaks are higher, and the margins are not so well rounded. Compared to the *C. aurea*, it is broader, the hinge margin is less curved, though the color is about the same.

25. Cyclas aurea *Nobis*. Bost. S. N. H. Proc. iv. 159.

Cabinet of the B. S. N. H.

Shell. Vide Bost. S. N. H. Proc. iv. 159.

Locality. Lake Superior, (Agassiz.)

This is a rare and beautiful species. In outline it is somewhat like the *C. similis*, but otherwise it is different. Its very much curved hinge margin renders it distinct from any other shell.

26. Cyclas acuminata *Nobis*. Bost. S. N. H. Proc. iv. 155.

Cabinet of the B. S. N. H.

Cyclas albula Nobis. Bost. S. N. H. Proc. iv. 155.

Shell. Vide Bost. S. N. H. Proc. iv. 155.

Locality. Lake Superior, (Agassiz.) Ohio, (Ingalls.)

Compared to the *C. flava*, this species is larger, more robust, and of a different color.

27. Cyclas emarginata *Nobis*. Bost. S. N. H. Proc. iv. 156.

Cabinet of the B. S. N. H.

Shell. Vide B. S. N. H. Proc. iv. 156.

Locality. Lake Superior, (Agassiz.)

Compared to the *C. acuminata*, this species is smaller, more oblique; the hinge margin is more curved, and the lateral teeth are more prominent; the coloring and outline are different.

28. Cyclas bulbosa *Anthony*, Mss.

Cabinet of T. Prime.

Shell. Not large, short, thick, globose, spherical; posterior margin somewhat abrupt; anterior and inferior ones rounded; beaks large, prominent, well rounded; lines of growth not deep, but irregular; color yellowish green; interior light blue; hinge margin curved; cardinal teeth nearly obsolete; lateral ones not very prominent; posterior tooth the more elongated.

Long. 0.38; lat. 0.33; diam. 0.28 inches.

Locality. Arkansas, (Anthony.)

This is our most spherical and globular species, and owing to these distinctive marks, it is not very likely to be confounded with any other.

29. CYCLAS FLAVA *Nobis.* Bost. S. N. H. Proc. iv. 155.

Cabinet of the B. S. N. H.

Shell. Vide Bost. S. N. H. Proc. iv. 155.

Locality. Sault Ste Marie, (Agassiz.)

This species seems to bear no particular affinity to any other; it is remarkable for its uniform yellowish color.

30. CYCLAS MODESTA *Nobis.* Bost. S. N. H. Proc. iv. 159.

Cabinet of the B. S. N. H.

Animal. Tubes light reddish yellow.

Shell. Vide Bost. S. N. H. Proc. iv. 159.

Localities. Greenwich, Washington County, N. Y., Hoosack River, (Ingalls.) Pennsylvania, (Haldeman.) Saratoga Lake, N. Y. (Nobis.)

This species is somewhat similar to the *C. distorta;* it differs, however, in being less inflated and less broad, also in being decidedly less heavily striated.

The animal is very lively.

31. CYCLAS SIMPLEX *Nobis.* Bost. S. N. H. Proc. iv. 159.

Cabinet of the Ac. Nat. Sc.

Shell. Vide Bost. S. N. H. Proc. iv. 159.

Locality. Fox River, Ill. (Haldeman.)

This species, of which one valve only has been found, and that a dead shell, does not seem to be very closely allied to any other. Compared to the *C. modesta*, it is more inflated; the beaks are more tumid; the margins are more rounded, and the posterior cardinal tooth double in the right valve and single in the *C. simplex*, is double in the *C. modesta.*

32. Cyclas inornata *Nobis*. Bost. S. N. H. Proc. iv. 159.

Cabinet of the Ac. Nat. Sc.

Shell. Vide Bost. S. N. H. Proc. iv. 159.

Locality. Illinois, (Haldeman.)

One dead valve of this species is all that has, as yet, been found.

Compared to the *C. similis*, it is less elongated; the lateral margins are less rounded, the cardinal teeth are also more rudimentary.

33. Cyclas distorta *Nobis*. Bost. S. N. H. Proc. iv. 158.

Cabinet of the B. S. N. H.

Shell. Vide Bost. S. N. H. Proc. iv. 158.

Localities. Ohio, (Adams and Agassiz.) Maryland, (Foreman.)

This shell has been confounded with *C. similis;* it is, however, more compact, broader, less equilateral, less elongated; the hinge margin is more spherical. Compared to the *C. solidula*, it is more elongated, the margins are less rounded, the striations are heavier and more irregular, and the coloring is different.

34. Cyclas tenuis *Nobis*. Bost. S. N. H. Proc. iv. 161.

Cabinet of the B. S. N. H.

Shell. Vide Bost. S. N. H. Proc. iv. 161.

Localities. Massachusetts? (Stimpson.) Androscoggin, Me. (Girard.)

This species closely resembles the young of *C. transversa;* it differs, however, in being more inflated and less elongated; it is broader in latitude.

35. Cyclas patella *Gould*. Bost. S. N. H. Proc. iii. 293.

Shell. Vide Bost. S. N. H. Proc. iii. 293.

Locality. Oregon, (Gould.)

This is to be compared with *C. cornea*, on account of the peculiar rounded form of the dorsal margin; the umbones not rising so as to interfere with the general outline. The cavity of the beaks is still more shallow; the sulcation coarser, and the color yellowish rather than green, and on the whole, the shell is more dense and larger. *Gould.*

December 1, 1852.

Dr. Cabot in the Chair.

Mr. Stodder mentioned, that a recent cut at East Boston had exposed a curious feature in the drift formation at that place. The drift deposit there consists of a layer of gravel with an undulating surface of uniform thickness, underlying a deposit of clay. At the place recently exposed, cracks in the clay are seen from six inches to three or four feet in width, and some of them fifteen feet deep, filled with the drift overlying it. What was the origin of these cracks?

The Secretary read a letter from Prof. N. Julius Budge, of Bonn, asking an exchange of the Society's Publications for those of the Natural History Society of Prussia and Westphalia. Referred to the Publishing Committee.

Two pamphlets on the Sugar Cane were presented in the name of Mr. G. H. Gallup. The thanks of the Society were voted for the donation.

December 15, 1852.

The President in the Chair.

Mr. Hitchcock presented a very perfect specimen of a Crystal of Spodumene, from Norwich, Mass.; also fossil fruits and Lignite, from Brandon, Vt., and Fucoids from the tertiary deposit of Massachusetts.

Dr. Gould remarked, that at Brandon extensive iron works are carried on, in which the only fuel used is the Lignite, of that locality, which was accidentally discovered about the time the works went into operation. In working one of the drifts, timbers were found supporting galleries, constructed some sixty years ago, which had become converted into the same substance. The Lignite when found is moist, and must be kept so to preserve the fruits entire.

The President called the attention of the Society to a subject which he regarded as one of much importance, namely, the introduction of foreign fish into our waters. Several species, highly prized in Europe, such as the Turbot and Sole, might, he thought, be brought over and become very valuable articles of trade. In France the experiment had been tried of raising salt water species in the fresh water Lakes of the interior with complete success. He stated, that at his request the American Minister to England had made inquiries in relation to the matter, and obtained estimates as to the necessary expense, but no attempt had been made as yet to carry the proposition into effect.

With reference to the difficulty experienced in transferring living fish from one locality to another at a distance, the Secretary stated, that he had been told that the experiment had been recently tried of introducing the Muscalonge, *Esox nobilior*, from one of the Western Lakes into a pond at Cape Cod. The fish arrived safely within the borders of Massachusetts, but died almost immediately on changing the water, in which they were brought, at one of the railway stations.

Dr. Gould stated, that several attempts to bring living fresh water shells from Cuba and England to this country had failed, as the vapor of salt water seems to be fatal to them, whether they are brought in mud, in water, or dry.

This fact would furnish an argument, if one were needed, against the identity of species apparently the same, in these different quarters of the world.

Mr. Ayres stated, that in France salt water fish had been propagated in fresh water by conveying their ova from one locality to the other.

Mr. Ayres remarked, that the Muscalonge, (*Esox nobilior*,) fifteen years ago, was introduced into a pond eight miles west of Bellows Falls. Since then the embankment of the pond has been broken through, allowing the fish to escape into the Connecticut, where they are now quite numerous in the still water at the foot of Bellows Falls. They have gradually made their way down the river to within fifty miles of Long Island Sound.

The President recurred to the original subject of remark, and said he considered it a matter of considerable importance, and he hoped the Society would take some action with regard to it.

The President's remarks led to a somewhat desultory conversation on the subject of the Fisheries of the State.

Mr. Bouvé stated, that the town of Pembroke had heretofore enjoyed a considerable revenue from the Herrings which annually visited certain ponds within its territory. At a particular season, they were taken in great numbers in seines, and distributed to the citizens under the supervision of officers legally appointed. Owing to a difference which had arisen between the inhabitants and those of the towns between them and the sea, as to certain charges connected with the fishery, they had determined on exterminating these fish by intercepting them on their way up. The work had been commenced the past year, and there was every prospect of its being completely successful, so that this valuable fishery was in danger of being entirely cut off.

Mr. H. R. Storer spoke of the serious injury the coast fishery had sustained from the incursion of the Blue Fish.

It was well known that within a few years this species had made its appearance in Massachusetts Bay, and all along the shores of the State it had seriously interfered with the fishing interest, by driving off valuable species which have heretofore been taken in great numbers; while the Blue Fish itself is comparatively worthless. The early catch of mackerel at Provincetown, which formerly furnished active employment to many fishermen, was now almost entirely stopped by the presence of these voracious marauders. It was even said, that the cod and haddock had become much less abundant since their arrival. Mr. Storer suggested that it might be expedient to memorialize the Legislature on the subject, so that, by the offer of a bounty, fishermen might be induced to make active exertions to exterminate such an injurious race.

Mr. W. O. Ayres remarked that this species was well known to be a periodical visitant. Many years since it visited our shores and then disappeared, so that there was reason to hope it would do so again. South of Cape Cod, it is regarded as a fish of considerable value. Those caught there usually weigh from one to two pounds, while those taken in Massachusetts Bay usually weigh from three to five pounds, or more. In New York Harbor it had driven out the Squeteague or Weak fish, which would probably return, as on former occasions, after its disappearance.

Mr. Storer said there were fish in the waters of Massachusetts of great value, which were not appreciated as they deserved to be. In Europe such species would be sought for with eagerness; even such despised species as the Skate would not be overlooked. Mr. Ayres coincided in opinion with Mr. Storer. He thought the State of Massachusetts was annually the loser by thousands of dollars, through an unfounded prejudice against certain fish. The Blue fish, which are not eaten here, sell readily in New York. The Pollock, which is almost always thrown away by Massachusetts fishermen, is much prized in neighboring States. Since Dr. Storer's Report on the Fishes of Massachusetts was published, one is occasionally sold in the market at an insignificant price. He had himself seen, in Connecticut, a Pollock on the table, which might have been bought in Boston market for four or five cents for the whole fish, which had been bought there for six cents a pound, the whole fish weighing seven or eight pounds. He regarded it as a very valuable fish, from the use of which the people of Massachusetts are entirely debarred by an unfounded prejudice. In Connecticut it goes by the name of Sea Salmon.

Mr. Storer remarked, that this species is one of the most important in the fisheries of the British Provinces.

In accordance with the suggestion of the President, it was finally

Voted, That a Committee of three be appointed to take into consideration the subject of the Preservation and Economic Value of our own Fish, and the Introduction of Foreign species into our waters. Mr. W. O. Ayres, Dr. D. H. Storer, and Mr. H. R. Storer were chosen a Committee for this purpose.

The stuffed skin of an Albatross was presented in the name of Mr. Henry A. Hildreth; and the Skin of a South American Snake, from Mr. J. A. A. Ribeiro, of Arakaty, Brazil. The thanks of the Society were presented to the donors.

A Galapagos Tortoise was presented in the name of Mr. W. R. Lawrence, a member of the Society.

BOOKS RECEIVED DURING THE QUARTER ENDING DECEMBER 31.

Explication de la Carte Géologique de la France, redigeè par MM. Dufrenoy et Elie de Beaumont. Tome 2ième. 4to. Paris, 1848. *From the Author.*

Geological Survey of Canada. Report of Progress, 1850 – 52. 2 Pamphs. 8vo. By W. E. Logan. *From the Author.*

Proceedings of the Academy of Natural Sciences of Philadelphia, pp. 117 – 146. Vol. VI. No. 6. Philadelphia, 1852. *From the Academy of Natural Sciences.*

Bulletin de la Société Géologique de France. Tome VIII. Feuilles 35 – 40. Tome IX. Feuilles 11 – 19. 8vo. Paris, 1852. *From the Société Géologique.*

Liste des Membres de la Société Géologique au 1er Juillet, 1852. 8vo. Pamph.

Abhandlungen aus dem Gebiete der Naturwissenschaften, herausgegeben von dem Naturwissenschaftlichen Verein in Hamburg. 2 vols. 4to. Hamburg, 1846, 1852. *From the Hamburg Natural History Society.*

Die Insel Helgoland. Untersuchungen über deren Grösse in Vorzeit und Gegenwart vom Standpunkte der Geschichte und Geologie. 4to. Von W. M. Wiebel. Hamburg, 1848. *From the Author.*

Denkschriften der Kaiserlichen Akademie der Wissenschaften. Dritter Band. Long. 4to. 1851 – 2. *From the Akademie der Wissenschaften.*

Sitzungberichte der Kaiserlichen Akademie der Wissenschaften. Dritter Band. 8vo. Jahrgang. 1851. VII. Band, 3. 4 und 5. Heft. Band, VIII. Heft, 1, 2, 3. *From the Akademie der Wissenschaften.*

Species, Genera et Ordines Algarum. Auctore J. G. Agardh, 1, 2, 3. Lundæ, 1848 – 52. *From the Author.*

Recensio Specierum Generis Pteridis. Auctore J. D. Agardh. 8vo. Pamph. Lundæ, 1839. *From the Author.*

Kalender der Flora des Horizontes von Prag. K. Fritsch. 8vo. Pamph. *From the Author.*

Pohl und Schabus. Tafeln Vergleichung und Reduction der in Verschiedenen Längen Massen Argelesenen Barometerstände. *From the Authors.*

Tafeln zur Reduction der in Millimetern Abgelesenen Barometerstände auf die Normaltemperatur von O. Celsius. Berechnet von J. J. Pohl und J. Schabus. 8vo. Pamph. *From the Authors.*

Memoires de la Société de Physique et d'Histoire Naturelle de Genève. Tome XIII. 1re Partie. 4to. Genève, 1850. *From the Société de Physique, &c.*

Journal d'Agriculture, Nos. 8, 9. Vol. V. Pamph. Montreal, 1852. *From L. A. H. Latour.*

Report and Survey of Water Supply of Montreal. By T. C. Keefer. 8vo. Pamph. Montreal, 1852. *From L. A. H. Latour.*

Proceedings of Committee of North Shore Railroad. 8vo. Pamph. Quebec, 1852. *From L. A. H. Latour.*

History of British Mollusca and their Shells. By E. Forbes and S. Hanley, Nos. 47, 48. 8vo. London, 1852. *Exchange with H. Cummings.*

Thesaurus Conchyliorum. By G. B. Sowerby, Jr. Part xiii. 8vo. London, 1852. *Exchange with the Author.*

Report on the Clarification of Cane-juice, by J. Shier. 8vo. Pamph. Demerara, 1850. *From G. W. Gallup.*

Report on the Starch-producing Plants of British Guiana. By J. Shier. 8vo. Pamph. Demerara, 1847. *From G. W. Gallup.*

Contributions to Conchology. No. 11. 8vo. Pamph. By C. B. Adams. Amherst, 1852. *From the Author.*

Report on Sea and River Fisheries of New Brunswick. 8vo. Pamph. By M. H. Perley. 2nd Edition. Fredericton, 1852. *From the Author.*

Report on Geology of Lake Superior Land District. By J. W. Foster and J. D. Whitney. Part 2nd. (Congressional Document.) Washington, 1851. *From Charles Sumner.*

Jahresbericht des Naturwissenschaftlichen Vereins in Halle. 5 Nos. 8vo. Pamph. Berlin, 1849–52. *Exchange.*

Proceedings of the Academy of Natural Sciences of Philadelphia. Vol. VI. No. 5. pp. 147–188. 1852. *From the Academy.*

Journal d'Agriculture et Transactions de la Société d'Agriculture du Bas-Canada. Vol. V. No. 11. Montreal, 1852. *From L. A. H. Latour.*

Received from the Courtis Fund.

Annals and Magazine of Natural History. October, 1852. Vol. X. No. 58.

Annals and Magazine of Natural History. November, 1852. Vol. X. No. 59.

Annals and Magazine of Natural History. December, 1852. Vol. X. No. 60.

Deposited by the Republican Institution.

Cyclopædia of Anatomy and Physiology. Edited by R. B. Todd. Part XLIII. 8vo. London, 1852.

Travels in Peru during 1838 – 42. By J. J. Von Tschudi. 12mo. New York, 1852.

History of the Reformation. By J. H. M. D'Aubigné, D. D. 4 vols. 12mo. New York.

Lives of the Lord Chancellors and Keepers of the Great Seal of England. By J. L. Campbell. 7 vols. 8vo. Philadelphia, 1851.

Lives of the Chief Justices of England. 2 vols. 8vo. By J. L. Campbell. Philadelphia, 1852.

Lives of the Queens of England. By Agnes Strickland. 12 vols. in 6. 8vo. Philadelphia, 1852.

The Works of Stephen Olin, D. D. 2 vols. 12mo. New York, 1852.

Works of Daniel Webster. 6 vols. 8vo. Boston, 1852.

History of the United States of America. By Richard Hildreth. 6 vols. 8vo. New York, 1848.

History of England. By T. B. Macauley. 2 vols. 8vo. Boston, 1852.

Cosmos. A Sketch of the Physical History of the Universe. 4 vols. 12mo. By Alexander Von Humboldt. New York, 1852.

Romance of Natural History. By C. W. Webber. 8vo. Philadelphia, 1852.

Nineveh and its Remains. By C. H. Layard. 2 vols. 8vo. New York, 1851.

Austria in 1848–49. By W. H. Stiles. 2 vols. 8vo. New York, 1852.

Lectures on Ancient History. By B. G. Niebuhr. 3 vols. 8vo. Philadelphia, 1852.

Works of Rev. Sydney Smith. 8vo. New York, 1846.

The Hundred Boston Orators. By J. S. Loring. 8vo. Boston, 1852.

Life and Letters of Niebuhr. By Bunsen, Brandis, & Lorbell. 8vo. New York, 1852.

History of the Restoration of Monarchy in France. By A. de Lamartine. 2 vols. 8vo. New York, 1851.

Bridgewater Treatises. 3 vols. 12mo. (Bohn's Scientific Library.) London, 1852.

Arctic Searching Expedition. By Sir John Richardson. 8vo. New York, 1852.

Personal Memoirs and Recollections of Editorial Life. By Joseph T. Buckingham. 2 vols. 12mo. Boston, 1852.

Ancient Egypt, under the Pharaohs. By John Kenrick. 2 vols. 12mo. 1852.

Annals of the Queens of Spain. By Anita George. 12mo. 2 vols. New York, 1850.

Vestiges of the Natural History of the Creation. 12mo. Cincinnati, 1852.

Dictionary of Science, Literature, and Art. By W. T. Brande. 8vo. New York, 1852.

Manners and Customs of the Ancient Egyptians. By Sir Gardner Wilkinson. 5 vols. 8vo. London, 1847.

Works of William E. Channing, D. D. 6 vols. 12mo. Boston, 1849.

Life and Voyages of Columbus. By Washington Irving. 3 vols. 12mo. New York, 1851.

Religion of Geology and its connected Sciences. By E. Hitchcock. 12mo. Boston, 1852.

Selections in Poetry. By Epes Sargent. 12mo. Boston, 1852.

Homes of American Authors. 8vo. New York, 1853.

Treatise on Landscape Gardening and Rural Architecture. 4th Edition. By A. J. Downing. 8vo. New York, 1852.

Life and Works of John Adams. Vols. 6, 7. 8vo. Boston, 1852.

Works of Antonio Canova, in Sculpture and Modelling. 3 vols. 4to. London, 1849.

January 5, 1853.

The President in the Chair.

Dr. C. T. Jackson gave an account of the processes now in operation in Sussex County, New Jersey, for the extraction of Iron from the ore called Franklinite, which abounds in that locality.

This mineral has been known for more than a hundred years, and numerous attempts have been made to work it for iron, but always without success from the loss of heat caused by the sublimation of the zinc entering into its composition, resulting in the formation of a Salamander, so called, by which the furnaces were clogged and rendered useless. The recent use of Anthracite coal has overcome this difficulty, and an immense supply of the best iron ore is now at the command of the miners. The Franklinite contains twenty per cent. of zinc, seventeen of oxide of manganese, and the rest is peroxide of iron, with a small proportion of protoxide. The mineral is peculiar to the locality, and, after the separation of the zinc, furnishes an ore valuable for the manufacture of the best kinds of bar iron and steel. The iron obtained is granular, containing no carbon, bright on the broken surface, and remaining so, presenting no trace of zinc on analysis, and but from five and a half to six per cent. of manganese. Most cast irons contain six or seven per cent. of graphite, but this contains but one, and that on the surface. Thus the manganese takes the place of carbon, and this alloy does not take up carbon. One deposit of manganesian iron ore, in New Jersey, at Andover, furnishes iron containing nine per cent. of manganese. It is too brittle for most castings, but is the best iron for making steel. In reducing it to bar iron, it "comes to nature" with very great rapidity. Carbonaceous irons are very slow in "coming to nature," but by being mixed with this iron they become quite tractable, producing a remarkably tough iron. Dr. Jackson's theory of the action of oxide of zinc in iron, was, that the oxygen of the oxide of zinc in the Franklinite combines with the sulphur of the bad iron, producing sulphurous acid, which goes off by heat and the zinc is then sublimed and leaves the iron. In the manufacture of the white oxide of zinc, from the New Jersey mineral, there is an immense residue of Franklinite, which at least pays for the fuel consumed in the process. Some zinc remains combined with the Franklinite, but in the high temperature of a reverberatory furnace this comes off as a pale yellow oxide, so colored partly by being vitrified, and partly by a portion of iron and manganese. This makes a very valuable paint for railroad cars, &c. Five tons of the white oxide of zinc are now manufactured daily from this mineral at one manufactory.

Mr. D. A. Welles inquired if Prof. Rogers was in possession of any information relative to the manufacture of Sheet Iron in the United States.

Prof. Rogers said, he knew of one establishment for its manufacture, but was not entirely conversant with all the processes. The iron made was nearly as good as the Russian, and its excellence was due, he thought, mainly to the great care taken to keep up a given temperature during the rolling process.

Mr. Welles said, that some time since, Dr. Hayes and himself had made an examination of the Russian iron to discover, if possible, the secret of its excellence, about which so much mystery had been kept up. They had come to the conclusion that it was due only to the very great purity of the iron. The lustre on the surface was produced by a Silicate of Iron, probably made by passing the iron hot through a solution of Silicate of Potash or some such liquid.

Dr. Cabot announced the donation of a specimen of American Ostrich, *Rhea Americana*, from Col. Jacques, of Charlestown, Mass. The thanks of the Society were voted for the donation.

January 19, 1853.

The President in the Chair.

Prof. Rogers read the following memorandum on the probable depth of the Ocean of the European chalk deposits.

Various geologists, and among them Prof. Ed. Forbes, in his excellent and learned Palæontology of the British Isles, in Johnston's Physical Atlas, have suggested that the Ocean of the Chalk deposits of Europe was a deep one ; and in evidence of this, Prof. Forbes cites the " striking relationship existing to deep-sea forms of the English Chalk Corals and Brachiopods, adding that the peculiar Echinoderms, (Holaster, Galerites, Ananchytes, Cidaris, Brissus, and Goniaster) favor this notion, as also the presence of numerous Foraminifera.

I beg leave to present a difficulty in the way of this conclusion. Several of these genera of Echinoderms, as *Ananchytes*, *Cidaris*, *&c.* occur in the Green Sand deposit of New Jersey, referable by every fossil test to the age of the Green Sand and Chalk of Europe. And this American stratum was unquestionably the sediment of quite shallow littoral waters. That they must have had a trivial depth is proved by the circumstance that they repose in almost horizontal stratification, at a level of not more than from one hundred to two hundred feet lower than the general surface of the hills and upland region to the N. W. of the margin of the zone they occupy as their outcrop. It is obvious that a depression of the cretaceous region, such as would cover the present deposits with a deep sea, would have likewise overspread the low Gneissic hills to the N. W. of the Delaware, which present no traces of having ever been submerged during the cretaceous or any secondary period.

Mr. Ayres remarked, that of those genera of Echinoderms, which Mr. Forbes regarded as deep sea genera, two or three are found in North America in water not two hundred feet deep. Terebratula, which has been generally regarded as only an inhabitant of very deep water, and whose structure has been described as admirably adapted to the depth at which it has been found, and which Prof. Owen has demonstrated cannot exist at a depth of less than two or three hundred fathoms, exists at Eastport, Me., in water so shallow that it can be taken by hand. In the same locality and position, Radiata are found which have heretofore been thought to be only inhabitants of deep water. Some of Mr. Forbes's genera are also found in less than ten fathoms of water.

Dr. Kneeland exhibited a tarso-metatarsal bone of *Palapteryx*, belonging to President Hitchcock, with the view of confirming the opinion expressed by him at a former meeting, that the specimen belonging to the Society indicates a new species of this genus.

The specimen exhibited was no doubt *P. ingens*, as it agrees remarkably with the dimensions given to it by Owen. It was interesting as having a perfect upper extremity, from which Dr. N. B. Shurtleff had moulded the portion wanting in our specimen. It also had, just where it ought to have it, according to Owen, and just where our specimen has it, a rough articulating surface for a *fourth*, or hind toe; it can hardly be believed that this is also an accidentally abraded surface, as some thought of our specimen.

That ours belongs to a new species he was confirmed in his belief from the examination of this bone of *P. ingens*, and the name of *P. major* is still very appropriate. Our mutilated bone is just fifteen inches long, just the length of the perfect bone of *P. ingens;* but at least one and a half inches (or the true tarsus, separated as an epiphysis in this immature bone) is wanting in *P. major*, which will give a length greater than any described species of Palapteryx, and nearly equal to the largest Dinornis.

The proportion of the circumference to the length of the bone is in *D. giganteus less* than one third ; in *P. major* one third, in *P. ingens* and *P. robustus*, *more* than one third ; as this ratio gradually increases to one half in the smaller species, we have an indication that *P. major* belongs to a larger species than *P. ingens*, and nearly equal to *D. giganteus.*

The proportion of the breadth of the lower or distal extremity to the length gives a similar indication in regard to the size of *P. major;* this ratio in *D. giganteus* is a little *less* than one third, in *P. major* one third, in *P. ingens* and *P. robustus* considerably *more* than one third ; as this ratio also gradually increases to one half in the smaller species, *P. major* must have been greater than any other described species of the genus.

For these additional reasons, he was confirmed in the opinion, that the specimen in the cabinet of the Society belongs to the genus *Palapteryx*, and to a new species, *P. major.*

Rev. Zadock Thompson exhibited a mass of débris from the interior of a Swallow Tree in Vermont. It contained the feathers of several wings and tails of the former tenants of the tree lying in the proper relation to each other, but without any trace of the skeleton, beaks, or claws of the birds. It was difficult to explain how all these parts could have disappeared without any destruction of the feathers. These birds now rarely inhabit trees, but have adopted for their residences the hospitable chimneys of man's dwellings. Occasionally a Swallow Tree is found in the depths of the forest. In the spring, before pairing, it is quite common for two or three hundred chimney swallows to occupy temporarily, a single chimney. The same takes place in the autumn, before their southern migration.

Dr. Kneeland read an extract from a letter from Manilla, giving an account of the Earthquake of September 16, 1852.

The first shock occurred at 7 o'clock on the evening of September 16, 1852. The inhabitants all ran into the streets, expecting every moment the houses to fall into ruins, foreigners looking on with awe and astonishment, and the natives, better aware of the danger, on their knees devoutly praying. The houses are built of stone, with very thick walls, and rather low in order to withstand better such shocks of earthquakes, and yet many of them were completely destroyed. In one of the strongest houses, an occupant writes, that the lower story did not move much, but the upper one swayed to and fro, to use his expression, "like a blade of grass in the wind." The noise made by the breaking of walls, the falling of furniture, and the cracking and creaking of the timbers was such as to impress every one with an exaggerated idea of the destruction of property. The shock lasted about one and a half minutes ; during the evening there were four more distinct shocks, at regular intervals of about an hour, namely, at eight, nine, ten, and eleven, and another at four the next morning. At each shock the great bell of the cathedral would toll, followed by all the bells of the city.

At night the city was almost deserted, from the greater danger of remaining in houses with tiled roofs ; the inhabitants fled to the native houses of the suburbs with thatched roofs, and many slept in boats on the river. For two or three days after, there were several slight shocks, and for weeks several ships in the river were used as lodging houses.

This was the longest and most severe earthquake that has visited these islands for two hundred years. The damage to property was considerable, though the loss of life was small ; only three or four lives are known to have been lost. Almost every stone house suffered more or less, according to its strength ; nearly all the government barracks, the custom house, colleges, palace, theatre, and many private dwellings, were rendered completely untenantable. Two churches were destroyed ; one, the oldest in Manilla, founded nearly three hundred years ago by the Jesuits, very large, with walls and arches four feet thick, was thrown down into one immense mass of ruins. The movement was not slow and gradual, like a long heavy swell, but a quick succession of short sudden shocks. The effects of the shocks were different in different parts of the island; there did not seem to be any regular track pursued by the earthquake; in places within a few miles of each other, in one it was not felt at all, while in the other it was quite severe. At Mariveles, just across the Bay from Manilla, the earth opened, with an eruption of black sand, which covered the country for a considerable extent; how large the opening was at the time is not known, but it is now seven hundred yards long and one yard wide. The volcanoes at Albay and Taal, which have not been in operation for many years, have been since discharging lava, stones, &c. with considerable activity."

Prof. Rogers referred to the circumstance that the undulatory movement of an earthquake is felt much more sensibly at a point above the earth's surface than directly upon it. An instance illustrating this had come within his own knowledge. The earthquake which destroyed the principal city of Guadaloupe was felt in the city of New York, but only in the fourth story of a printing office. The sound generally precedes the shock, as has been observed in this country. In North America, the undulation is always parallel to the physical features of the continent, making it reasonable to believe that through a long series of epochs the motion has been in one rather than various directions, as supposed by Elie de Beaumont. There are two movements in earthquakes; an undulating and a molecular movement. The latter, Prof. Rogers thought was the movement which attracted most observation, giving rise as it does to sudden and abrupt changes of relation on the surface of the earth at places where the formation of the strata admits of more or less freedom of movement, causing the sudden shocks which are so destructive. Prof. Rogers gave an account of some of the opinions of geologists as to the thickness of the earth's crust. He gave it as his own opinion, that in most places it is not more than ten miles thick.

Rev. Theodore Parker said, that in one of the Biographies of Pythagoras it is stated that on a certain occasion, when in the south of Italy, he looked into a deep well, tasted the water, and foretold an earthquake. Governor Winthrop, also, mentions that the water of a well in the eastern part of Massachusetts, which had been remarkably pure, became brackish just before an earthquake. These facts, he thought, had some bearing on the question of the thinness of the earth's crust, as the water was probably charged by gases coming up from below.

Mr. Parker presented from forty to fifty shells of the Ohio and its tributaries, together with a number of fossil shells from the same neighborhood.

Dr. Gould presented a volume of Descriptions of Shells and Mollusca, brought home by the United States Exploring Expedition.

February 3, 1853.

The President in the Chair.

Prof. Wyman introduced a series of Resolutions, urging upon the Government of the United States the importance of a Geological Survey of Oregon and Nebraska by a competent naturalist, as follows:

Understanding the Commissioners of the General Land Office, at Washington, have included in their estimate for the land surveys of the approaching season, an item for the geological survey of Oregon and the Mauvaises Terres of Nebraska, in which previous surveys have led to the discovery of one of the most remarkable tertiary geological deposits in the world, therefore,

Resolved, That the Boston Natural History Society respectfully recommends the prosecution of the surveys of one of the most interesting and important geological regions of this country, believing that the result will be of the highest value to science, and will give much information of the early history of the American continent.

Resolved, That Congress be earnestly solicited to make the necessary appropriations to carry out these surveys in the manner proposed by the Commissioners of the General Land Office.

Resolved, That a copy of this preamble and series of resolutions be signed by the officers of the Society and be transmitted by the Secretary to the Commissioners of the General Land Office at Washington.

The Resolutions were unanimously adopted.

Dr. Gould presented, in the name of Prof. Gibbs, a Paper on a new species of Menobranchus with the specific name *punctatus*. Referred to the Committee on Herpetology.

Dr. Bryant read a Paper on the Sandhill Crane, as follows:

Audubon and the majority of Ornithologists consider the brown or Sandhill Crane, *Grus canadensis*, and the white or Whooping Crane, *Grus Americana*, as identical. Having had many opportunities of observing the Sandhill Crane, as it is seen in the peninsula of Florida, south of Lake George, I am convinced that it is a distinct species; though I have no doubt that the young of the Whooping Crane resemble it in color and general appearance. I have seen hundreds of Sandhill Cranes while alive, and have examined many when dead, but have never seen a single bird that presented any appearance of changing its plumage to white. I have, also, made inquiry of many of the inhabitants of that part of the country, and have never met with an individual who had ever seen a white or particolored bird. This being the fact, and the bird being a constant resident of Florida, and breeding there in sufficient numbers for me to have been enabled to examine four nests within three miles of the house where I was residing on the banks of Lake Munroe, I think I am authorized to consider it a distinct species. I am of course aware that many birds breed in an immature plumage, and should not therefore consider the mere fact of the brown bird breeding of any importance, if it were not for additional facts. As most unfortunately, I have never had an opportunity either of studying the habits or of examining a recent specimen of the *Grus Americana*, I cannot make any minute comparisons between the two species, founded on my own personal knowledge of both birds. There is, however, one point which I think cannot be mistaken, that seems to me worthy of attention. The Whooping Crane is represented in Audubon's plate with the whole of the head, with the exception of the occiput and a narrow strip from the eye backwards, naked; I cannot think that the papillated skin, covering the upper part of the head only of the Sandhill Crane, and possessing all the properties of an erectile tissue, would, after the bird was sufficiently adult to carry on the function of reproduction, be increased so as to cover the space it does in the Whooping Crane.

Audubon, in his description of this bird, says, that it is found in Florida only during the winter months; and that Bartram, when he affirmed that it was a constant resident, must have mistaken the Wood Ibis for it. How Audubon could have supposed that any person, however unobservant, who had ever seen the two birds, could mistake the one for the other, I do not understand. The loud notes of the Whooping Crane can be heard every still morning for miles, while the only note the Ibis ever makes is a feeble sort of grunt. The Crane flies by a regular succession of slow and heavy, but vigorous flappings of the wings, while on the other hand the Ibis passes the greater part of its time, when in the air, in soaring in circles, like the Turkey Buzzard, and when flying from place to place, proceeds by a regular succession of flappings and sailings.

During the winter months the Sandhill Cranes are seen in flocks of a greater or lesser number of individuals. By the first of February they have separated into pairs, and after this time are seldom seen in a greater number than two or three pairs; generally, however, a single pair, flying or feeding together. Their food consists at this time almost wholly of a root called by the inhabitants pink root, which grows in all the wet Savannahs, and is of about the size of a pipe-stem, of a fine pink color internally, and possesses the same quality as madder, of coloring the bones of animals red. About the middle of March, they commence building their nests, either in a wet Savannah, or in one of the small marshy spots, called ponds by the inhabitants. They are generally situated at some distance from the dry land, and are composed of fragments of the dry stalks of the coarse marsh-grasses ; they are perfectly flat, about eighteen inches in diameter, and five in thickness, scarcely elevated above the surrounding mud and water. For the space of five or six feet round the nest, the vegetation is trampled into the mud so as to resemble at a little distance what is called an alligator's hole, for which I at first mistook it. In two instances I found an old nest in close proximity to the one then occupied, from which I infer that, unless disturbed, they return annually to the same spot. The eggs, two in number, are deposited from the 21st of March to the 10th of April; they vary in color from a light olive to a yellowish drab, and are sparingly spotted with dull lilac, and more thickly with greenish and reddish brown, the spots becoming confluent at the larger end in most specimens; they average ninety-five millimetres in length and sixty in breadth. Soon after incubation commences, the eggs become so coated with mud that the original color can with difficulty be discerned. The bird sits on the nest with its legs under it, and the neck generally drawn in, so as to make as little show as possible, and does not fly up when approached, if it thinks itself unobserved. The period of incubation is about three weeks, and both birds take part in it. The young, when first hatched, are covered with a brownish hair-like down, and are quite ugly from the comparatively large size of their legs and the projection of their eyes. They are fed by regurgitation and grow rapidly. The plumage and general appearance of the adult bird being already sufficiently well described, I shall not redescribe them ; but, as the measurements given in those books to which I have access, are quite incomplete, I will add those of four specimens, two males and two females.

	♂	♂	♀	♀	
Length to end of bill,	1.090	1.150	1.030	1.040	Milli-
Length to end of claw,	1.580	1.680	1.380	1.480	metres.
Length to end of wing,	1.585	1.650	1.420	1.510	
Extent,	1.880	1.960	1.770	1.830	
Length of wing from flexure,	.515	.525	.470	.490	
Length of tail,	.167	.180	.160	.180	
Tarsus,	.248	.260	.232	.250	
Middle toe,	.080	.085	.075	.074	
Middle toe claw,	.022	.023	.019	.022	
Hind toe,	.020	.022	.018	.014	
Hind toe claw,	.012	.013	.010	.0105	
Outer toe,	.066	.068	.060	.056	
Outer toe claw,	.016	.016	.014	.016	
Inner toe,	.058	.060	.047	.052	
Inner toe claw,	.026	.029	.019	.024	
Bill along the ridge,	.134	.139	.119	.135	
Gape to tip of lower mandible,	.131	.137	.119	.135	
Depth of bill opposite centre of nostril,	.022	.024	.021	.019	
Breadth of bill opposite centre of nostril,	.0115	.014	.0135	.013	
Length of nostril,	.023	.024	.021	.026	
Breadth of nostril,	.0034	.0034	.003	.0035	

Sir John Richardson, in the narrative of his expedition in search of Sir John Franklin, expresses the opinion that these two birds are of different species; he founds his opinion on the facts that the Brown bird breeds farther north, and is larger than the white one. On referring to the *Fauna Boreali-Americana*, I do not find the measurements of the *Grus Canadensis* there given to be larger than those of the *Grus Americana*. The length of both birds is the same, forty-eight inches; but all the other measurements of the *Canadensis* are smaller than those of the *Americana*, the tarsus and wing being each three inches, and the bill two inches shorter than the same parts of the Whooping Crane. The length of Audubon's specimen of the Whooping Crane is fifty-four inches, and his two Sandhill Cranes are respectively forty-five and a half inches, a little larger than the average of my specimens. I am inclined to think that notwithstanding Richardson's usual accuracy, he must have formed his opinion of the superior size of the brown bird, either from a comparison of the two birds as seen at a distance, or else from an imperfect recollection of the size of the Whooping Crane; as, although he mentions obtaining specimens of the Sandhill Crane, he says nothing about procuring any of the Whooping Crane. If, however, the northern brown bird should prove to be larger than the white one, it cannot, of course, be the young of that bird, and, in that case, as the Sandhill Crane of the United States is certainly much smaller than the Whooping Crane, I should be of the opinion that there are three distinct species of Grus inhabiting this country.

A letter written to Dr. Brewer by Mr. Thure Kumlien, of Wisconsin, a well-informed ornithologist, strongly corroborates the specific distinction of the Sandhill and Whooping Cranes. He states that though the *Grus Canadensis* is common in that part of the country, and that a pair of these birds have bred for six years within sight of his house, he has never seen one which presented any variation from the dark-colored plumage of what is called the Sandhill Crane. This I consider the more remarkable, as I had previously supposed that the Whooping Crane would be seen there, at least, in its semiannual migration.

The President gave an account, and presented to the Society a very perfect Cast of Mystriosaurus, and pointed out, in detail, its anatomical features.

Dr. A. A. Gould announced to the Society the death of one of its most distinguished Corresponding Members, Prof. C. B. Adams of Amherst College, and offered the following resolution, which was unanimously adopted:

Resolved, That we learn, with much regret, the afflictive death of one of our Associates, Prof. C. B. Adams, of Amherst College, in whom Science has lost one of her most industrious and devoted followers, whose collections and publications have already added materially to our knowledge; and in the prosecution of an extended plan of investigation which promised most important results in regard to the laws of the geographical distribution of animals on our globe.

Dr. A. A. Gould presented a large nodule of flint in chalk, in the name of Mr. Granville Mears, of Boston; also a fossil Echinoderm from the same specimen.

Mr. H. R. Storer announced that Mr. J. A. A. Ribeiro had recently discovered a new alkaloid in a Brazilian plant, which he was now experimenting with to ascertain its medical properties.

Mr. Henry K. Oliver, Jr., was elected a resident member of the Society.

February 17, 1853.

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

Mr. Sprague read a communication on *Ophiocaryon paradoxum,* a nut of which had been recently presented to the Society, and exhibited several carefully-executed drawings of the specimen.

Dr. C. T. Jackson alluded to the circumstance that the New Jersey Mines, known as the "Sterling Mines," have been supposed to have been opened by the younger Lord Sterling, and statements to this effect are quite common in books. Having some curiosity to decide the point, while on a visit to these workings, he had obtained a section of a cedar tree growing in such a position that its growth must have been subsequent to the working of the mines. The tree had been dead twenty years, and was found, by counting its rings, to have been seventy-four years old. As Lord Sterling died in 1783, thirty-three or thirty-five years old, it is therefore impossible that he was the first to work these mines. They probably were opened by a party of Nassau miners, who explored the State for mining purposes in 1640. Dr. Jackson had received the first suggestion of this from Major Farrington, and it was confirmed by his own examination of the tree in question.

Dr. Jackson stated that the New Jersey Franklinite is deposited in a white crystalline limestone, which is included in an igneous rock of sienitic character analogous to trap rock. This limestone has been regarded as a metamorphic rock, but he himself believed it to be an igneous rock like calcareous spar, which was, in his opinion, of igneous origin. On the shores of Lake Superior, calcareous veins may be seen, producing analogous changes in the adjoining rock to those caused by undoubted igneous rocks. Dr.

Jackson was not of opinion that all lime rocks are the secretions of animals, for these must have derived their lime from some external source. He thought that lime rocks were probably part of the original elementary structure of the earth.

A donation of two large specimens of native copper from Lake Superior was received, in the name of Mr. Frederick W. Davis. The thanks of the Society were voted for the donation.

Mr. B. F. Kendall was elected a member of the Society.

March 3, 1853.

The President in the Chair.

A note was read from Mr. William Stimpson, presenting to the Society a large number of specimens of Mollusca preserved in spirit.

The President exhibited to the Society a skeleton of Ornithorhyncus, probably the only one in the United States. He pointed out in detail its various curious anatomical features.

The Secretary read a paper from Dr. W. I. Burnett on the reproduction of lost parts in Reptiles, as illustrated in the case of the Glass Snake, as follows:

Last year I presented to the Society a communication on the *Ophisaurus ventralis* and *Scincus fasciatus*, noticing their well known and remarkable power of voluntarily snapping off their tails to elude pursuers, and describing the disposition of the muscles of the caudal extremity, by which this phenomonon is produced. (See Proceedings, Vol. IV., p. 216.)

A short time since one of these animals, an *Ophisaurus ventralis*, was presented to me, in which the lost part was in process of reproduction. I seized upon the opportunity to make a somewhat careful microscopical examination of the parts to learn their histological character.

Some two months before, the animal had lost its tail, and already it had been reproduced to the length of three inches, and was still rapidly growing. Externally the line of junction of the old and new parts was pretty distinct, and the scales on the first inch of the new part were arranged irregularly; but on the last two inches they were in distinct rows corresponding to those of the old part, so that when the process had been completed the rows of the old and new parts would be continuous throughout. I mention this fact, for it would appear that the scales required some time to arrange themselves conformably to the characteristics of the animal. I divided the animal a short distance above the junction of the old and new parts, and then carefully dissected down to the seat of the reproductive process. The last half inch of the old part presented a highly vascular, injected aspect, not unlike that of the ends of a fractured bone undergoing reparation.

The process evidently takes place, vertebra after vertebra, together with its muscular and nervous parts, according to "the law of analogous formation." From the osseous, the muscular, and the nervous tissues of the last vertebra of the old part, are thrown out as many kinds of formative plasma, in which are developed, respectively, the new bone, muscle, and nerve. As fast as they are formed they are pushed along successively by new ones which follow behind. The last vertebra, with its appendages, is, therefore, the fruitful parent of all those newly formed, which may be even ten or twelve in number. Upon examining the first vertebra of the new part, and then in process of formation, I found the development to take place as in embryology, the different tissues going through the usual cell-stages of growth. But the formation of one vertebra is far from being completed before it is succeeded by another, and on this account the first two or three of the new parts appear imperfect, but subsequently become fully formed and joined together. I was particular to examine the spinal cord of the new part, for

Spallanzani, Bonnet, and Blumenbach, in their experiments with Salamanders, assert, that the spinal cord is not reproduced ; but there is no reason, histologically, why it should not be, for the nervous tissue is not unfrequently reproduced in the higher animals ; and in experiments on the renewal of the legs with Salamanders Rudolphi found the nerves in the newly-formed part perfect and continuous, with no distinct limit with the old trunks.

These observed conditions show that the phenomena of repair and reproduction are manifestations of the exercise of the same power as that by which the body was developed from the impregnated germ. This power is the type, or germ-power of the animal, which, in the lower forms of animal life, does not seem entirely expended in the formation of the individual, but lies over in excess, waiting these contingencies of life. The higher the animal the more completely is this power expended in the formation of the adult form ; so that in man, when fully grown, there is no tissue which is exactly repaired after injury, but the new formation is only a conventional one. On the other hand, but in accordance with this same view, the young of the higher animals possess this power to a certain extent, for the germ-force is still in excess ; this is the reason why wounds in very young children heal without a cicatrix.

Moreover this germ-power is something more than a manifestation of the process of nutrition, for it may be drawn upon so extensively as at last to be entirely expended. Thus, if the animal in question, the Glass Snake, be repeatedly broken, the newly-formed part is, at last, only an abortion.

Mr. H. R. Storer read a communication from Dr. W. I. Burnett, entitled Notes on the Rattle Snake, as follows :

By the kindness of my friend, Dr. William E. Dearing, of Augusta, Ga., (Mayor of that city, and corresponding member of this Society,) I have had placed at my disposal several living reptiles for anatomical and physiological uses. Among these were two quite large and beautiful Rattle Snakes (*Crotalus durissimus*) with which I lost no time in making many experiments. The longest, a little more than four feet in length, and having fourteen rattles,* was killed, and I made a dissection of its mouth in order to learn some details of the anatomical relations of the fangs and poison-apparatus. As the opportunity for the study of the progressive development of these was an unusually good one, I will give the results somewhat in detail.

The two fangs in use, with the poison-sacs at their base, presented nothing remarkable, excepting that they were old and worn, and evidently soon to be shed. But directly behind these the mucous membrane on each side was crowded with what may be called the *fangs of reserve;* for, like successive teeth elsewhere, they are ready for complete development in turn, as fast as those in use pass away.

These were of all sizes from near that of the fangs in use, down to the smallest germ, and I was able to easily count twelve on each side. Their development I studied with the microscope, and it appeared as follows: — First, a minute involution of the mucous membrane (*the tooth follicle*); in this is seen a small conical papilla as the first trace of the future fang. This is gradually developed by the aggregation of cells, and when about one twenty-fifth of an inch in length, its cavity (the *pulp-cavity*) is occupied by a net-work of blood-vessels. The growth after this is more rapid and determinate. The epithelial cells covering the apex of the papilla become lineally arranged, and, fusing together, form fibres, which, when filled with calcareous salts, constitute the intimate structure of the enamel. This enamel is formed very early, and sometime before the appearance of the dentine or ivory; so that at one period is found simply the epithelial tooth-sac crowned with a point of enamel. As the tooth-sac increases and is pushed out, the enamel point is more and more elongated, and becomes, finally, very long and acicular, and with the sharpness well known in the perfect fang. Meanwhile the dentine, or ivory, is formed, and as this process is going on, its edges begin to roll towards each other on the convex and upper surface of the tooth. This rolling of the edges to

* The popular belief is that the number of rattles on the tail indicates the number of years of the snake's life. But according to several observers (Bachman, Holbrook, and Dearing) this is not so; for, not only may it lose several of the rattles by accident, but two and even four have been known to form in a single year. One of my own accidentally lost two of its rattles, and it is rare to find specimens having more than ten or twelve.

meet each other, continues gradually with the growth of the tooth, forming first a half, and usually, at last, a complete canal. This canal is the poison duct, and being thus formed, two results ensue: — 1st. It is outside, and disconnected with the pulp-cavity, but communicates with the tooth-follicle at its base. 2d. It is only in the ivory substance, terminating, externally, at the point where this last connects with the enamel; the enamel point being free and solid.

Thus formed, these fangs seem to be in waiting to replace the old ones in the event of their being removed, or naturally shed. How this replacement takes place, I am unable to say from observation. But it appears to me that the original tooth-follicle becomes the poison-gland or sac; for several of the larger reserve-fangs had each a small sac embracing its base, which appeared to be only the primitive tooth-sac; and, moreover, the largest pair of these reserve fangs lay directly behind the ones in use. The replacement might, therefore, occur as in the higher animals, — the pair of reserve passing gradually, together with the poison-gland, into the places of those removed.

But, however occurring, the substitution is exact and complete, and may take place in a very short time, for Dr. Dearing informed me, that from one of his captive specimens he extracted the fangs, which were replaced in exactly six weeks; this he repeated several times with the same result.

There are many facts tending to show that these fangs are naturally shed once in a while, if not regularly; at all events their points are likely to be broken off by frequent use, and, however removed, nature appears to have provided an ample stock in reserve for their almost indefinite reproduction.

The virulence of the poison of this animal is too well known for special description. I will only add there is good reason for the belief that its action is the same upon all living things, vegetables as well as animals. It is even just as fatal to the snake itself, as to other animals; for Dr. Dearing informed me that one of his specimens, after being irritated and annoyed in its cage, in moving suddenly accidentally struck one of its fangs into its own body; it soon rolled over and died as any other animal would have done. Here, then, we have the remarkable, and, perhaps, unique physiological fact, of a liquid secreted directly from the blood, which proves deadly when introduced into the very source (the blood) from which it was derived!

With the view of ascertaining the power and amount of this poison, Dr. Dearing performed the following experiment; the snake was a very large and vicious one, and very active at the time. He took eight half-grown chickens, and allowed the snake to strike each under the wing as fast as they could be presented to him. The 1st died immediately; the 2d after a few minutes; tbe 3d after ten minutes; the 4th after more than an hour; the 5th after twelve hours; the 6th was sick and drooping for several days, but recovered; the 7th was only slightly affected; and the 8th not at all.

With the remaining specimen I was desirous of performing several experiments as to the action of this poison on the blood. The following is one: — The snake was quite active, and as soon as any one approached the cage, began to rattle violently; but twenty-five or thirty drops of chloroform being allowed to fall on his head, one slowly after the other, the sound of his rattle gradually died away, and in a few minutes he was wholly under the effects of this agent. He was then adroitly seized behind the jaws with the thumb and forefinger, and dragged from the cage and allowed to partially resuscitate; in this state a second person held his tail to prevent his coiling around the arm of the first, while a third opened his mouth, and with a pair of forceps pressed the fang upward, causing a flow of the poison, which was received on the end of a scalpel. The snake was then returned into the cage.

Blood was then extracted from a finger for microscopical examination. The smallest quantity of the poison being presented to the blood between the glasses, a change was immediately perceived, the corpuscles ceased to run and pile together, and remained stagnant without any special alteration of structure. The whole appearance was as though the vitality of the blood had been suddenly destroyed, exactly as in death from lightning. This agrees also with another experiment performed on a fowl, where the whole mass of the blood appeared quite liquid, and having little coagulable power.

Other and like experiments were performed, but I must omit here their description.

The physiological action of this poison in animals, is probably that of a most powerful sedative, acting through the blood on the nervous centres.

This is shown by the remarkable fact that its full and complete antidotes are the most active stimulants, of these, *alcohol*, in some shape, is the first. I cannot better illustrate this important point, than by the two following cases furnished me by Dr. Dearing, in whose experience they occurred.

1. Mr. B—— was bitten just above his heel, three quarters of a mile from home. The usual symptoms of most acute pain and large swelling immediately followed ; he succeeded, however, in reaching his house, but complained of blindness and universal pain. Brandy was then given, to the amount of a quart in the course of an hour ; this produced a little nausea, but not the least intoxication ; in the next two hours another quart had been given followed with relief of pain and subsidence of swelling, but without the least intoxication. Stimulants were kept up in small quantities during the ensuing forty-eight hours, with the gradual passing off of the local and other symptoms. The patient kept his room the three following days, complaining only of a general soreness. After this, was about as usual ; but a few weeks after all his hair fell off.

2. Miss F—— was bitten on her middle finger. The usual severe symptoms immediately followed ; but brandy, with the addition of a little ammonia, was freely given, and continued in large doses until relief of symptoms, but without the least appearance of intoxication, although in health, the individual could not, probably, have borne a single ounce ; the symptoms gradually disappeared, and on the third day the patient was well, generally, although the finger sloughed.

These two cases, authentic in every particular, are quite valuable ; for aside from their physiological relations, it is of no small importance to know that the sure fatality of such an accident can be fully prevented by so simple a remedy.

I have been desirous of performing some experiments with a view to learn the relations of this poison to the state of anæsthesia in animals. I commenced these a few days ago, but the behavior of the snake was far from being commendable or satisfactory, and I shall postpone them for the present.

Mr. Storer also read a paper addressed to him by Mr. J. A. A. Ribeiro, of Brazil, on the Large Serpents of Brazil, containing numerous facts connected with their habits, and various legends concerning them, current among the natives of that country.

The skeleton of a Black Capped Titmouse was presented in the name of Mr. Samuels.

Mr. Frank Moore and Mr. F. U. G. May were elected Resident Members of the Society.

March 17, 1853.

Dr. A. A. Gould in the Chair.

The Secretary read a Communication from Dr. W. I. Burnett on the Cotton Worm of the Southern States, as follows:

During the past winter I have been collecting materials for the history of that most devastating of American insects, the "Cotton worm." In this I have been aided and favored by several intelligent Southern planters, whose severe losses from the ravages of this animal, have made them keenly alive to many of its habits and modes of life. Of these gentlemen, I am particularly indebted to Mr. Robert Chisolm, of Palmetto Hall, Beaufort, South Carolina, an intelligent and extensive cotton-planter, who has with much care watched the economy of this insect during several of its later appearances. He has sent me several communications, from which, together with an examination of the larval specimens with which they were accompanied, I have been able to prepare the following account:

This insect appears to be but little known in science, although the injury to property which it causes, is perhaps greater and more deplorable than that occasioned by any other with which we are acquainted. On the years of its appearance, the entire cotton crop of certain districts is often cut short; and in not a few instances, single plantations have suffered to the amount of from ten to fifteen thousand dollars.

It is one of the span-worms or *Geometridæ*, belonging to the same family of insects as the canker-worm, which is so much feared by horticulturists of the north.

I have as yet only seen the larva. It is not indigenous to the Southern States, and there is no evidence that it can live naturally north of the shores of Texas. Most probably it is a native of Brazil or some other equatorial climate in that vicinity; for it is so sensitive to the cold, as to quickly die in an atmosphere even approaching the freezing point. It appears, then, on the Southern cotton fields, always as in migration, coming suddenly like a foreign enemy, and always selecting the most thrifty plantations. It is very remarkable, therefore, that it should appear regularly at intervals of every three years in the same districts, striking first the seaboard and progressing gradually inland as circumstances may favor. But equally remarkable in this connection is the fact, that its most extensive and deplorable ravages occur always after intervals of twenty-one years, or every seventh time of its advent, as shown in the years 1804, 1825, and 1846, during the last half century. These facts are inexplicable, unless referable to some peculiar conditions of their economy in their native land. Little is known from what southern direction they come; for, like all insects of this family, their movements are made at night, and the seaboard planter often rises in the morning to find whole sections of his plantations covered with the adult insects busily engaged in depositing their eggs on the tender leaves of the cotton. There is, however, no regularity in the exact month of their coming, for Mr. Chisolm says that on his plantations they came in 1840 quite early, but in 1843 much later, and remained until frost; in 1846, in June, and in 1849 and 1852 in August.

The cotton-caterpillar is nearly always accompanied directly by another insect called the Boll-worm (probably one of the *Noctuidæ*) which confines its attacks to the immature lint and seeds of the green pods of the short-stapled variety of cotton; and, as short cotton is mostly cultivated in sections farther south than those of the long-stapled variety, this boll-worm is generally seen in Texas and Mississippi six weeks or so before the cotton-caterpillar proper appears on the coast of Georgia and South Carolina. Little is known of its habits more than this; for its ravages are comparatively so inconsiderable that it attracts scarcely any attention of the planter. Its concomitancy with the true cotton-worm, however, is not a little remarkable, and there is no doubt that it belongs to a different family of insects.

The cotton insect having made its appearance, shows considerable sagacity in always seeking first the most luxuriant fields. The eggs, which are of a dull white color, are deposited singly, or at most in twos, on the under surface of the most tender leaves. Their period of incubation is quite short, being six or seven days, and the time of hatching is always after sunset or in the night. They then begin to feed ravenously, and grow in proportion; their attacks being always confined to the long-stapled variety when accessible, though, when hard pushed, they will eat the short variety, but never any thing else; and if their numbers are disproportionate in excess to the cotton at hand, they will die of starvation rather than touch any other vegetable. During their caterpillar state, they are almost wholly unaffected by all changes in the weather, excepting cold; for the heaviest rains and the severest gales of wind do not stay their movements, or prevent in the least their devastations. Mr. Chisolm says that a very violent hurricane, of two or three hours' duration, which swept over his plantations in August last, made no impression whatever on their progress. If, however, there occurs even a slight frost, they are killed throughout. These circumstances are worthy of mention, as bearing upon their probable tropical origin. Their larval state is of about ten days' duration, and, during this time, they moult two or three times, changing their colors and general appearance in the same singular manner as the canker-worm of the north. The caterpillar, when full grown and well fed, is sixteen legged, of the size of a common crow-quill, and from an inch and a quarter to an inch and a half in length. It has a reddish head, is whitish below, and brownish black above; on each side are two longitudinal, wavy, white lines, and another, straight, on the middle of the back. When ready to wind up, they swing down from the cotton plant, and, without any choice, take up indifferently with the nearest objects, on which they may rest during this process. Their chrysalid state continues about twelve days ; the moths then appear and immediately go about depositing their eggs, after which they die. This perfect state lasts only four or five days. Such is the routine of their reproduction. When they appear early in the season, there are usually three broods ; but some years they come so late that only a single new generation is seen. In either case, the last brood almost invariably perishes throughout, being either killed instantly by the frost, or dying from starvation, having eaten all the cotton before their transformations take place. It follows, therefore, that these ravaging insects as they appear in the cotton fields of the south, do so at the loss of that portion of their race, for they leave no progeny behind them. At the same time, this condition of things makes the matter the more deplorable for the planter, for, as he has to contend with a suddenly invading foe from foreign parts, he is rendered wholly powerless in averting this regularly periodical destruction of property.

The Secretary read a letter from Mrs. Adams, in reply to a letter from himself, communicating the vote of the Society, expressing their sympathy with her in the recent decease of her husband, Prof. C. B. Adams, of Amherst College.

Dr. Kneeland read a letter from Mr. David Christie, on a new species of Ammonite. Referred to the Publishing Committee.

Dr. S. L. Sprague was elected a resident member.

ADDITIONS TO THE LIBRARY DURING THE QUARTER ENDING MARCH 31, 1853.

Congressional Report of Hon. E. Stanley and A. Evans, on the Ether Discovery. 8vo. Pamph. 1852. *From Dr. C. T. Jackson.*

Thése pour le Doctorat en Medicine. Par S. L. Bigelow. 4to. Pamph. Paris. 1852. Recherches sur les Calculs de la Vessie. Atlas. *From the Author.*

American Journal of Science and Arts. Nos. 42, 43. 2nd Series. Nov. 1852, Jan. 1853. *From the Editors.*

Journal d'Agriculture et Transactions de la Société d'Agriculture du Bas-Canada. Vol. V. Nos. 10, 12. Montreal, 1852. *From L. A. H. Latour.*

Archives du Muséum d'Histoire Naturelle. Tomes V. Liv. 4, et V, 1, 2. 4to. Paris. *From the Muséum d'Histoire Naturelle.*

United States Exploring Expedition. Vol. IX. Mollusca and Shells. By Augustus A. Gould, M. D. 4to. Boston, 1852. *From the Author.*

Transactions of the Albany Institute. Vol. II. Albany. 8vo. 1852. *From the Albany Institute.*

Address at the Anniversary Meeting of the Royal Geographical Society. By Sir R. I. Murchison. 8vo. Pamph. London, 1852. *From Sir Charles Lyell.*

Sanatory Institutions of the Hebrews. 8vo. Pamph. pp. 1–26–50. *From L. A. H. Latour.*

Journal of the Academy of Natural Sciences of Philadelphia. New Series. Vol. II. Part III. 4to. Phil. 1853. *From the Academy of Natural Sciences.*

Catalogue of Flowering Plants, and Ferns, in the vicinity of Cincinnati. By J. Clark. 12mo. Pamph. Cincinnati, 1852. *From the Author.*

Norton's Literary Register for 1853. 12mo. Boston. *From the Editor.*

American Journal of Science and Arts. 2nd Series. No. 38. For March, 1852. *Exchange.*

Description of Remains of Extinct Mammalia and Chelonia from Nebraska Territory. By Joseph Leidy, M. D. 4to. Pamph. Philadelphia, 1853. *From the Author.*

Proceedings of the Academy of Natural Sciences of Philadelphia, pp. 189–221. Vol. VI. No. 6. 1852–53. *From the Academy of Natural Sciences.*

Proceedings of the American Philosophical Society. Vol. V. No. 48. pp. 246–300. 8vo. Pamph. Philadelphia. *From the American Philosophical Society.*

Sixth Annual Report of the Regents of the Smithsonian Institution. 8vo. Pamph. Washington, D. C., 1852. *From J. McMair.*

Journal d'Agriculture. Vol. VI. No. 1. 8vo. Pamph. Montreal, 1853. *From L. A. H. Latour.*

Wisconsin. Its Geography, Topography, &c. By S. A. Lapham. 12mo. Milwaukie, 1846. 2d ed. With map. *From the Author.*

Memoir of the Extinct Species of American Ox. By Joseph Leidy. 4to. Pamph. Washington, D. C., 1852. *From the Smithsonian Institution.*

Notices of the Meetings of the Royal Institution of Great Britain. Part 2d. July, 1851 – July, 1852. 8vo. Pamph. London. *From the Royal Institution of Great Britain.*

List of Members, Officers, &c., of the Royal Institution of Great Britain, for 1851. 12mo. Pamph. London. *From the Royal Institution of Great Britain.*

Transactions of the Linnæan Society of London. Vol. XXI. Part 1. 4to. 1852. *From the Linnæan Society.*

Proceedings of the Linnæan Society. Nos. 47, 48, and 49. pp. 145 – 200. 12mo. 1851 – 2. *From the Linnæan Society.*

List of Members of the Linnæan Society. 12mo. Pamph. 1852. *From the Linnæan Society.*

Bulletin de la Société Géologique de France, dixième Série. Tome IX. Feuilles 20 – 27. (5 Avril, 24 Juin, 1852.) *From the Société Géologique.*

Sermon on Daniel Webster. By Rev. Nehemiah Adams, D. D. 8vo. Pamph. Boston, 1853. *From the Author.*

Philosophy of Railroads. By T. C. Reefer. 8vo. Pamph. Montreal, 1853. *From L. A. H. Latour.*

Inverted Microscope. By J. Lawrence Smith. 8vo. Pamph. New Haven, 1852. *From the Author.*

Smithsonian Report, Bibliographia Americana Historico-Naturalis. A. D. 1851. Auctore C. Girard. 8vo. Pamph. Washington, 1852. *From the Smithsonian Institution.*

Recent Improvements in the Chemical Arts. By J. C. Booth and C. Morfit. 8vo. Pamph. Washington, 1852. *From the Smithsonian Institution.*

Journal of the Academy of Natural Sciences of Philadelphia. New series. Vol. I. Part 2. 4to. Philadelphia, 1848. *From the Academy of Natural Sciences.*

American Journal of Science and Arts. Vol. XV. No. 44. 2d series. March, 1853. *Exchange.*

Sixth Annual Report of the Regents of the University of New York. 8vo. Pamph. Albany, 1853. *From the Regents of the University.*

Journal d'Agriculture. Vol. VI. No. 2. 8vo. Pamph. Montreal, 1853. *From L. A. H. Latour.*

Anæsthesia. By. W T. G. Morton, M. D. Cong. Doc. 8vo. Washington, 1853. *From the Author.*

Report of Mr. Walker, in the Senate of the United States, on the Ether Question. Cong. Doc. 8vo. Pamph. Washington, 1853. *From the Author.*

Report of a Geological Survey of Wisconsin, Iowa, and Minesota. By D. D. Owen. 4to. Philadelphia, 1852. *From Hon. Charles Sumner.*

Journal d'Agriculture. Vol. VI. No. 3. 8vo. Pamph. Montreal. *From L. A. H. Latour.*

Deposited by the Republican Institution.

Writings of Levi Woodbury, LL. D. 3 vols. 8vo. Boston, 1852.

Astronomy and General Physics considered with reference to Natural Theology. By W. Whewell, D. D. 12mo. London, 1852.

Received from the Courtis Fund.

Annals and Magazine of Natural History. 1853. Vol. XI. Nos. 61, 62, and 63. London.

American Almanac for 1853. 12mo. Boston.

British Species of Angiocarpous Lichens, elucidated by their Sporidia. By W. A. Leighton, (Ray Society). 8vo. London, 1851.

April 6, 1853.

The President in the Chair.

The Secretary read a letter from the Commissioner of the General Land Office, in reply to one from himself, communicating the resolutions passed at a recent meeting of the Boston Society of Natural History, in favor of a geological survey of Oregon and Nebraska; to the effect that Congress had determined to abandon, for the present, the project of such a survey before the communication recommending it was received.

The Secretary read a paper in behalf of Dr. W. I. Burnett, on the Sedative Action of the Poison of the Rattle-Snake, as follows: —

At the second February meeting, a paper of mine was presented to this Society, in which, beside some anatomical details of the poison-apparatus of the rattle-snake (*Crotalus*), I gave an account of the peculiar action of the poison of this animal on the blood, and of the efficacy of its very certain antidote, alcohol.

Since then I have received some very interesting statements, confirming the views there expressed on the probable sedative action of this poison. For these facts, which are authentic and reliable, I am indebted to Judge Bethune, of Jacksonville, Fla. The account furnished is from his personal acquaintance with Dr. Oates, of St. Johns River, Fla., who made the experiments. It is succinctly, as follows: —

Dr. O., having frequently witnessed the effect of the use of alcoholic spirits after the bite of venomous animals, and particularly that of the rattle-snake, and perceiving that not only was the action of the poison arrested, but that, under such circumstances, the system seemed scarcely capable of being intoxicated with alcohol in any form, was desirous of reversing this experiment, by watching the effect of this poison, when introduced into the system of a person thoroughly intoxicated. This he performed through the stomach, instead of through the circulation direct. For this purpose he carefully extracted a small quantity of the poison from a healthy, active snake, and incorporated it into several bread-pills. He then intoxicated himself considerably with brandy, after which he took one of these pills; its effect was, to soon diminish the pulse, and to completely neutralize the intoxication. He afterwards repeated the experiment, but with larger doses of both brandy and poison-pills; and, although the intoxication was pretty deep, three of these pills so reduced the pulse and depressed the whole system, that, from danger of collapse, powerful stimulants had to be quickly resorted to. These, and other subsequent trials fully satisfied him of the profound sedative action of this product, which, probably, is unequalled by that of any other known substance.

In this connection I may add, that a case was stated to me a short time since, by a physician, knowing, authentically, the circumstances, of a man in Athens, Ga., who, while lying in a very intoxicated state, under a fence, was bitten by one of these animals; the result was, that very speedily the intoxication was neutralized, and although the snake was very large and active, no harm followed the wound.

Dr. T. M. Brewer read the following list of Birds, found both in Europe and America, with others not identical, but confounded together from close resemblances.

Aquila chrysaëtos. Golden Eagle. Common to both continents.

Haliaëtos leucocephalus. White-headed Eagle. American; accidental in Europe.

Pandion haliaëtus. Fish-hawk or Osprey. Quite distinct from the American species.

Butaëtes lagopus. Rough-legged Falcon; distinct from Butaëtes Sancti-Johannis, of America. It is not improbable that the former may occur here.

Nauclerus furcatus. Swallow-tailed Hawk. American; accidental in Europe.

Falco gyrfalco. Jerfalcon. Much diversity of opinion prevails as to the identity of the American and European species. It is quite probable they are different species; but occurring more or less frequently on both continents.

Falco peregrinus. Great-footed Hawk. The identity of the European and American species is not fully agreed upon, but is probable.

Surnea funerea.	Hawk Owl.	Common to both.
Nyctea candida.	Snowy Owl.	do.
Syrnium cinereum.	Cinereous Owl.	do.

Brachyotus palustris. Short-eared Owl. The identity of the European and American species is questionable.

Ulula nebulosa. Barred Owl. Common to both.

Progne purpurea. Purple Martin. American; accidental in Europe.

Bombycilla Carolinensis. Cedar Bird. American; accidental in Europe.

Cotyle riparia. Common to Europe and America. The identity of these birds has never been questioned; but is worthy of being investigated.

Parus bicolor. Crested Titmouse. Common to both.

Corvus corax. Raven. The European and American representatives are presumed to belong to different species.

Agelaius phœniceus. American; accidental in Europe.

Struthus hyemalis. Snow Bird. American; but found also in northern Europe.

Linota borealis. Mealy Redpoll. Common to both. Identity disputed.

Linota linaria. Redpoll. Common to both. Identity disputed.

Plectrophanes Lapponicus. Lapland Longspur. Common to both. Identity disputed.

Plectrophanes nivalis. Snow Bunting. Common to both. Identity disputed.

Phileremos alpestris. Shore Lark. Common to both. Identity disputed.

Corythus enucleator. Pine Grosbeak. Common to both.

Loxia leucoptera. White-winged Crossbill. do.

Erythrophrys Americanus. Yellow-billed Cuckoo. American; accidental in Europe.

Turdus migratorius. Robin. American; accidental in Europe.

Ectopistes migratoria. Passenger Pigeon. American; accidental in Europe.

Ortyx Virginiana. Quail. American; introduced in Europe.

Lagopus albus.	Willow Grouse.	The identity of European and American species disputed.
Lagopus mutus.	Ptarmigan.	
Lagopus rupestris.	Rock Ptarmigan.	

Squatarola Helvetica. Black-breasted Plover. Common to both.

Strepsilas interpres. Turnstone. Common to both.

Egretta candidissima. Snowy Egret. American; accidental in Europe.

Tringa maritima. Common to Europe and America.

Tringa canutus. do.

Tringa rufescens. do.

Pelidna subarquata. do.

Pelidna cinctus. do.

Pelidna Schinzii. do.

Pelidna pectoralis. do.

Calidris arenaria. do.

Actitis macularius. Spotted Sandpiper. American; accidental in Europe.

Actiturus Bartramius. Bartram's Tatler. American; accidental in Europe.

Catoptrophorus semipalmatus. Willet. American; accidental in Europe.

Macroramphus griseus. Gray Snipe. American; accidental in Europe.

Phalaropus fulicarius. Common to Europe and America.

Lobipes hyperboreus. do.

Chen hyperboreus. do.

Anser albifrons. do.

Bernicla leucopsis. do.

Bernicla brenta. do.

Anas boschas. do.

Rhynchaspis clypeata. The identity of European and American species in dispute; probably the same.

Somateria mollissima. Common to Europe and America.

Somateria spectabilis. do.

Stellaria dispar. do.

Oidemia perspicillata. do.

Oidemia fusca. The common American representative is described as a distinct species by Mr. Cassin.

Oidemia nigra. European; accidental in America.

Fuligula marila. Common to Europe and America.

Clangula Barrovi. do.

Clangula histrionica. do.

Harelda glacialis. do.

Mergus albellus. European; accidental in America.

Mareca Penelope. European ; occasional in America.
Machetes pugnax. do. do.
Merganser castor. Common to both continents.
Merganser serrator. do.
Merganser cucullatus. American ; accidental in Europe.
Phalacrocorax carbo. Common to both continents.
Sterna hirundo. do.
Sterna arctica. do.
Sterna Dougalli. do.
Hydrochelidon nigrum. The European and American species are supposed to be distinct.
Hydrochelidon fuliginosum. American ; accidental in Europe.
Megalopterus stolidus. do. do.
Gavia eburnea. Common to both continents.
Xema Sabini. do.
Xema Bonapartii. American ; accidental in Europe.
Xema atricilla. do. do.
Rissa tridactyla. Common to both continents.
Rossia rosea. do.
Larus glaucus. do.
Larus marinus. do.
Larus leucopterus. do.
Larus argentatus. do.
Lestris pomarinus. do.
Lestris Richardsonii. do.
Procellaria glacialis. European ; accidental in America.
Puffinus anglorum. do. do.
Puffinus obscurus. do. do.
Puffinus cinereus. do. do.
Thalassidroma pelagica. European ; occasional in America.
Thalassidroma Leachii. Common to both continents.
Thalassidroma Wilsonii. American ; occasional in Europe.
Podiceps auritus. Common to both continents.
Podiceps cornutus. do.
Podiceps rubricollis. do.
Podiceps cristatus. do.
Colymbus glacialis. do.
Colymbus arcticus. do.
Colymbus septentrionalis. do.
Uria troile. do.

Uria Brunnichii.	Common to both continents.
Uria Grylle.	do.
Mergulus alle.	do.
Mormon arcticus.	do.
Mormon glacialis.	do.
Alca impennis.	do.
Alca torda.	do.

Dr. C. T. Jackson gave a detailed account, with drawings on the blackboard, of the Wilksbarre coal-field, its geological formation, and the workings for raising the coal. He stated, as a novel circumstance, that the mine is kept clear from water, by a pump worked by a steam-engine, within the mine itself. A chimney has been cut from the surface of the earth sixty feet, perpendicularly, through the layers of sandstone above the coal, beneath which a forty-horse power engine is placed, which raises through a slope all the water which runs to the lowest parts of the mine. Abundant fuel, of course, is in the immediate vicinity of the engine.

In reference to the condition and formation of the known coal strata, Prof. Rogers remarked in regard to their well known plication, that they seem to have been thrown into these folds by the compressing action of underlying strata, upon their elevation into a basin-like form. That there are underlying coal strata deeper than any that have been worked, is certain, from the fact that these strata crop out at a steep angle with the earth's surface; they have never been traced throughout, as there are so many workable strata nearer the surface. Prof. Rogers thought, however, that these deep strata would probably more than compensate for the increased expense in getting to them in the greater facility with which they could be worked, owing to their freedom from folds and breaks.

Dr. S. Kneeland, in behalf of a Committee of the Council, to whom had been referred the subject of making some additional rules with regard to the admission of visitors to the Society's buildings, reported the following regulations:

The rooms will be open to visitors every Wednesday, from 10 A. M. to 2 P. M., and from 3 P. M. to 6 P. M., in summer; and 5 P. M., in winter.

The rooms will not, on other days, be open to visitors, unless introduced by a present or past officer of the Society.

Children, under twelve years of age, will not be admitted without a guardian, who will be held responsible for any injury done to specimens, or property.

Visitors will not be allowed to handle specimens, unless by express permission of Curators.

The library will not be open to visitors, except in company with a member of the Society.

The report was accepted, and the regulations unanimously adopted.

Two hippocampi, from Naples, were presented, in the name of Haliburton Fales, Esq.

Peter Wainwright, Esq., was elected a resident member

April 20, 1853.

The President in the Chair.

Mr. C. J. Sprague read a list of plants, which have been introduced into this country from Europe, and have become naturalized here; concluding with the following remarks:

I have given the names of the more common plants naturalized among us. It will be seen that many of them are common, worthless weeds, which are pests wherever they intrude; about sixty or seventy of them. So very common are these, that the young botanist who shall begin to collect materials for an herbarium, will probably secure fifty specimens in a single season, not one of which is truly a New England plant. It is a rather singular fact that the weeds which grow broadcast around our doors, should be imported ones, and that our native weeds should appear to be confined to unimproved lands.

There are several plants which I have not mentioned, that are more or less naturalized, but it has been by man's agency, and they are esteemed useful for many purposes. An instance of the way in which many of the common foreign weeds are brought over, came under my notice, in this city. There is a large number of poor Germans located near Roxbury, on Harrison Avenue, and directly in front of their tenfooters I found, two years ago, a little cluster of *Sherardia arvensis*, a common German weed, resembling a low *Galium*. I took it up, root and all, but it died in the rich loam of my garden. I never could find another specimen. The seed had, probably, been shaken out of the luggage they brought with them.

Mr. Wells said he had often noticed seeds of foreign plants in the rubbish from foreign rags, thrown out near paper-mills. In such places, plants before unknown in the neighborhood, grow up every year. He had observed, for several years, a novel species of gourd growing in the dust heap near a paper-mill, at Springfield, and the same species in a similar position near Fitchburg.

Mr. Wells exhibited the prepared fibres of several species of American plants, which had been subjected to a new chemical process, to fit them for manufacturing purposes. The first was a skein of fibres prepared from a single leaf of the Mexican Aloe, *Agave Americana*, the plant which furnishes the Sisal hemp. The skein was as thick as a man's thumb, and nine feet long. The fibre is the strongest known. The second was a skein of the fibres obtained from the Okra plant, which were six and a half feet long, and prepared in a similar way. He exhibited, in contrast, a bunch of flax straw, one end of which was converted into hemp, the whole being less than two feet long. He had been experimenting, for some time, on the first two plants, in the hope and expectation of making a very important addition to the manufacturing staples raised in the United States. He stated that the Agave was introduced into Florida, in the vicinity of Key West, at the time of the outbreak of the Florida war, and had become naturalized there.

The President exhibited a very perfect cast of a skull taken from one of the Ohio mounds, known as Grave Creek Mound. This mound is seventy feet high, and from it a number of bones have heretofore been taken. The President compared it, in detail, with a number of Indian skulls taken from other localities, showing the very decided differences which have been noticed by other observers. When placed by the side of a skull of a Peruvian Indian, the resemblance between them was very remarkable, giving weight to the opinion which has been extensively entertained, partly based on tradition, that the mound builders were a race distinct from the other North American tribes, and that when they disappeared, they moved towards the south and west, possibly passing through Mexico, to Peru.

The Secretary read, in behalf of Dr. W. I. Burnett, a paper on the Zoölogical nature of Infusoria, with a description of a parasitical animal from the intestinal canal of Ants, as follows:

Some time ago, (see "Journal," Vol. VI. Art. XIX.) I presented to the Society a communication on the intimate character of the genus *Bodo*, a parasitic infusorium, found pretty constantly in the intestinal canal of many reptiles, and that of the frog, in particular. I then improved the opportunity to discuss, briefly, the question of the real position of such animal-like bodies in the organized world.

Since that time, repeated studies in this direction, and many explorations along the very confines of animal life, with very high and excellent magnifying powers, have urgently presented this question to my mind, and under various aspects. Its great significance, in both Zoölogy, and Physiology, is at once quite prominent, for familiar as we now are with the general relations of the *Cell* — the fundamental unity of living bodies — it is an inquiry not a little important what combination of organic particles is necessary to characterize a real individual animal. *Kölliker* ("Ueber die Gattung Gregarina," in the Zeitsch. f. Wissensch. Zoöl. I., p. 10, 1848), has described as a distinct animal, a simple, nucleated cell, a closed sac with neither mouth nor arms, and which, he says, lives an independent existence. Now, it is true that the beginning of all individual animal life is from the same elementary body — a simple, nucleated cell; it is equally true that those combinations of particles which, on this basis, lead to the formation of all animals, consist only in the multiplication and aggregation of this same cell body, so that, everywhere, the fertilized ovum is only a repetitional compound of its first simple element. These facts indicate a beautiful unity and simplicity attending the first appearance of all living forms; but, suggestive as they are, I do not think that they warrant, in the present state of science, the view that simple, *unmodified* nucleated cells may be each, under any circumstances, a distinct, individual animal. They may, indeed, be the transitional, immature forms of real animals, exactly as the ovum of a Medusa is a round bunch of cells, swimming freely about, in a very animal-like manner, by means of cilia; we cannot regard this ovum, at that time, as the true animal, although it is the potential one in future; neither, in the same way, may we look upon the ciliated, moving, cell-like bodies, which constantly fall under the eye of the microscopist, as any thing but the germs or immature parts of higher forms.

The correctness of this view will be the more apparent if we consider, for a moment, the existing state of the subject of Infusoria. The organized forms, included under this class, embrace the most heterogeneous elements of both the vegetable and animal kingdoms; and difficult as it is to pursue, step by step, the history of those invisible forms from their origin to their death, it must be a long time before we shall have any thing like a satisfactory knowledge of their real character. Many of the late studies seem, if any thing, to have rendered the subject more perplexing than ever, for they have declared that some of the so-called Infusoria, hitherto regarded as among the most reliable, are only metamorphosing vegetable structures. Indeed, *Kützing*, well known in this department, has sought refuge from the many perplexing questions here arising, in the view which he has advanced, that the distinctions so widely separating the animal from the vegetable world, with all the higher forms, cease to exist with these very lowest creations. Nevertheless, careful observations are made, from year to year, upon the special forms; and, although their history is rarely made out completely, yet the bearing of these studies clearly indicates that, at last, the class Infusoria may be swallowed up in other classes of both the vegetable and the animal world. Thus, I scarcely need say, that already most of the *Polygastrica*, as the *Bacillaria*, the *Diatomaceæ*, the *Vibrionia*, and many other families are, indisputably, only vegetable forms; and the individual character of *Vorticellina*, *Trachelina*, *Kalpodea*, and others, all of which have held as firm a position as any in this whole class, seems to me to be quite disputable. Many of them have been shown to be the imperfect, immature forms of *Acalephs*, *Helminths*, *Crustaceans*, and other classes of the Invertebrata. That they may well be such, is now more easily comprehended since we understand, in part, the phenomena of the so-called *Alternation of Generation*, which show that an animal form may live, for a period, independently, or as a parasite, and without any special resemblance to the ulterior condition it is finally to attain. In this intermediate condition they may be, as they often have been, taken for true adult, specific forms. They may be of a cell-like form, or even to all appearances only simple, nucleated cells, freely moving about by means of cilia, and unless the microscopist is able to watch them through all the phases of an entire generation to the reproduction of their own by a new one, he is not justified, I think, in describing them as distinct animals. But what are to constitute the phenomena of reproduction in these lowest creations? Generation and fissuration, so much insisted upon here, I do not regard to have been satisfactorily shown to exist; at least, as these processes occur among the lower invertebrates. There are, to be sure, in *Volvox*, *Poramæcium*, *Bursaria*, and others, phenomena of a somewhat similar character, apparently; but much of this so-called fissuration, by which new cells are formed, appears to me to belong to the process of real vitelline segmentation; many of the bodies in which they occur being ova or germs at some period of development.

As far as we are yet acquainted, all permanent animal forms propagate by ova, and this seems to be their starting zoölogical point. It is true that reproduction by scission and by buds is not uncommon among the lower invertebrates, but even where these last modes are most common, they move only within a certain cycle, and after a longer or shorter period, it seems necessary for the complete animal to begin a new round in generation by the union of the sexual products, the ovum and the spermatic particle. This scission and budding seem to be only the extension of the active germ-power under individual forms, and can never, it would seem, be indefinite; for in the virgin-reproduction of the Aphides or plant-lice, continued, as has been sometimes observed, through several years, there comes a time at last when the cycle is finished, and reproduction, by distinct sexes, preserves the race by beginning a new series. This law in Zoölogy, the necessity of some period of true sexual generation, seems so rigid, that from it alone one would be almost justified in presuming that those infusorial organisms, which are evidently too small to admit the existence of distinct sexual organs, ovaria and testes, must, therefore, be regarded out of the proper domain of Zoölogy. I say too small, in the above passage, for all reproductive sexual processes are invariably carried on through the medium of cells, and nucleated cells have a point of origin far beyond or above such minute forms as must here be present, if at all; and no doctrine is more untenable than that which declares that organic, functional particles have no definite limit as to minuteness; for there is an observable confine on which life and matter seem to meet, as it were, for the first time, and below which all is lifeless and confused. To assert, then, that these infusorial organisms do, or even can have, distinct sexual organs, is as gratuitous as it is unphysiological.

This subject may be partially illustrated by alluding, briefly, to some studies I have recently prosecuted on infusorial forms, and especially some of the parasitic ones I have found in the intestinal canal of ants. By examining very many specimens, I have been enabled to work out, pretty definitely, their characteristics and developments. Under some circumstances they are found swarming in the intestine, and evidently in such numbers as to affect the life of the animal in which they reside.

When seen in their earliest condition they consist of delicate, nucleated cells of about $\frac{1}{3500}$ of an inch in diameter. These cells cannot be regarded as ova, but rather as cast-off particles from higher organisms, perhaps separated by some scission-process. A little farther advanced they appear larger and are covered with very delicate cilia on two opposite poles ; at the same time the pole about which the cilia are most abundant, becomes a little protuberant, and is perforated by a small opening, the mouth. In this state it is a free, swimming, cell-like body, with a crown of cilia about the mouth. The minute particles in its interior move to and fro, as though acted upon by currents. Next, there appear on the surface raised parallel lines which run obliquely to the two poles of the mouth and opposite extremity. The body next elongates, assuming a leech-like form, and moves about in a very serpentine manner. Still increasing in size, they become flask-shaped, the cilia about the mouth become more perfectly formed, and there is developed about the nucleus, which has remained unchanged all this time, a pyriform sac communicating with the mouth, the nucleus being clearly seen at the bottom of this sac. This may be regarded as the stomach, for by the vortical action of the cilia about the mouth, particles of fat, &c., are constantly drawn into it. The only change, after this, is that this animal-like body becomes more spherical, and quite resembles, when highly magnified, a mite deprived of its legs.

A most careful examination of its contents, with the highest powers, detects no organs whatever, except the stomach ; its whole body is highly contractile, and the neck equally protractile, and its whole movements seem quite indicative of voluntary power. After all it is little else but a modified nucleated cell, and however animal-like is its appearance, it cannot, I think, be regarded as an individual animal, but only as the intermediate condition of one belonging, it may be, to the *Helminths*, or to the *Turbellaria*, and which is living in this way in its larval or immature estate.

Mr. Sprague announced that suites of American plants, containing eight hundred specimens, collected by the late

Dr. Oakes, were for sale by Mr. Thayer, of the firm of Maynard & Noyes, for the sum of twenty dollars.

A number of minerals from the copper region of the Gila, were presented in the name of Dr. T. H. Webb.

A geological specimen from the vicinity of Aiken, South Carolina, was presented in the name of Rev. Chandler Robbins.

Three bird skins, a Dactylopterus from the Cape de Verd Islands, a snake skin from Monrovia, and the skin of a bat, taken at sea, two hundred miles from the nearest land, were presented in the name of Dr. A. M. Bell, U. S. N. Several skins of South American birds were presented in the name of Dr. F. W. Cragin.

Robert Chisholm, Esq., of Beaufort, S. C., was elected a Corresponding Member.

The thanks of the Society were voted to Prof. James Hall, Dr. T. H. Webb, Rev. Chandler Robbins, and Dr. A. M. Bell, for their donations.

May 18, 1853.

ANNUAL MEETING.

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

The Curators being called on, in order, read their Annual Reports, of which the following are abstracts. The Reports are on file.

The Curator of Orinthology reported that the collection is now in good condition; those parts of it which had been attacked by insects having been baked. A small, but valuable collection of birds has been received from Dr. F. W. Cragin, of Surinam. Valuable donations have also been received from Messrs. Samuel Jacques and Charles J. Sprague.

The Curator of Geology reported that the department under his care had received additions during the past year, by donations from the President, Messrs. Moses B. Perley and Isaac Lea, and by purchase. The specimens in this department are nearly all labelled, and so arranged as to exhibit them to the best advantage.

The Curator of Comparative Anatomy reported that the department under his care had been enriched by valuable donations from Mr. Henry Cross, President Hitchcock, Dr. William Read, and by purchase, as reported at successive meetings during the year.

The Curator of Conchology being absent from the city, no report was received from him ; but Dr. A. A. Gould stated that he thought the Annual Meeting ought not to be allowed to pass without an acknowledgment of the donation during the past year of some fifteen hundred shells from Henry T. Parker, Esq., of Boston.

The Curator of Oölogy reported that at the time when he commenced the arrangement of the collection under his charge, it contained the eggs of fifty-six species ; of which, thirty were eggs of Massachusetts birds, thirteen of other North American birds, nine South American, three European, and one Australian. Since the collection had been under his care, he had himself presented the eggs of one hundred and twenty-four species ; thirty-one being of Massachusetts species, five of species from other portions of North America, and sixty-eight from Europe.

It is quite desirable that this department should be aided by contributions from other members of the Society, or by its friends, who may have an opportunity to enrich it, either from their own collections, or by exerting themselves to obtain new specimens. By a little pains it might be materially increased, especially in regard to the eggs of the birds of Massachusetts. The Curator earnestly invites all who may have any contributions to offer, or who may possess any facilities for obtaining them, to aid him in his endeavors to add to this interesting portion of the Society's collection.

The Curator of Ichthyology reported the good condition of the specimens under his charge.

The Curator of Botany reported "A considerable improvement in the condition of the herbarium since last May. At that time but a small proportion of the specimens had been systematically arranged, a partial classification having been made as far as the order Rubiaceæ. The other orders lay in folios, undistributed, in several instances, without papers between the specimens. Several large bundles of plants from France, Austrian Italy, the Vosges Mountains, the Cape of Good Hope, an admirable collection from Florida, and another from Kentucky, remained in the same condition in which they were received. These have all been examined and provided with sheets of paper during the past year.

The collection has been increased by a valuable donation from the Historical Society, of a large number of European plants, procured many years ago by the Hon. Thomas H. Perkins. A package of New England plants, collected by the late William Oakes, particularly rich in White Mountain specimens, has been purchased by the Society. The Curator has procured a hundred or more specimens of plants growing in the Botanic Garden, Cambridge, through the kindness and ever ready assistance of Prof. Gray. Many of these are new, and, as yet, unpublished plants, from Texas and New Mexico.

The entire herbarium has been revised, and sheets provided for all the plants. The genera have been placed in Manilla paper covers, and arranged upon the shelves according to Endlicher's Genera Plantarum, bearing his numbers on the corner. The Herbarium now contains representatives of about thirteen hundred genera, and five or six thousand species. It is still wanting in many of the New England plants, and the Curator would take the opportunity to say that he is desirous of obtaining specimens of all the vegetable products of the globe, particularly those of our own country. As he is not able to go personally in quest of them, he will be glad to receive the assistance of those better able than he to procure them."

No reports were received from the Curators of Entomology, Mineralogy, Herpetology, and Crustacea and Radiata, who were absent from the City.

The Treasurer reported that during the past year he had received on General Account

	$523.62	
Income of Courtis Fund . .	647.00	$1170.62
Balance of last account . .		754.76
		$1925.38.
Expended on General Account .	325.00	
On account of Courtis Fund .	497.69	822.69
Balance now in Treasurer's hands		$1102.69

The Librarian reported that during the past year there had been received one hundred and forty-three bound volumes, and sixty-four pamphlets. Of these, all the pamphlets, and forty-one of the bound volumes were obtained by donations or exchange, four were purchased, ninety-eight were deposited by the Republican Institution.

In accordance with the recommendation of the last Annual Report, the Publishing Committee have sent thirty copies of the Journal and Proceedings to as many Societies in Europe, to be exchanged for their publications.

In conclusion, the Librarian recommended the adoption of the following votes:

Voted, That the Library Committee be authorized to expend the sum of $200 in the purchase of books during the ensuing year, it being understood that the interest of each Curator shall be considered in said purchase.

Voted, That the Library Committee be authorized to prohibit the circulation of books of reference, and of such other books, as from their great value, cannot be easily replaced.

On motion of Mr. Bouvé, it was voted, that the second of these propositions be adopted, and the first be referred to the Council.

On motion of Mr. Bouvé, it was voted, that the President, with Messrs. Barnard, Bouvé, Alger, and Dr. Brewer, be a committee to take measures, if deemed expedient by them, for the purchase of the collection of Ornithichnites belonging to the estate of the late Mr. Marsh, of Greenfield.

Dr. Cabot reported, in behalf of the Committee, on the subject of a change in the deed of the Society's estate, so that all processes legitimately pertaining to Natural History might be pursued in the Society's building, that the change had been effected with the consent of the former proprietors. The report was accepted.

Dr. Shurtleff read a letter from the President and Directors of the Boston Theatre, asking that the boundary line between their estate and that of the Natural History Society may be definitely established, and making certain propositions relative to the foundations of the Society's building.

On motion of Dr. Durkee, it was voted, that said letter, and the subjects treated of in it, be referred to a Committee, consisting of Dr. Shurtleff, Mr. J. E. Cabot, and Dr. A. A. Gould, with power to take any steps in the premises which may seem to them fit.

A letter was read from M. Vattemare, accompanying a donation of books, and requesting the continuance of an interchange of books and specimens with the Museum of Natural History in Paris. The letter is on file.

The Committee appointed at the last meeting to nominate a list of officers for the ensuing year, reported the names of the officers of the past year, with the exception of the substitution of Mr. T. J. Whittemore as Curator of Conchology, and Dr. J. B. S. Jackson as Curator of the department of Crustacea and Radiata, the gentlemen who held those offices during the past year having left the city.

The report was accepted, and the gentlemen nominated were elected for the ensuing year, as follows:

PRESIDENT,

John C. Warren, M. D.

VICE-PRESIDENTS,

D. Humphreys Storer, M. D. Charles T. Jackson, M. D.

CORRESPONDING SECRETARY,

J. Eliot Cabot.

RECORDING SECRETARY,

Samuel L. Abbot, M. D.

TREASURER,

Nathaniel B. Shurtleff, M. D.

LIBRARIAN,

Charles K. Dillaway.

CABINET KEEPER,

Charles Stodder.

CURATORS,

Samuel Cabot, Jr., M. D.	*Of Ornithology.*
Thomas T. Bouvé,	*Geology.*
Francis Alger,	*Mineralogy.*
Waldo I. Burnett, M. D.	*Entomology.*
Samuel Kneeland, Jr., M. D.	*Comparative Anatomy.*
Horatio R. Storer,	*Herpetology.*

Thomas M. Brewer, M. D.	*Of Oölogy.*
Silas Durkee, M. D.	*Ichthyology.*
Charles J. Sprague,	*Botany.*
John B. S. Jackson, M. D.	*Crustacea* and *Radiata.*
Thomas J. Whittemore,	*Conchology.*

Dr. Gould presented, in the name of the Rev. F. Mason, of Maulmain, Notes on the Natural History of Tenasserim, by himself. The thanks of the Society were voted for the donation.

The Curator of Comparative Anatomy announced that a cast of the *Palapteryx ingens,* had been added to the collection.

A specimen of Great Cinereous Owl (*Syrnium cinereum*) was presented in the name of C. B. Callender, Esq., and a specimen of American Ostrich (*Rhea Americana,*) by Samuel Jacques, Esq. The thanks of the Society were voted to the donors.

Messrs. William S. Thatcher and Calvin B. Page were elected resident members.

June 1*st*, 1853.

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

Mr. C. J. Sprague read a letter from Mr. C. F. Winslow, accompanying the donation of a dried plant, *Argyroxiphium Sandvicense,* a native of the Sandwich Islands. The letter gave an account of the appearance of the plant in its native localities, with some speculations as to its origin in the Sandwich Islands.

The Secretary read a note from Mr. J. E. Cabot, resigning the office of Corresponding Secretary. On motion of Mr. Bouvé, it was voted that Mr. Cabot's resignation be accepted, and that a Committee of two be appointed to nominate a candidate for election, as his successor. Messrs. Bouvé and Abbot were appointed on this Committee.

On motion of Dr. Kneeland, it was unanimously voted, that the thanks of the Society be presented to Mr. Cabot, for his efficient and valuable services in years past, as Corresponding Secretary.

Mr. Samuel Jacques was elected a resident member.

July 6th, 1853.

Dr. S. Durkee in the Chair.

Dr. W. I. Burnett presented a communication "on the Blood-corpuscle-holding Cells, and their relations to the function of the Spleen."

After alluding to the many and varied theories which had been advanced upon the function of the Spleen, Dr. B. remarked, that recently an entirely new view had been advocated, which had attracted no little attention among physiologists.

This view is that of *Kölliker*, who affirms that the Spleen is a blood-destroying organ. It is, indeed, a significant question in physiology, what becomes of the blood corpuscles which have served their time, and performed their allotted function? *Kölliker* offers an answer to this, in declaring that they are conveyed to and lodged in the spleen, where they are dissolved, and become subservient to, perhaps, biliary purposes. This view he has advanced and supported in the article "*Spleen*," in the Cyclopædia of Anatomy and Physiology.

To understand its bearings, it will be necessary to briefly refer to the structure of the Spleen.

The composition of this organ is very simple, being in general terms, only a parenchyma, with septa-like digitations, which form a support and framework for the ramification of a large system of bloodvessels. In the higher vertebrates, however, there are scattered through this parenchyma numerous closed glands, which are filled with granular, chyle-like corpuscles; these are the so-called Malpighian bodies of the Spleen. They are, I think, invariably wanting in the lower vertebrata. A vascular structure, capable of quite variable capacities, supported on a framework of parenchyma, and sometimes a collection of closed chyligenous glands, — these constitute the general structural features of this organ.

We will now proceed to notice the point at issue in *Kölliker's* theory. In the spleen-tissue of many animals, there are not unfrequently noticed roundish or oval masses of a very variable size, from $\frac{1}{200}$ to $\frac{1}{1500}$ of an inch in diameter. These appear to be little sacs filled with blood-corpuscles in some stage of decomposition. These bodies *Kölliker* thinks he has invariably observed in all spleens, and he concludes that they are the worn-out blood-corpuscles undergoing dissolution, and, therefore, that these capsules are special, functional organs.

Such an opinion, so unique, did not fail quickly to attract the attention of physiologists, who examined its grounds of support. In no instance that I am aware of have these views been substantiated by subsequent observers, and some have gone so far as even to deny that such blood-corpuscle-holding sacs existed. But a discussion of these objections need not engage us here ; I wish to record my own observations, which differ somewhat from them all. During the past year I have examined the subject carefully, and even before I was fully aware of the state of opinion among the continental observers. My examinations of spleen-structure have extended through the four classes of vertebrata, and in some of these classes have been made on animals variously developed.

I have not found these bodies by any means as common as indicated by *Kölliker*, and, when present, they appeared as often uninclosed as inclosed by a capsular membrane. It is true, that in the rabbit and some other rodents, where they were most constantly present, they appeared regularly saccular; but in reptiles and birds, they were oftenest of all shapes and sizes. I have thus examined more than fifty fishes, thirty reptiles, and great numbers of birds and mammals. These bodies seemed to have no constant, functional relation to the tissue in which they were found, and my conclusion is, that the blood-corpuscle-holding cells of *Kölliker* are only accidental formations, in fact, are minute extravasations of the blood into the splenic tissue, and which may or may not be invested with a capsular membrane according to the plasticity of the material with which they are surrounded.

This view is substantiated by many facts and observed phenomena. In some cases, if blood drawn from the living body be allowed to stand, there will be found at the bottom of the vessel roundish aggregations of blood-globules invested with a plastic membrane.

This has been noticed both in health and disease, and these phenomena were conspicuously observed in the blood of an elephant, which was procured for me by its keeper. The same has also been observed in disease, where blood was extravasated into the brain, and where these capsules thus formed, inclosed heterogeneous elements. (See Edinb. Month. Jour. Med. Sc. Sept. 1851.)

I would, therefore, in conclusion, state that I regard these peculiar bodies, on which *Kölliker* has laid so much functional stress, as only unusual and accidental forms, and which, therefore, sustain no important relations in the uses of the spleen.

In this connection, it may not be amiss for me to make a remark on the most probable nature and function of the spleen. I have carefully examined this organ in all the classes of vertebrates pretty extensively, and in man in disease as well as in health; I have also studied it in very many different conditions of the same animal, while developing, while the animal was well fed, and when partially starved.

In these cases it seemed to sustain important and constant relations to the chyle-corpuscles, and those, too, from which one might justly infer, I think, that it is in one sense a lymphatic gland, and like the thymus and thyroid glands in the fœtus, in some way highly subservient in the preparation of the materials for the formation of blood.

The Secretary read a letter from the Secretary of the Regents of the New York University, acknowledging the donation of Numbers 17 and 18 of the current volume of the Proceedings.

A letter was read, addressed to the Librarian by William Dudley, Esq., the Secretary of the Wisconsin Natural History Association, proposing a system of exchanges with the Boston Society of Natural History.

A letter was read from the Secretary of the Société Royale des Sciences de Liége, offering, in behalf of the Society, the seven volumes of its memoirs already published, and promising the volume at present going through the press, and requesting the publications of this Society, in return.

Mr. Dudley's letter was referred to the Curator of Comparative Anatomy, with the request that he would reply to the same.

The letter from the Société Royale des Sciences de Liége, was referred to the Publishing Committee.

Dr. W. I. Burnett presented a collection of fossil shells, with fragments of bones, from the vicinity of Goldsborough, N. C.

Fifteen specimens of birds were announced as having been presented by an unknown donor, one of them being a specimen of *Ibis Ordi*, shot in Massachusetts.

Mr. Stodder deposited in the Cabinet of the Society one hundred and forty Massachusetts birds, most of them having been collected and mounted by Dr. G. W. Kinniston, of Newburyport, and belonging to him.

A fragment of worm-eaten wood was presented in the name of Philip Lovejoy.

July 20th, 1853.

Dr. Samuel Cabot in the Chair.

The Secretary read a communication from the President, announcing that the Address which he had prepared for delivery at the Annual Meeting, and which he had been prevented by ill health from delivering, had been printed, and a copy presented to each of the resident and corresponding members.

Dr. W. I. Burnett read a paper, entitled "Some account of the worm that has been so destructive to the fruit and forest trees of New England and vicinity, within the past two months, *Rhinosia* (Chætochilus) *pometella*, Harris," as follows:

Through the kindness of Dr. Harris, and of several editors of agricultural papers, as well as from some observations of my own, I have been able to collect considerable material towards the history of this devastating insect.

This is not an entirely new-comer among us, as has been supposed, for it appears that it came sixty-two years since (1791), in New England, having been particularly noticed in Cumberland

County, Me., where it destroyed both fruit and forest trees. In other parts of New England, also, its ravages were quite extensive, as I have learned from verbal accounts. It was then called the *Palmer Worm.* I can find no evidence of its appearance between that year and the present.

Dr. T. W. Harris, of Cambridge, first noticed it on June 10th, of the present year, in his garden, and I can find no account of its appearance earlier than this, this year. Its general advent through New England was not very noticeable until about the 20th. The following are the localities where it has been noticed, and where its ravages were particularly extensive:

The central and eastern portion of New York State; the adjacent portions of Vermont; Salisbury and New Haven, Conn.; and the valley of the Connecticut and Housatonic Rivers; New Boston and Keene, N. H.; Providence, R. I.; and the northeastern section of Massachusetts. I notice these places or localities particularly, since the devastations were there very marked; and in some of them the worms not only ate the leaves of the trees, but afterwards devoured the young fruit. In some places they have made such a complete sweep that the orchards look as though a fearful blight had passed over them. I have made considerable search to learn if they have been particularly numerous in their original and former locality, Cumberland County, Me., but I have been able to obtain no information from that quarter.

It is so long since their last appearance, that probably few people are living who recollect them; and, hence, agriculturists supposing them to be a new scourge, closely allied to the canker-worm, have given them the name Canker-worm, jr. The Zoölogical relations of this insect, however, are quite different. It belongs to the genus *Rhinosia* (*Chætochilus*); and Dr. Harris, who has studied it in all its conditions, pronounces it an undescribed species, and has proposed for it the elegant name *pometella;* it will be, therefore, *Chætochilus pometella*, and this is its scientific announcement; the Zoölogical details by Dr. Harris, are appended.

The worm grows to the length of half an inch, is of a pale, green color, with two slender brown lines along the top of the back. Its larval state continues about one month, and its pupa condition is only four or five days. I can give no general description of the perfect insect or miller, by which it would be recognized from others which somewhat resemble it. The miller is crepuscular, or nocturnal in its habits, keeping quiet during the day, but coming forth at dusk, and probably performing its labors at that time. In the grass grounds about the College buildings at Cambridge, I found, two days since, these moths very numerous; they flew up before me in hundreds, taking a short, angular flight, and then disappearing in the grass again.

The habits and peculiarities of such insects as these should receive marked attention from Naturalists and Entomologists. We know that the locust appears in the same locality regularly, at intervals of seventeen years, and we have imperfect accounts of certain other insects, which appear in great numbers in particular places, at regular, shorter intervals. It may be that the economy of this pest involves similar conditions, the intervals of the successive advents being very much longer.

Description of *Rhinosia pometella*, by Dr. T. W. Harris.

Rhinosia pometella Harris.

This insect belongs to a group or tribe called Tineadæ, and to the genus *Rhinosia* of Treitsche, or *Chætochilus* of Stephens. Most of the insects belonging to the above named tribe are of small size, and have diminutive specific names, ending in *ella.* As this insect frequents the orchard (in Latin *pometum*,) it may be called *Rhinosia pometella*, the little Rhinosia, or the little Snout-moth, of the orchard. From other species of the same genus it may be distinguished by the following characters. Fore wings ash-gray, sprinkled with blackish dots, three of which, larger than the rest, are placed triangularly near the middle; a dusky transverse band near the tips, and a curved row of seven black dots at the origin of the terminal fringe. Hind wings dusky, with a leaden lustre, black veins, and very long black fringes. Body and legs beneath yellowish white, with a lustre of satin. Length, from the forehead to the ends of the closed wings, five sixteenths of an inch. Expansion of the wings five eighths of an inch.

These worms, or caterpillars, grow to the length of about half an inch. Though varying somewhat in hue, they are mostly of a pale yellowish green color, with two blackish lines along the top of the back, and a brownish head. Under a magnifier, a few short hairs can be seen on the body, arising singly from little black points, arranged in threes on each side of every ring ; and there are usually two, more or less conspicuous, semicircular, blackish spots on the top of the first ring. They have sixteen feet ; the first three pairs being jointed, and ending with a point or claw, the others fleshy tubercles without proper joints. They are very impatient of being touched, and on being taken into the hand, move with great agility, and by jerks, both forwards and backwards. When the trees are shaken, the insects spin down, and hang suspended by threads. Probably most of them leave the trees in the same way, when their course is finished. In some places, it was observed that they all took their departure during heavy showers, towards the end of June. My official engagements, at that time, prevented my observing their progress abroad.

All the specimens sent to me, that remained alive, together with a few from my trees, were put into a wide-mouthed bottle, and were supplied with leaves. About the 28th of June, some of these worms began to cover themselves with a transparent web, formed of a few delicate silken threads. One of them was transformed to a chrysalis within its web on the 5th of July, and became a winged moth on the 9th ; having remained in the chrysalis state only four days. Others were more tardy in their transformations ; and one still remains a chrysalis. More than half of the whole were unable to take this form, having perished in the worm state from the attacks of an internal parasite, a minute grub, which, after preying on the vitals of its victim, left the body, and spun itself a little oval whitish cocoon or pod, from which it emerged soon afterwards as a tiny four-winged ichneumon fly.

The chrysalis of the palmer-worm is only one-quarter of an inch long. It is of a pale brown color, and differs from that of the common bud-worm in not having any transverse rows of teeth around the body. The moth is of an ashen gray color above, whitish and lustrous like satin beneath. The fore wings are very narrow, and are sprinkled with a few black dots, three of which near the middle are larger than the rest. The hind wings are also narrow, blackish, and surrounded by very broad fringes. The antennæ are bristle-formed. The palpi, or feelers, project horizontally from the head, in the form of a brush-like snout, and from the middle of the upper side of each of them arises the curved and pointed terminal joint, like a little spur. The tongue is spirally rolled, and, when extended, measures about half the length of the antennæ. This little moth rests with the forepart of the body slightly elevated, the narrow wings horizontally incumbent upon the body, and the antennæ turned backwards and lying straight upon the wings. The insect may be seen on the wing in the evening, soon after sunset; and it may also be found, in considerable numbers, among the grass, at a somewhat earlier hour.

Some hope may be entertained that the little parasites, alluded to in the foregoing account, may tend greatly to check the future undue increase of the palmer-worms. Should a second generation of the latter appear during the present summer, or should we have another visitation of them next year, or at any future time, some means for arresting their depredations may become necessary. Showering the trees with soap-suds, or a solution of whale-oil soap, or with lime-water, dusting ashes or air-slacked lime on the leaves, when wet with dew or rain, or casting dry sand upon the trees, may be found serviceable.

Dr. Burnett stated, on the authority of Prof. Dana, that, in Connecticut, the canker-worm always disappeared on or about the 10th of June. Being in New Haven at that time, Dr. Burnett confirmed this statement by his own observation. The worms were very numerous on the 4th and 5th; on the 9th, Prof. Dana said there would be none on the next day; and the event accorded with the statement, the worms having almost all disappeared. It seems probable, therefore, that the ravages attributed to canker-worms after this date, were in reality committed by this new species.

Dr. Burnett alluded to the fact that it is not uncommon to find toads in such a situation as to make it highly improbable that they could have gone through the usual stages of the tadpole state under the ordinary circumstances. He mentioned, that his attention had been recently called to the fact of their existence in great numbers in a garden in the vicinity of Boston, where there was no water for their tadpole existence, and where it was impossible that they could have entered from without. He referred to the opinions of Naturalists on this subject, as follows:

Lowe (Ann. Nat. Hist. XI., April, 1853, p. 341) notices the improbability of toads having passed through the larval or tadpole state, in cases of their appearance in places where there is no water, and where it is impossible that they should have come from distant brooks.

Jenyns, (Ibid. XI., June, p. 483,) who has observed reptile life, agrees with Lowe in his hypothesis, and thinks that gills never existed, or disappeared very shortly after birth.

It would also appear that like facts were noticed by many of the older Naturalists, Shaw, Ray, and others, who regarded them as indicative of the viviparity of these animals.

The anurous Batrachians have, as is well known, no copulatory organs, the fecundation taking place as the eggs escape, by the semen which is spread over them by the male. It is therefore highly improbable that there is viviparity as in the case of some snakes, (Watersnake, Rattlesnake, &c.); the young are probably brought forth as tadpoles, but soon lose the peculiarities of their larval state, and acquire, prematurely, the functional conditions of terrestrial animals.

Dr. Burnett presented specimens of the young toads which he had spoken of, and which were, he said, smaller than any fully developed toads he had ever seen, which had passed through the tadpole state in the ordinary way.

Dr. Burnett also presented the drone and the female of the African Ant, (*Termes bellicosus*,) in the name of Dr. A. N. Bell, of Newtown, Conn. The thanks of the Society were presented for the donation.

Dr. Burnett presented the skin of a Black Snake, (*Coluber constrictor*,) six feet long, which the animal had cast off without a single break ; even the corneæ were in their proper places, and firmly attached.

A fossil Shark's tooth, from Malta, was presented in the name of Mr. Luther Ellis. The thanks of the Society were voted for the donation.

A fossil Shark's tooth, from Alabama, taken from a deposit seventy feet beneath the surface, was presented by Dr. Silas Durkee.

Messrs. Augustus Brown, Charles L. Flint, and Charles B. Fessenden, were elected resident members.

September 7, 1853.

Dr. Silas Durkee in the Chair.

Dr. W. I. Burnett read a paper, entitled "A remarkable case of bisexual Hermaphroditism, with some remarks on the Embryological and Anatomical relations of these abnormities."

The case in question is one that has already attracted no little attention, and an account has recently been published, in which are given some of its details ;* but the subject has been regarded

* Amer. Jour. Med. Sc., July, 1853, by Blackwell.

more in the light of curiosity than of science, and I consider it worthy of reëxamination, since I enjoyed the privilege of examining the parts carefully and histologically, and was thus enabled to determine their nature pretty satisfactorily.

The individual from whom the parts were taken was a male, twenty-eight years of age. He was of English origin, but nothing further is known of his early life; he was of rather a simple mind, and an ostler by occupation. The last eighteen months of his life were spent in the service of a physician, in Cleveland, Ohio. During this time he disclosed nothing about his sexual peculiarities, and it was not even suspected that he was not a well-formed man. It was perceived, however, that he was strangely unwell every month regularly. He manifested an aversion to female society, and appeared to be rather free from sexual passion. He died from cerebral congestion, during one of his monthly attacks. His body was examined, and then, for the first time, his sexual anomaly was discovered. At that time the female organs appeared like those of a normal female during menstruation; the uterus was filled with blood, as well as the vagina and penis. The parts, with all their contiguous tissues, were immediately dissected out with care from the body, and preserved. The pilose system of this individual was feebly developed; the beard scanty; the pelvic and thoracic osseous formation, female; the mammal, male. Such is the account kindly furnished me by Prof. Ackley, of Cleveland, in whose possession the preparation now remains.

The following is an account of what I found from an anatomical examination of the organs:

Male Parts. — Penis of normal size and structure, presenting the appearance of that of an adult rather than of a boy before puberty. Scrotum, normal, but empty. The urethra, prostate gland, vesiculæ seminales, and bladder, in structure and situation were like those of a well-formed male. The testicles were situated in the locality of their primitive formation, and as before descent in the fœtus. They were of about half the usual size of a man of that age, and their real testicular structure was so apparent, that it seemed unnecessary to subject the tissue to a microscopical analysis. From the epididymis of each passed off, as usual, a vas deferens, which, running downwards, terminated finally, as usual, in a vesicula seminalis.

Female Parts. — The vagina was of the usual size, but at its lower part it was contracted into a small tube, which passed into the male urethra, just between the lobes of the prostate gland. The communication, therefore, between the male and female parts, was direct and complete. Upwardly, the vagina was continuous into a uterus of normal structure and appearance, and of the size of this organ in a well-formed female eighteen years of age. (A specimen was at hand for comparison.) The cavity of the uterus was complete, and from it was continuous, on each side, an ordinary Fallopian tube, which terminated with the usual fimbriated extremity.

The ovaries were situated in their accustomed locality, and their structure was such, apparently, as to leave no doubt as to their physiological character, without recourse to the microscope.

Briefly, then, there were here, perfect, both male and female internal genital organs.

This case is so remarkable as to be almost without its analogue in the history of monstrosities.

In the well-known work of *Isidore Geoffroy St. Hilaire*,* one or two somewhat analogous cases are cited, but one of these only belonged to the human subject.†

This instance is all the more remarkable, since true hermaphroditism or duplicity of the genitalia in the human subject is wholly denied by some, and all cases of this kind are considered to be apparent, merely, and referable to false hermaphroditism; such appears to have been the opinion held by *Bischoff*;‡ and *Vogel*§ thinks that the cases given, are, in the highest degree, questionable, and founded on a false interpretation of the supernumerary parts.

In the present case, the opportunity for so careful an examination of the parts, leaves no room for doubt as to their real nature.

* Histoire générale et particulaire des Anomalies de l'Organisation. Paris, 1836. II. p. 164.

† The case given by Schrell in the Med. Chirurg. Arch. de Schenk. I. Vienna. 1804.

‡ See Wagner's Handwörterbuch. I. p. 919.

§ Pathological Anatomy, &c. 1847. p. 475.

It may be added, that the presence of normal female parts, which performed the function of menstruation, renders it highly probable that this individual was susceptible of impregnation. On the other hand, it is improbable that the testicles ever performed their true function, and so this individual was, physiologically, only a female. Were this not so, and had the testicles secreted spermatic particles, this person must almost inevitably have become self-impregnated, as the sperm could scarcely avoid passing into the vaginal tube.

But, interesting as this case is, as a very rare form of monstrosity, it is much more so from the anatomical and embryological points it involves. These are so important, that I shall improve this occasion to refer to them somewhat at length.

What explanation, derived from embryological data, shall be put upon monstrosities, with duplicity of organs or parts? Two principal hypotheses have been, and still are, maintained by different observers. One of these is, that they are invariably referable to the more or less complete fusion of two germs; the whole of one of these germs proving entirely abortive, excepting that portion corresponding to the duplex organ. The other hypothesis is, that it is due to a segmentation of one germ at the part or parts, where the duplicity occurs.

This question is so deeply connected with the whole history of development, that its proper consideration cannot be entertained without a considerable knowledge of embryology; and without this, any person would be liable to grave errors, it matters not how many and varied were his specimens for examination.

The laws of development, expressed as they are through type-forms, are the same everywhere in the animal kingdom. They are invariable, and what is found in the lowest forms of a certain type of animals, may be predicted with certainty of the highest forms of the same.

Now the doctrine of the coalescence of the two distinct germs for the formation of monsters, is open to the objection that it goes too far, and proves too much; for, if accepted in such cases of complete duplicity as the Siamese twins and Hungarian women, it must also be accepted in the simplest forms, such as a supernumerary finger or toe; and in these most simple cases, it is wholly inexplicable, not only how the whole of the second germ, with the exception of the small duplex part, should have so entirely disappeared; but, also, how the local relations of the duplicate parts should always be so apposite, that a finger is always connected with a finger, a head with a head, &c.

On the other hand, unless we admit some new power in embryology, there would be no reason why, in these cases, the supernumerary parts should not as often be removed from their analogues, as be with them. Thus, in this fusion of two germs, we might well expect a toe to be found on the abdomen, or a finger on the head — a condition never met with as far as I am aware. But the argument of the most weight against this view, is, that there being two germs, there must, of course, be two sets of embryonic membranes, and it is inconceivable how such coalescence should have taken place, especially in the instances of the duplicity of the extremities, or any of their parts, — organs which are formed at a late period of the embryonic development.

In the case of double-yolked eggs, twins may be produced, but all experiments with eggs show that the formation of double monsters, with chicks, is from single-yolked eggs.

Thus, Dr. Allen Thompson* has described and figured a hen's egg, with two primitive grooves upon one yolk, and in one germinal membrane or blastodermic vesicle. This, when fully developed, would, undoubtedly, have produced a double monster.†

On the other hand, the hypothesis that this duplicity is due to a segmentation of one germ at the parts in question, has for its support the general conditions of development.

On the supposition, that in the earliest conditions of embryonic life, there occurs from, perhaps, an abnormal nutrition, a division of a certain portion of the germ, say, for instance, that of the

* London and Edinburg Monthly Jour. July, 1844.

† It is true that with the Turbellaria many embryos are said to be developed in a single egg, (See Siebold, Verhandl. d. Akad. in Berlin, 1841, p. 83); but in this case I regard the so-called egg as rather an egg-capsule, investing many true eggs. This view would be sustained by some phenomena observed with Mollusks. Thus Müller (Müller's Arch. 1852, p. 1.) has seen the ovarian capsule of a Mollusk burst and discharge from fifteen to twenty eggs, which subsequently grouped together, and were invested by a special capsular membrane.

head, there would then be formed two organs instead of one, which would always be contiguous and apposite.

Suppose this segmentation to divide the entire germ, and at a very early period, there would result a double monster, as, for instance, the Siamese twins ; or, suppose the fissuration to occur at a later period, and of only a portion of the germ, there would follow supernumerary parts, such as fingers, legs, &c.

I have now before me a duck with two heads, but which is single otherwise throughout. It is only necessary to consider for a moment the embryological conditions of the oviparous vertebrates, to perceive that this duplicity could have occurred only in a single-yolked egg.

I would maintain, therefore, in this connection, that in teratology, monsters by duplicity of organs, must be considered due to a more or less complete segmentation of a single germ or egg, instead of a fusion of two germs.

Let me now refer to our own case of hermaphroditism in relation to this point. How, it will be asked, can the anatomical conditions of the organs in this case be reconciled with the hypothesis, that there was here a segmentation of this portion of the germ ? The answer to this question leads me to refer to a point in Anatomy, which has been but recently appreciated. I refer to the *Vesicula prostatica*, or *Uterus masculinus* of *Weber*. This is an anatomical feature which, although perceived by *Morgagni* and others of the older anatomists, was truly discovered by *Weber*, for he first recognized its true morphological import. It is found only in Mammalia ; and in man consists of a small, flask-shaped vesicle, with a rounded blind end, and a narrow neck, directed downwards, placed on the posterior wall of the urethra, under the Veru montanum, and covered by the prostate. It is usually from three to six lines in length, and two lines or so in breadth. The vasa deferentia open beside it, one on each side, though not directly into its cavity, as is the case with the hare (*Lepus.*) *

* For references to the *Vesicula prostatica*, see
Morgagni, Adversaria Anat. IV. Animad. 3.
Albinus, Annotat. Acad. IV. Tab. III. fig. 3. p. 25.
Schlichting, Syphilidos Mnemosyn. Criticum. Amsterd. 1646, fig. 4.
Severinus, Zoötomia democritæa, p. 329.

Without further discussion of this point, I will only say that it is now pretty clearly established that this *Vesicula prostatica* is the male sinus genitalis, which, in the female, undergoes a further development into the vagina and uterus. This, therefore, and not the prostate gland and vesicula seminalis, is the representative of the uterus.

Now, in the case of the duplicity of the internal genitalia, we should expect that the bifurcation would occur at the point of the original seat of the organ. This was so in our case, for the vagina connected with the male urethra, at the point of the uterus masculinus, between the lobes of the prostate. In the very earliest periods of the fœtus, a segmentation of the germ must have occurred at this point, and, thus viewed, it is really no more remarkable than the production of two fingers where there should be but one.

The interesting points of this case, therefore, are manifold, even as episodes to the chief story of its monstrosity.

Maret, Mém. de l'Acad. de Dijon, 1772. I. II. p. 157.

Pallas, Nov. Spec. Quadrup. e Glirium Ordine, cum Illustrat. &c. Erlangen, 1778. p. 67. Tab. IV.

Ackermann, Infantis androgyni Historia. Jenæ, 1805.

Meckel, Transl. of Cuvier's Anat. Comp. IV. p. 423 — 436. Leipzig, 1810.

Brandt and Ratzeburg, Medizin Zoöl. I. p. 19 — 137. Berlin, 1829.

Rathké, Abhandlungen zur Bildungs- und Entwickelungsgeschichte der Menschen und der Thiere. I. Leipzig, 1832.

Weber, Annotat. Anat. et Physiol. zu Kretzschmar's Diss. Juauy. circa Lineam. Physiol. Morb. Leipzig, 1836.

——— Amtlich. Ber. üb. die 19te Versamml. Deutsch. Naturforsch. und Aerzte. Braunschweig, 1842. p. 64.

——— Zusätze zur Lehre vorn Bau und den Verrichtungen der Geschlechtsor gane. Leipzig, 1846.

Rathké, Sömmerings Anatomie. Eingeweidelehre. Leipzig, 1844. p. 411.

Leuckart, Zur Morphologie und Anat. der Geschlechtsorgane. Göttingen, 1847.

H. Meckel, Zur Morphologie der Harn- und Geschlechtswerkzeuge der Wirbelthiere. Halle, 1848. p. 46.

Bimbaum, Beschreibung und Kritik einer eigenthümlicher Bildungshemmung. Giessen, 1848. p. 15.

Lund, Bidrag til Generations Organernas Anatomi och Physiologi hos Menniskan och Daggdjuren. Akad. Afhahd. &c. Lund, 1849, or its Translation into German in Müller's Arch. 1849. p. 686.

Van Deen, Beitrag zur Entwickelungsgeschichte der Menschen und der Säugethiere, mit besonderer Berücksichtigung des Uterus masculinus, in Siebold and Kölliker's Zeitschr. 1849. p. 295.

Betz, Ueber den Uterus masculinus in Müller's Arch. 1850. p. 65.

Dr. B. S. Shaw exhibited specimens of a species of Coccus, supposed to be new, which has infested the grape vine in the west part of Boston, the present year. The specimens exhibited were the mother insect, inclosed in a secretion of a cottony substance, and the young male and female. The former is found on the stems of the vine, the latter on the leaves. After the eggs are deposited, nothing is found of the mother, but a dry, empty shell, attached to one side of the cotton. The young are very destructive to the foliage of the vine.

Dr. Burnett said that in his opinion the insect exhibited was a new comer, and, probably, as yet undescribed. In former years he had studied carefully the insects on grape vines, but had never met with this species before.

Dr. Samuel Cabot said that he had recently seen at Nantucket the lower jaw of a Spermaceti Whale, which exhibited a singular deformity. It was bent laterally upon itself to such a degree, that the extremity passed across beneath the jaw to the other side. If straightened, the jaw would have been about six feet long. There was no mark to indicate that this condition was the result of violence. The teeth were very large. It was difficult to understand how the animal, under such unfavorable circumstances, could obtain its food. No history was obtained of the specimen.

Dr. Burnett stated on the authority of Prof. Ackley, of Cleveland, that the male *Muskalonge*, (*Esox nobilior*,) is known to perform an act of copulation in fecundating the eggs of the female. The female, turning on her side, offers her abdomen to the contact of the male, who, after taking a circuit, swims against her with considerable force. The female then retires and deposits her eggs in the sand. After which, the process is repeated.

Dr. Cabot thought that the object of the act in question might be to press the ova from the female, just as they were about being extruded. He had seen male and female Suckers (*Catostomus Bostoniensis*) side by side, in close contact, during the breeding season, probably for a similar purpose. Dr. Durkee had noticed the same thing in the habits of the Brook Trout.

September 21*st,* 1853.

Dr. Samuel Cabot in the Chair.

Mr. C. J. Sprague stated that the species of Coccus which has infested the grape vines in Boston, the present season, had come under his notice for some years past, at the south part of the city.

Dr. W. I. Burnett exhibited specimens of the Cotton-worms, which he had made the subject of a communication at a previous meeting. He also read extracts from a letter from Mr. Chisholm, dated Beaufort, S. C., September 5th, announcing the appearance of these worms, out of regular season, in several plantations, where they have appeared in a similar way before.

Dr. Burnett called the attention of the Society to a new form of muscle, recently described in Müller's Archives, existing in the wing-moving muscles of insects, by which they are enabled to execute the inconceivably rapid movements of which they are capable. In these muscles, the fibrillæ, instead of being bound together like the strands of a rope, as in ordinary muscles, are inclosed in separate sheaths, like parallel strings in a musical instrument, so that each one is capable of contracting by itself. Dr.

Durkee exhibited, under the Microscope, beautifully prepared specimens of this muscular tissue, together with other forms of the same tissue. Similar specimens were exhibited by Dr. Burnett. Both gentlemen displayed in the most perfect manner the ultimate fibrilla by itself.

A number of valuable fossils and minerals from Europe were presented in the name of Rev. Chandler Robbins; and a collection of dried plants from an unknown donor.

The thanks of the Society were voted for the donations.

BOOKS RECEIVED DURING SIX MONTHS ENDING SEPTEMBER 30, 1853.

Proceedings of the Academy of Natural Sciences of Philadelphia. Vol. VI. No. 7. pp. 223—302. *From the Academy of Natural Sciences.*

Annals of Science. No. 11. 8vo. Pamph. Cleveland, Ohio, 1853. *Received in Exchange.*

Memoir of Robert Troupe Paine. By his Parents. 4to. New York, 1852. *From Dr. M. Paine.*

Discourse on the Soul and Instinct. By Martyn Paine, M. D. 12mo. New York, 1849. *From the Author.*

Medical and Physiological Commentaries. By Martyn Paine, M. D. 3 vols. 8vo. New York. 1840-44. *From the Author.*

Theory of Chemical Changes, and on equivalent volumes. By T. S. Hunt. 8vo. Pamph. New Haven, 1853. *From the Author.*

Catalogue of North American Reptiles in the Museum of the Smithsonian Institution. Part 1. Serpents. By S. F. Baird and C. Girard. 8vo. Pamph. Washington, 1853. *From the Smithsonian Institution.*

Annals of Science. Conducted by H. L. Smith, A. M. No. 10. 8vo. Pamph. Cleveland, 1853. *Received in Exchange.*

Memoir of the Physics of the Mississippi River. By. C. H.

Forshey. 8vo. Pamph. New Orleans, 1850. *From the Author.*

History of British Mollusca and their Shells. By E. Forbes and S. Hanley. No. 49. Pamph. London, 1852. *From H. Cuming in Exchange.*

Genera of Recent Mollusca. By H. and A. Adams. Parts 1–2. 8vo. Pamph. London, 1853.

Zeitzchrift für Malakozöologie. K. J. Menke und L. Pfeiffer. Nos. 3–8. 12mo. Pamph. 1852. *Received in Exchange.*

Palæontology of New York. By James Hall. Vol. II. 4to. New York, 1852. *From the Author.*

Synopsis of the Medicinal Plants of the United States. By A. Clapp, M. D. 8vo. Pamph. Philadelphia, 1852. *From the Author.*

Archiv für Naturgeschichte. Von Dr. F. H. Troschel. Nos. 1, 2, 4, 5, 6. Berlin. *From F. H. Troschel.*

American Journal of Science and Arts. Vol. XV. No. 45. May, 1853. *From the Editors.*

History of the Condition and Prospects of the Indian Tribes of the United States. By H. R. Schoolcraft. Part 3. 4to. Philadelphia, 1853. *From G. W. Manypenny.*

Cosmography or Philosophical Views of the Universe. By C. F. Winslow, M. D. 12mo. Boston, 1853. *From the Author.*

Annals of Science, Nos. 1–10, 12, 13. 8vo. Pamph. Cleveland. *Received in Exchange.*

Tenasserim: or, Notes of the Fauna, Flora, Minerals, and Nations of British Burmah and Pegu. By Rev. F. Mason. 12mo. Maulmain, 1852. *From the Author.*

Proceedings of the American Antiquarian Society in Worcester. 8vo. Pamph. 1852. *From the American Antiquarian Society.*

Bulletin de la Société Géologique de France. 2ième série. Tome X. Feuilles 1–3 (8–15 Novembre, 1852.) 8vo. Pamph. Paris. *From the Société Géologique.*

Annals of Science. No. 14. *Received in Exchange.*

Proceedings of the Academy of Natural Sciences of Philadelphia. Vol. VI. No. 8. 8vo. Pamph. 1853. *Received in Exchange.*

History of the Fishes of Massachusetts. By D. Humphreys Storer. 4to. Pamph. Boston. *From the Author.*

Bulletin de la Société Géologique de France. 2ième série. Tome IX. Feuilles 28–35 (21 Juin, 1852.) 8vo. Pamph. Paris. *From the Société Géologique.*

Thesaurus Conchyliorum. By G. B. Sowerby. Parts 7 and 14. 8vo. Pamph. 1846 and 1853. London. *Received in Exchange.*

Descriptions of New Species of Achatinella from the Sandwich Islands. By Dr. W. Newcomb. 8vo. Pamph. New York, 1853. *From the Author.*

Annals of the Lycæum of Natural History. Vol. VI. pp. 1—18. 8vo. New York, 1853. *From J. H. Redfield.*

Transactions of the Agricultural Societies of Massachusetts. 8vo. Boston, 1853. *From C. L. Flint.*

Memoirs of the American Academy of Arts and Sciences. New series. Vol. V. Part 1. 4to. Boston. 1853. With a Map of the recent Tornado in Massachusetts. *From the American Academy of Arts and Sciences.*

Mémoires de la Société Royale de Liége. Vols. I.—VII. 1843—1851. 8vo. Liége. *From the Société Royale de Liége.*

Monographie des Coleoptéres subpentamères de la Famille des Phytophages. Par M. Th. Lacordaire. Tome I. 8vo. Bruxelles et Leipzig, 1845. *From the Société Royale de Liége.*

Memoir of the Geological action of the Tidal and other currents of the Ocean. By Charles H. Davis. 4to. Pamph. Cambridge, 1849. *From J. E. Cabot.*

Annals of the Lycæum of Natural History of New York. Nos. 1–12. Vol. IV. 8vo. Pamph. New York. *From J. E. Cabot.*

Archives du Muséum d'Histoire Naturelle. Tome VI. Liv. 3, 4. 4to. Paris, 1852. *From the Muséum d'Histoire Naturelle.*

Faune Ornithologique de la Sicile. Par A. Malherbe. 8vo. Pamph. 1843. Metz. *From A. Vattemare.*

Du Role des Oiseaux chez les Anciens et chez les Modernes. Par A. Malherbe. 8vo. Pamph. Metz, 1844. *From A. Vattemare.*

Catalogue Raisonné d'Oiseaux de l'Algérie. Par A. Malherbe. 8vo. Pamph. Metz, 1847. *From A. Vattemare.*

Journal d'Agriculture. Vol. VI. No. 4. Montreal. Avril, 1853. 8vo. Pamph. *From L. A. H. Latour.*

First Annual Report of the Trustees of New Bedford City Library. 8vo. Pamph. 1853. *From the Trustees.*

Annals of Science. No. 15. June 15, 1853. 8vo. Pamph. Cleveland. 1853. *Received in Exchange.*

Report on Insects injurious to Vegetation in New England. By T. W. Harris, M. D. 8vo. 2d Edition. Boston, 1852. *From Francis Boyd.*

Memorias de la Academia Real de Ciencias de Madrid. Tome 1. Parte 2. 4to. Madrid, 1851. *From the Academia Real.*

Resumen de las Actas de la Academia Real de Ciencias de Madrid. 4to. Pamph. Madrid, 1851. *From the Academia Real.*

Annals and Magazine of Natural History. No. 64, for April, 1853. No. 16, for April, 1849. No. 65, for May, 1853. London. *From the Courtis Fund.*

Sixty-sixth Annual Report of the Regents of the University of New York. 8vo. Pamph. Albany, 1853. *From the Regents.*

Illustrationes Piperacearum, von F. A. W. Miguel. 4to. Pamph. *From Prof. Asa Gray.*

Smithsonian Contributions to Knowledge. Vol. V. 4to. Washington, D. C., 1853. *From the Smithsonian Institution.*

American Journal of Science and Arts. Vol. XIV. No. 64. For July, 1853. New Haven. *Exchange.*

Annals of Science. No. 16. For July, 1853. *Exchange.*

Monographes d'Echinodermes Vivans et Fossiles. Par L. Agassiz. 1ère Livraison. 4to. Neuchatel, 1838. *From Hon. Nathan Appleton.*

Catalogue of the Cabinet of Natural History of the State of New York. 8vo. Albany, 1853. *From the Regents of the University.*

Illustrations of the Birds of California, Texas, &c. By John Cassin. No. 1. 2d Ed. 8vo. Pamph. Philadelphia, 1853. *From the Author.*

Annals of the Lycæum of Natural History of New York. Vol. VI. No. I. *From the Lycæum of Natural History.*

Annales des Sciences Physiques et Naturelles, publiées par la

Société d'Agriculture de Lyons. 1ère et 2nde. Parties. 8vo. Lyons, 1850 – 51. *From the Société d'Agriculture.*

Mémoires de l'Académie Nationale des Sciences, &c., de Lyons : Classe des Lettres. Nouvelle Série. Tome 1. Lyons, 1851. *From the Société d'Agriculture.*

Mémoires de l'Académie Nationale des Sciences, &c. de Lyons : Classe des Lettres. Nouvelle Série. Tome 1. Lyons, 1851. *From the Société d'Agriculture.*

Mémoires de l'Académie Nationale des Sciences, &c., de Lyons : Classe des Sciences. Lyons, 1851. *From the Société d'Agriculture.*

Annales de la Société Linnéene de Lyons. Années 1850 – 52. 8vo. Lyons, 1852. *From the Société Linnéene.*

Proceedings of the Academy of Natural Sciences of Philadelphia. Vol. VI. No. 9. 8vo. Pamph. Philadelphia, 1853. *From the Academy of Natural Sciences.*

Description of the extinct Genus Nesodon, &c. By Prof. Owen. 4to. Pamph. London, 1853. *From the Author.*

Annals of Science. No. 17. For July, 1853. 8vo. Pamph. Cleveland. *Exchange.*

Bulletin de la Société Géologique de France. 2ième Série. Tome IX. Feuilles 36 – 40. (5 – 17 Septembre, 1852.) *From the Société Géologique.*

American Journal of Science and Arts. Vol. XVI. No. 47. For September, 1853. *Exchange.*

Coral Reefs and Islands. By James D. Dana. 8vo. New York, 1853. *From the Author.*

Journal of the New Brunswick Society for the Encouragement of Agriculture, &c. 8vo. Pamph. Part 4. Fredericton, N. B.

Catalogue of Maps and Charts in the Library of Harvard University. 8vo. Cambridge, 1851. *From Dr. A. A. Gould.*

History of British Mollusca and their Shells. By E. Forbes and S. Hanley. Nos. 50 – 51. 8vo. London.

Genera of recent Mollusca. By H. and A. Adams. Part 3. 8vo. London, 1853. *Exchange with H. Cuming.*

Bulletin de la Société Géologique de France. 2ième Série. Tome X. Feuilles 4 – 11. (15 Novembre, 20 Decembre, 1852.) Paris. *Prom the Société Géologique.*

Annals of Science. No. 19. Cleveland, 1853. *Exchange.*

Bibliography of American Natural History, for 1851. By Charles Girard. 8vo. Pamph. Washington, D. C. *From the Author.*

Received from the Courtis Fund.

Annals and Magazine of Natural History. No. 66. Vol. XI., for June, 1853. No. 67. Vol. XII., for July, 1853. No. 68. Vol. XII., for August. No. 69. Vol. XII., for September, 1853. London.

Deposited by the Republican Institution.

Life of Isaac T. Hopper. By L. M. Child. 8vo. Boston, 1853.

History of the Campaign of Waterloo. From the French of Jomini. 12mo. Boston, 1853.

Record of the Boston Stage. 12mo. By William W. Clapp. Boston, 1853.

Works of Shakspeare. Text by J. P. Collier. Vols. II. to V. 12mo. Boston, 1853.

Works of John Adams. Vol. VIII. 8vo. Boston. With Life, &c. By Charles. F. Adams.

Works of William Shakspeare. Redfield's edition. Vols. VI. and VII. 12mo. Boston, 1851.

Six months in Italy. By George S. Hillard. 2 vols. 12mo. Boston, 1853.

October 5, 1853.

The President in the Chair.

Dr. Marshall Hall present, by invitation.

Mr. Francis Alger, from the Committee on the purchase of the Ornithichnites belonging to the estate of the late Mr. Marsh, reported that Mr. Bouvé and himself went to

Greenfield on the day of the public sale, and purchased a large part of the collection for the Society, for the sum of $1400.

On motion of Dr. Durkee, it was voted that the report be accepted, and the Committee be requested to continue their efforts to raise, by subscription, a sum sufficient to meet the payment for which they had become responsible.

Dr. W. I. Burnett presented the following communication on the nature and character of Muscular tissue, as illustrated by its development and minute structure.

The beautiful form of this tissue, as occurring in the Thorax of insects, and which was discussed at the last meeting, has led to some further research upon the whole subject of the histology of muscle. This delicate, and what may be termed, *fibrillar* form of striated muscle, mentioned at the last meeting, is found to occur in the other Articulata, beside the Insecta. Perhaps it is most prominent in the Crustacea, and particularly in the Entomostraca. Thus, in the Argulina and Caligina, the muscles show this structure even more perfectly than in Insects. By the addition of water, these fibrillæ separate into their constituents, and then the discs, of which they are composed, may be studied separately. With the use of the highest and best microscopic powers, these discs appear as entirely homogeneous, solid bodies. As the fibrilla has no sarcolemma, it is unknown by what means these discs are retained in place in the fibrilla; but they are arranged in piles, with a small interspace between every two, which is the light space seen when the fibrilla is examined with high and good lenses. The physical phenomenon of the contraction of these muscular fibrillæ, seems to consist merely in the crowding of these discs together, the light intervening space disappearing, whereby the fibrilla is shortened.

In muscular tissue, the *fibrilla* is a secondary or an artificial product; the *fibre* is the true embryological formation. This is shown by studies upon tne development of this tissue, which occurs by large, nucleated cells being arranged in rows, then fusing together, forming cylinders; these last are the fibres proper, and they may be unstriated, constituting the muscles of organic life, or they may be striated, forming the voluntary muscles, according to the degree of development they attain. The muscle of organic life is but a lower, and, in one sense, undeveloped form of that which is striated. Striated muscle stands at the head of this tissue, and there may be a degradation from this all the way down to the Bryozoa and worms, where this tissue occurs even without fibres, there being only colligations of granules under peculiar forms. It may be here remarked that in *Alcyonella* (of the Bryozoa) I have failed to find striated muscle, after repeated search, although Allman, of England, declares that he has observed it in the Bryozoa, and especially in *Paludicella*; but it may be mentioned that in the lower animals there may be often seen a ruffling of the muscular tissue, which, at first, resembles the appearance of striation.

In the higher animals, all voluntary motion is performed exclusively by means of the striated muscular tissue; but in the lowest forms, non-striated muscle must subserve the same purpose; thus, the Acalephæ, whose muscles are all non-striated, move at will, and, according to circumstances, their various appendages. The histological condition of striation would appear to be intimately connected with rapidity, delicacy, and definiteness of action, a point well illustrated in the structure of the wing-muscles of the musquito.

In illustration of Dr. Burnett's remarks, several microscopic specimens, prepared by Dr. Durkee, were exhibited.

One specimen, from a human embryo, weighing seventy grains, showed the arrangement of the primitive cells in a linear series; another specimen, from the same subject, displayed the cells united, the nuclei being separated and somewhat broken up, and the longitudinal lines just beginning to be developed.

A specimen was also exhibited to show the relative size of the perfect elementary muscular fibre in the adult subject, when compared with that of the embryo, the latter appeared to be about one third the size of the former.

A specimen of muscular fibre, taken from the leg of the musquito, was exhibited, to show the transverse striæ and the central row of corpuscles or nuclei of the primitive cells.

Another specimen, from the wing of the musquito, on examination under the microscope, proved that the muscular tissue of this part consisted of moniliform fibrillæ, not united by sarcolemma.

Mr. Alger exhibited two specimens of native copper from Lake Superior, containing large quantities of native silver. One weighed about two and a half pounds, and contained about thirty dollars' worth of silver.

Dr. Durkee exhibited a remarkable cabbage plant, on which forty-three completely developed heads had taken the place of the original one, which had been broken off after coming to full development, the stalk being about one and a half inches in diameter at the time. The supplementary cabbages were of various sizes, from that of an orange to that of a child's head.

Mr. Sprague thought that this uncommon growth was the result of a remarkable development of the axillary buds.

Mr. John P. Marshall was elected a resident member.

October 19, 1853.

The President in the Chair.

Dr. B. S. Shaw was chosen Secretary pro tem.

A letter was received from Dr. S. L. Abbot, addressed to the Society, resigning the office of Recording Secretary, on account of the pressure of other duties.

On motion of Dr. Durkee, it was voted that the thanks of the Society be presented to Dr. Abbot for his efficient and faithful services for the last five years, as Recording Secretary.

Dr. W. I. Burnett presented a paper "On the Development of Mollusks in Holothuridæ, as follows:

I wish to call the attention of the Society to that remarkable episode in the embryology of the Mollusca — the development of certain Mollusks in Holothuridæ. The facts of the case were discovered and announced by J. Müller, (Verhandl. der Akad. zu Berlin, 1851, p. 628, (October 23,) and Nachtrag, p. 679, (November 13,) or *in extenso* in Müller's Arch. 1852, p. 1,) and they are, indeed, so wonderful, that it is well they were brought out by so reliable a physiologist and embryologist.

The main facts, briefly stated, are as follows: — In certain individuals of *Synapta digitata*, there are found from one to three sac-like bodies in the cavity of the body, attached by their superior extremity to the head, and by the lower end to the intestine; but this connection of the sac with the abdominal and other organs, is one of simple contiguity, and not of any direct communication. The upper portion of the sac is of a yellow, and the lower of a green color; the lower portion, moreover, is intussuscepted, with a blind end, like an inverted finger of a glove. It is in this sac-like organ that are developed true Mollusks; in its upper or more capacious portion are found both testes and ovaria, in the shape of sacs, which are not attached in any way to the main molluskigerous sac. These organs bear no resemblance whatever to ordinary testes or ovaria, except in their products, which are identical. When the ovarium is perfectly developed, it and its capsule burst and discharge the ova, which are then contained in the main molluskigerous sac; after this, from fifteen to twenty ova become invested with a common capsule, though their fecundation takes place previous to this investment. Upon this succeeds their development.

The sperm capsules vary from four to eighteen in number, and lie perfectly free in the main sac, not far from the ovary. The spermatic particles, which resemble those of the Gasteropoda, are set free by the bursting of these capsules.

The development of the egg here proceeds exactly as in the Mollusca, e. g. *Actæon*, according to Vogt, and finally assumes a pretty definite character, indicating rather its relation to the Pectini-branchiata. Of its zoölogical character as a Mollusk, there can, therefore, be no doubt; and the whole story in a few words, is, that a true Mollusk is developed within a *Synapta*, not by means of germination, but by the normal sexual products, which occur under otherwise anomalous parts and conditions.

Such being the facts, the question now arises, What interpretation shall be given to these phenomena? The distinct sexual mode of reproduction would seem to remove them from the catagory of the so-called Alternation of Generations, or Gemmiparity, as I now understand it. Then, again, the doctrine of "heterogeneous generation," as suggested by Müller, does not seem to me admissible, beside being particularly unsound; for if an animal can reproduce, by true sexual generation, an offspring zoölogically dissimilar to itself, Zoölogists may well look about for the stability of their science.

If I may be allowed an opinion, or rather a view of a subject, on which I have made no observations, I would say that an approximative solution of this enigma seems obtained by admitting the possibility of new and hitherto unknown parasitic conditions in the life of the Mollusk in question.

Why may not this Mollusk undergo a form of retrograde metamorphosis, during which its life is parasitic, and very peculiarly connected with the life of another and wholly different animal? Or, again, why may not the phenomena observed, be the final conditions of certain low modes of life, which are connected with points in the economy of these animals (Mollusks) that we do not yet understand? I throw out these remarks in a suggestive way. If we refer for a moment to the historical relations of the Cestodes, it will be perceived that there was a time when the conditions of their life were equally, if not more obscure. Siebold, however, has shown that here, although the path taken by Nature is circuitous and intricate, yet, after all, no new features of a heterogeneous nature are introduced, and that all required for the observer is patience and care. It does not seem to me any more improbable that this Mollusk should have entered, in some of its stages, the body of the *Synapta*, than that the anomalous forms of many Helminths should pursue a like course with the animals in which they are found, as we now know to be really the case. In Müller's last account of the subject, he discusses to some extent these facts. After some remarks upon the importance of a careful study of the embryology of this form, he says : — "I do not give up the hope that we may yet determine, at least, the germs of this Mollusk, and I found this hope mainly upon the very characteristic form of the spermatic particles, beside the other features above mentioned. . . . . The spermatic particles of *Natica*, and its allied forms, are yet unknown. . . . . In studies bearing upon this matter, one should particularly bear in mind the terminal enlargement of the spermatic particles, which, up to this time, has been observed in no Gasteropoda, but which, in the spermatic particles of the Mollusk in question, is never wanting."

Although for some time familiar with the details of the spermatic particle of the Gasteropoda, yet, I have very recently reexamined the spermatic particles of *Natica* (*N. heros*) with reference to this point. They resemble closely those of the pulmonary Gasteropoda (*Helix*, for instance,) and consist of a well-defined cork-screw head, to which is attached a very delicate tail ; they agree, in general, therefore, with the form given by Müller of those of the Mollusk in question.

Dr. Gould remarked that the shell alluded to probably had no affinity to Natica, but was one of the well-known parasites of the Radiata, especially of the Holothuriæ, known under the names of *Stylina*, *Stylifer*, *Eulima*, the former of which resembles, in form, a minute Natica. Moreover, he thought it most probable that the animal in which they were found (*Synapta digitata*) held no relations to the development of this univalve, except to afford it a nidus.

Mr. Sprague stated that the *Nasturtium sylvestre* of Europe, which has been naturalized in the neighborhood of Philadelphia, is now naturalized on the banks of Charles river, in Newton meadows.

Dr. B. S. Shaw stated that he had noticed frequently during the past summer, after rains, the appearance of earth-worms in a reservoir in the yard in rear of his house. This reservoir was three feet long, one and a half wide, and one and a half high, without cover, of wood, painted, and its sides were quite perpendicular. The yard was paved with brick, and the reservoir rested immediately upon the bricks, and was lined with lead. It was used to contain tadpoles, snails, &c., and he had noticed in it during and after a fall of rain, from one to twenty common earth-worms, of all sizes, and, generally, all alive. The reservoir was repeatedly emptied of its contents, washed and dried, and yet, after every rain, a greater or less number of worms was seen in it. The reservoir being at the foot of a trellis covered with grape vines, under the supposition that the worms might have fallen from this, it was removed to the centre of the yard, where nothing could fall into it from the walls of the house, or the trellis, and yet the worms appeared as before. They were seen about on the bricks at the same time, and, in some instances, coming up between the bricks, but they were never seen mounting the perpendicular and smooth sides of this reservoir.

Dr. Keep stated that he had found earth-worms on bushes and rough boards, several inches above ground, but in these cases they could have reached these spots without mounting perpendicularly.

Dr. Durkee had seen them on slabs in the Granary burying-ground, several inches above ground. He thought as they can surround twigs, and move them on the ground, they may possibly mount twigs spirally, where they can clasp them, but did not understand how they could climb a smooth, perpendicular surface.

Dr. Burnett remarked that they move on horizontal surfaces, by the principle of the lever, but he could not understand how this could allow them to climb perpendicularly.

Dr. Gould stated that they move perpendicularly whilst in the earth, being retained in their position by the setæ, which cover them, but that these would not enable them to mount perpendicular surfaces.

A letter was received and read from Dr. W. H. B. Thomas, of Cincinnati, inclosing drawings of fossil remains found in a cave at Tuscumbia, Alabama, which he believed to be those of the Megalonyx; and, also, a description of a new species of fossil fish, under the name of "*Paleoniscus Brainerdi.*"

On motion of Dr. Durkee, it was voted, — that a Committee of three be appointed to nominate candidates for the offices of Corresponding and Recording Secretaries, to report at the next meeting.

Dr. A. A. Gould, Dr. Silas Durkee, and Mr. J. M. Barnard were appointed on this Committee.

November 2, 1853.

The President in the Chair.

Dr. Durkee, from the Committee on nominating Corresponding and Recording Secretaries, reported the names of Dr. S. L. Abbot for Corresponding Secretary, and Dr. B. S. Shaw for Recording Secretary, and the report was accepted.

The President exhibited specimens of Ornithichnites, impressions of Rain Drops, &c., and gave an historical account of the Science of Ichnology, particularly as illustrated by the fossil foot-prints in the Connecticut river Sandstone.

Dr. Samuel Kneeland, Jr., gave a description and history of the *Victoria Regia*, a leaf and flower of which were shown to the Society, presented to them by Mr. Daniel T. Curtis, of Boston. The plant was raised by Mr. Allen, of Salem.

The thanks of the Society were presented to Mr. Daniel T. Curtis for his donation.

Dr. Abbot read a letter from Mr. Charles Girard, asking that a Committee be appointed by the Society, to examine and report upon his work, the "Bibliography of American Natural History," which he proposes to publish annually.

Drs. Abbot and Kneeland were appointed on this Committee.

Dr. Kneeland exhibited a cast of the head of the Troglodytes gorilla, belonging to the Society; and this cast, on motion of Dr. Kneeland, was presented to the President of the Society.

Dr. S. L. Abbot was elected Corresponding Secretary of the Society, and Dr. B. S. Shaw, Recording Secretary.

November 16, 1853.

The President in the Chair.

The President, by the kindness of Messrs. Bigelow, Brothers, and Kennard, was permitted to exhibit to the Society a fossil tooth of the Mastodon, obtained about forty miles west of Chicago, and about eight feet from the surface of the ground. The President said it was the largest specimen ever seen or described, as far as he knew, and, from its size, it might be at first supposed to belong to a new species, but its structure is the same as that of the Mastodon giganteus. For the sake of comparison, the President showed a tooth of the Elephas primigenius, belonging to a set of three found at Lanesville, Ohio, and now in his possession. The tooth of the Mastodon was much inferior in size to these teeth, one of them measuring seventeen inches in length, and having thirty ridges. The President also exhibited the plates of which the tooth is composed, when united by the cement, these plates having accidentally been found loose in one of his specimens.

Prof. Wyman stated that Owen considers the European and North American species of Fossil Elephant as identical, but that he himself is not satisfied, as yet, for several reasons, that this is so. In the American species the teeth have more ridges than the teeth of any other elephant, the greatest number given by Owen in the European species being twenty-eight. These teeth have thirty ridges. The law of the Geographical Distribution of Animals is also against it; for, according to Owen, the European species is very widely distributed, extending over the whole of Europe, the North of Africa, part of Asia, and the whole of North America. This is too great a range for one species.

Prof. Wyman thought that there was no real diagnostic sign yet known; but that all the evidence taken together, renders probable the distinction of the species. At some future time the discovery of the skull will probably settle the question either for or against the identity of the species.

In one of the teeth of the mammoth (Fossil Elephant) exhibited, the anterior portion was much worn; the roots, also, were very much developed, which is never the case, except when the tooth is old. As the tooth is worn away in front, the socket becomes absorbed in front of the tooth, the tooth advances, and the socket is built up behind it. In this way the tooth actually moves forward, and, in the same manner as the human tooth, is forced upwards or downwards, only one moves in a vertical, the other in a horizontal direction.

President Hitchcock having been invited to address the Society, gave some of the results of his examinations in the Connecticut Valley, in reference to fossil foot-marks.

He stated that he had very recently measured a section across the valley of the Connecticut, where are several localities of fossil foot-prints. This section (which he illustrated by a map) extended from the hypozoic rocks on the east, to the mica slate on the west; the gneiss of the east forming the high hills. The distance across is eight miles. The gneiss dips about 30°. The sandstone on the west side of the Connecticut river, in Gill, dips irregularly, having remarkable curves, but soon assumes the normal or easterly dip. From the results of his observations, he believed the perpendicular thickness of the sandstone in this valley, throughout this width of eight miles, to be over fourteen thousand feet.

The localities of the foot-marks are various. One is near the east end of the section; and at the place called the Horse Race, are localities on both sides of the river. Half a mile farther down the river, near Roswell Fields, is the locality whence was obtained the largest and best slab of fossil foot-prints ever found, or, as he was (to use his own words) "bold enough to say, ever would be found," and which is now the property of this Society. Smaller specimens of foot-marks occur at the ferry at Turner's Falls, and also a hundred rods below the falls, on the north bank of the river. From the results of his examinations, he had come to the conclusion that the thickness of the rock above these last named foot-prints, is four thousand feet. The most abundant fossils are the tracks of birds. One fact in particular he had noticed, that the strike of the sandstone is more to the east than is generally supposed, as much upon an average as 45°.

As to the elevation of the strata, he first supposed it to have been caused by the intrusion of the trap rock. But he had convinced himself that this is not the case, and that it has been raised in some other way; perhaps by the great crowding movement described by Prof. Rogers, as having taken place amongst the Alleghanies. The present could not have been the original inclination of the strata, for it is now 40°, and the idea that birds could walk on ground at this angle, leaving no traces of slipping, nor even of walking on an inclined surface, is absurd. At the east end there is an appearance of the strata being crowded by pressure ; but there is no inversion, and no repetition of folds on the whole section.

Another inference made, was, that so great a thickness of rock cannot all belong to the Trias. For, making all reasonable allowance for the original deposition of the strata on an inclined surface, there is still a thickness of ten thousand feet ; at least, enough for the Trias, the Permian and Carboniferous, perhaps, even the Devonian also. The rock on the section lying below the trap ranges, is decidedly of a different character from that above, and abounds in fucoids, but no other fossil has been found in it. Doubtless these strata will be found to embrace several distinct formations, and here is an interesting field of research for our geologists. Other sections, however, should be taken across the valley, before the inferences above made can be regarded as entirely certain. But it is the opinion of President Hitchcock, that the sandstone will be found quite as thick in other parts of the Connecticut valley, as at Turner's Falls, though, in general, not so highly inclined.

Prof. Henry B. Rogers thought that the inclination of the strata in question, might be owing both to deposition at angle, and to the movement, by crowding. Where actual measurements of the thickness of strata can be made, he thinks this is the only safe method. In the red sandstone of the Middle States, the thickness can be measured in several places ; there are instances of denudation, leaving coves, where it can be measured, and where it is found to be only thirty or forty feet thick, agreeing with actual measurement in other places ; whereas, by inferential measurements, its thickness has been made several miles.

Dr. W. I. Burnett read a communication on the Development of Viviparous Aphides, as follows :

The peculiarities attendant upon the reproduction of plant-lice, have long been familiar to Naturalists, and, from the earliest times, have excited the attention and curiosity of Zoölogists and Physiologists. These peculiarities consist briefly in the fact, that there is here a *Lucina sine concubitu ;* whole colonies of these insects, consisting exclusively of individuals capable of bringing forth their kind, and this, without there being among such colonies any male individuals. The authenticity of these wonderful conditions of reproduction, has been satisfactorily established in science, by the queer and successful experiments made by many of those quaint Entomologists of the last century. A brood of plant-lice appears early in the spring, as soon as the sap begins to flow freely ; this brood consists solely of individuals, which are reproductive, and each of these last has developed within it a certain number of new individuals, which, like their parents, are all of the reproductive kind, there being no males among them. These individuals follow the same course as their progenitors, so that each successive brood exceeds the previous one, in a certain geometrical ratio. This constant succession of broods continues through the whole summer, there being sometimes seven, or nine, or eleven, according to the season. In the autumn, the last brood which appears, consists of regular male and female individuals. The females soon lay eggs, after which, they die ; the eggs hatch, and the individuals thereby produced enter the earth, where they pass the winter, reappearing in the ensuing spring, constituting the first brood of that season, and reproducing their kind, &c., as already described.

My researches were made with a view to ascertain the intimate nature of these remarkable reproductive phenomena ; they were commenced this last spring, and have recently been completed, by examinations of the last brood or colony, during the past two or three weeks of this autumn.

My observations were made upon *Aphis caryae* (probably *Lachnus* of Illiger, or *Cinara* of Curtis) one of the largest and most favorable species for these investigations. This was in the spring of 1853. The first colony, on their appearance from their winter quarters, were of mature size, and contained, in their interior, the developing forms of the second colony, quite far advanced in formation. On this account it was the embryology of the third series or colony, that I was able to first trace. A few days after the appearance of the first colony (A), the second colony (B), still within the former, had reached two-thirds of their full embryonic size ; the arches of the segments had begun to close on the dorsal surface, and the various appendages of the embryo were becoming prominent ; the alimentary canal was more or less completely formed, although distinct abdominal organs of any kind belonging to the digestive system were not apparent.

At this time, and while the individuals B were not only in the abdomen of their parents A, but were also inclosed each in its primitive egg-like capsule ; at this time, I repeat, appear the first traces of the germs of the third colony, C. Their first traces consisted of small egg-like bodies, arranged two, three, or four in a row, and attached at the locality where are situated the ovaries in the oviparous forms of the Aphididæ. These egg-like bodies were either single nucleated cells of one three-thousandth of an inch in diameter, or a small number of such cells inclosed in a simple sac. These are the germs of the third generation or colony, and they increase *pari passu* with the development of the embryo in which they are formed, and this increase of size takes place not by the segmentation of the primitive cells, but by the endogenous formation of new cells within the sac. After this increase has continued for a certain time, these bodies appear like little oval bags of cells, — all the component cells being of the same size and shape, — there being no one particular cell which is larger and more prominent than the others, and which could be comparable to a germinative vesicle. While these germs are thus constituted, the formation of new ones is continually taking place. This occurs by a kind of constriction-process of the first germs; one of the ends of these last being pinched off, as it were, so that what was before a single body or sac, becomes two, which are attached in a moniliform manner. The new germs thus formed may consist each of a single cell only, as I have often seen; but they soon attain a more uniform size by the endogenous formation of new cells within the sac in which it is inclosed. In this way the germs are multiplied to a considerable number, the nutritive material for their growth being, apparently, a fatty liquid in which they are bathed, contained in the abdomen, and which is thence derived from the abdomen of the first parent. When these germs have reached the size of about one three-hundredth of an inch in diameter, there appears on each, near the inner pole, a yellowish, vitellus-looking mass or spot, composed of yellowish cells, which, in size and general aspect, are different from those constituting the germ proper. This yellow mass increases after this period, *pari passu* with the germ, and, at last, lies like a cloud over and partially concealing one of its poles. I would, moreover, insist upon the point that it does not gradually extend itself over the whole germ-mass, and is, therefore, quite unlike a proligerous disc.

When these egg-like germs have attained the size of one one-hundred and fiftieth of an inch in diameter, there begins to appear distinctly the sketching or marking out of the future embryo. This sketching consists at first of delicately-marked retreatings of the cells here and there; but these last soon become more prominent from sulcations, and, at last, the form of an articulated embryo is quite apparent.

During this time, the yellowish, vitellus-looking mass has not changed its place, and although it has somewhat increased in size, it appears otherwise the same. When the development has proceeded a little further, and the embryo has assumed a pretty definite form, the arches of the segments, which have hitherto remained gapingly open, appear to close together on the dorsal surface, inclosing the vitellus-looking mass within the abdominal cavity. It is this same vitelloid mass thus inclosed, which furnishes the development of the new germs, (which, in this case, would be those of the fourth colony, or D), and this germ development here commences with the closing up of the abdominal cavity, and then the same processes which we have just described are repeated.

The details of the development subsequent to this time, the formation of the different systems of organs, &c., are precisely like those of the development of true oviparous Arthropoda in general; and, although the ovoid germ has, at no time, the structural peculiarities of a true ovum, such as a real vitellus, germinative vesicle and dot, yet, if we allow a little latitude in our comparison, and regard the vitellus-looking mass as the *mucous*, and the germ-mass proper as the *serous* fold of the germinating tissue, as in true ova,—if this comparison of parts can be admitted, then the analogy of the secondary phases of development between these forms, and true ova of the Arthropoda can be traced to a considerable extent.

These secondary phases of development need not here be detailed, for they correspond to those described by Herold, Kölliker, of the true ovum in other Insecta, and which, too, I have often traced in various species of the Arthropoda in general.

When the embryo is fully formed, and ready to burst from its capsule, in which it has been developed, it is about one sixteenth of an inch in length, or more than eight times the size of the germ, when the first traces of development in it were seen. From this last mentioned fact, it is evident that, even admitting that these germ-masses are true eggs, the conditions of development are quite different from those of the eggs of the truly viviparous animals, for, in these last, the egg is merely hatched in the body instead of out of it, and, moreover, it is formed exactly as though it was to be deposited, and its vitellus contains all the nutritive material required for the development of the embryo until hatched. In the Aphididæ, on the other hand, the developing germ derives its nutritive material from the fatty liquid in which it is bathed, and which fills the abdomen of the parent. The conditions of development in this respect, are here, therefore more like those of the Mammalia, and the whole parent animal may be regarded, in one sense, as an individualized uterus filled with germs; for the digestive canal, with its appendages, seems to serve only as a kind of laboratory for the conversion of the succulent liquids this animal extracts from the tree on which it lives, into this fatty liquid which is the nutritive material of the germs.

Omitting the curious and interesting details of the further history of the economy of these Insecta, as irrelevant to the point in discussion, we will now turn to see what view we should take of these processes, and what is their physiological interpretation. In the first place, it is evident that the germs which develop these viviparous Aphides, are not true eggs; they have none of the structural characteristics of these last,—such as a vitellus, a germinative vesicle and dot; on the other hand, they are, at first, simple collections, in oval masses, of nucleated cells. Then, again, they receive no special fecundating power from the male, which is the necessary preliminary condition for the development of all true eggs; and, furthermore, the appearance of the new individual is not preceded by the phenomena of segmentation, as is also the case with all true eggs. Therefore, their primitive formation, their development, and the preparatory changes they undergo for the evolution of the new individual, are all different from those of real ova.

Another point of equal importance, is, these viviparous individuals of the Aphides have no proper ovaries and oviducts. Distinct organs of this kind I have never been able to make out. The germs, as we have before seen, are arranged in moniliform rows, like the successive joints of confervoid plants, and are not inclosed in a special tube. These rows of germs commence, each, from a single germ-mass, which sprouts from the inner surface of the animal, and increases in length, and the number of its component parts by the successive formation of new germs by the constriction process as already described. Moreover, these rows of germs which, at one period, closely resemble in general form, the ovaries of some true Insecta, are not continuous with any uterine or other female organ, and, therefore, do not at all communicate with the external world; on the other hand, they are simply attached to the inner surface of the animal, and their component germs are detached into the abdominal cavity as fast as they are developed, and thence escape outwards through a *Porus genitalis*.

In regard to the last, or terminal brood, in the autumn, investigations made within a few weeks, as these insects were closing up their economy for the year, showed results somewhat different from those recorded in science ; for, instead of this last brood being composed of males and females, I found, upon an examination by the microscope, of the internal organs, that this brood contained, also, individuals like those of the preceding brood, — that is, without sex, but capable of reproducing their kind.

The conditions, therefore, which determine the appearance of distinct male and female individuals in this last brood, do not seem referable to the fact of its being the last, but rather, perhaps, to relations of nutrition we do not now understand.

With these data, the question arises, what is the proper interpretation to be put upon these reproductive phenomena we have just described? My answer would be, that the whole constitutes only a rather anomalous form of gemmiparity ; they are not females, for they have no female organs ; they are simply *gemmiparous* animals, and the budding is internal, instead of external, as with the Polypi and Acalephæ ; moreover, this budding takes on some of the morphological peculiarities of oviparity ; but these peculiarities are economical and extrinsic, and do not touch the intrinsic nature of the processes therein concerned. Viewed in this way, the different broods or colonies of Aphididæ cannot be said to constitute as many true generations, any more than the different branches of a tree can be said to constitute as many trees ; on the other hand, the whole suite, from the first to the last, constitute but a single true generation. I would insist upon this point, as illustrative of the distinction to be drawn between *sexual* and *gemmiparous* reproduction. Morphologically, these two forms of reproduction have, it is true, many points of close resemblance, but there is a grand physiological difference, the perception of which is deeply connected with our highest appreciation of individual animal life.

A true generation must be regarded as resulting only from the conjugation of two opposite sexes, — from a sexual process in which the potential representatives (spermatic particle and ovum) of two opposite sexes are united for the elimination of one germ. The germ power thus formed may be extended by gemmation or fission, but it can be formed only by the act of generation, and its play of extension by budding or by division, must always be within a certain cycle, which cycle is recommenced by the new act of the conjugation again of the two sexes. In this way the dignity of the ovum as the primordium of all true individuality, is maintained.

In another place I have entered upon the discussion of those many points suggested by these studies. One of these is, the relation of this subject to some of the various doctrines of development, which have been advanced in late years, such as that of *Alternation of Generation*, by Steenstrup, and that of *Parthenogenesis*, by Owen. I have there attempted to show that the phenomena of these doctrines, as advanced by their respective advocates, all belong to those of gemmiparity, and that, therefore, Alternation of Generation and Parthenogenesis in their implied sense, are misnomers in physiology. Another point is, the identity of this mode of reproduction we have just described in the Aphididæ, with that observed in the so-called hibernating eggs of the Entomostraca, and the like phenomena observed in nearly every class of the Invertebrata. They are all referable, in my opinion, to the conditions of gemmation, modified in each particular case, perhaps, by the economical relations of the animal.

A report from the Committee, to whom was referred the work of Mr. Girard on the Bibliography of American Natural History, was read and accepted.

It was highly favorable; strongly commending the judicious arrangement of the work, and the thoroughness with which it had been prepared, and showing it to be quite indispensable to all who would become acquainted with the progress of Natural History in America.

Mr. Sprague laid upon the table a valuable collection of plants from Switzerland, presented to the Society by Mr. B. F. Kendall.

December 7, 1853.

The President in the Chair.

Mr. Edward Daniels, of the State Geological Surveying Corps of Wisconsin, was present, by invitation.

Mr. Daniels, on being invited to give some account of his recent examinations in Wisconsin, stated that he had lately spent about six months in his preliminary duties, especially in the lead district in the south-west corner of the state. This district extends over an area of thirty-five hundred square miles. It is remarkable for the absence of drift. The surface, generally, consists of heavy beds of dark-red clay, containing flint and little lead ore; it is evidently the result of decomposition of the limestone rocks.

Commencing at the west, on the Mississippi river, the limestone is seen exposed on its banks in the high cliffs, and contains lead veins. Farther east are the high table lands, and a high mound, so called there, three hundred feet in height. Here is the yellow, sandy, magnesian limestone; and, above this, a shale of from five to fifteen feet thick, thickening towards the west, and thinning towards the east. The upper layers of this are nonfossiliferous, but the lower layers are full of organic remains. Some species of chambered univalves, small trilobites, the Lingula Iowensis, &c., all minute, when compared with similar types in the rocks below. The life of this period seems to have been Liliputian, and the fossils can now be gathered in immense quantities.

The mounds are capped by a formation, which does not occur at any point between them, and is of a coralline nature. The blue mound, the culminating point between the Mississippi and Wisconsin rivers, is capped by still another deposit; a bed of hornstone, nearly three hundred feet thick, containing few fossils, and these difficult to secure on account of the hardness of the rock. The origin of this is a question for geologists. Was it the result of a sub-marine hotspring throwing up silica? It is evidently the result of the deposit of silica, which was once in solution.

Passing below these layers already mentioned, we come to the blue limestone. This is of different degrees of thickness, thickening towards the west, and thinning towards the east, and containing the fossils common to this rock. Below this is a bed of buff-colored limestone, thickening and thinning in a reverse manner to the bed above. Beneath this is a sandstone from forty to one hundred feet thick, thickest on the east side; and, beneath this, the lower magnesian limestone. There are still two other beds of limestone, before reaching the primary rocks.

The mounds are points which have survived a general erosion, although it is generally supposed by the miners that they are the result of upheaval. Upon this supposition, they have often been searched for lead ore, but with no favorable result. No siliceous fossils are found over this region, and if there has been erosion here, this is a curious fact, as flints are found, evidently the remains of erosion.

At the western part of the district is an extra development of the clay beds, differing entirely from any found elsewhere in the district. It is a very pure pipe clay. These beds are four hundred feet above the Mississippi river. At the north part, Limneæ are found in great numbers; and in one spot, about six feet below the surface of the ground, were found the bones of a gigantic mammal, but these crumbled immediately on exposure to the air, leaving a tooth only, which proved them to have belonged to the fossil elephant. In a shaft, also, in this same clay, were found bones, and two teeth of the Mastodon.

Mr. Daniels next gave some account of the Mineral Veins in these rocks, in the lead district.

The veins are not found in all the surface rocks. They exist principally in the gray limestone; in this are caverns of immense extent, partially or wholly filled with water, and which have been penetrated to the distance of a mile or more, all containing evidences of lead ore. The horizontal direction of the veins is, generally, nearly east and west, and they are generally found in groups of two or more veins, at small distances from each other, and these groups at intervals of one hundred or more feet apart. As they descend, they apparently stop at the blue limestone, but, on careful examination, some indication is generally found of their passing through this rock, and being continuous below, though the fissure may have only the thickness of a knife-blade. They have been generally supposed by the miners to cease at the blue limestone, but Mr. Daniels has not only traced them through this rock, but has actually found them in the buff-colored limestone below, where they have been worked for ten years, without the miners being aware that they were below the blue limestone. He considers the buff-colored limestone equally productive with the strata above, and advises sinking below for it. The lower magnesian limestone also contains metal, which was not believed to be the case before this survey.

In the perpendicular veins the ore is free from vein stone, but this is not the case in the other veins, especially lower down. The width of the veins at the surface varies from one to one hundred and fifty feet, although the ore is not perfectly continuous the whole distance. The ore has been worked a mile and a half without interruption. It is principally sulphuret and carbonate, with a little sulphate and phosphate.

Prof. H. D. Rogers stated that Mr. Daniels had shown him a mass of galena, containing shells which were mere porous masses filled with the ore, and showing that the fossil was the oldest. He thought that, in some instances, the ore might have been introduced by sublimation, and then solidified amongst the fossils. He also thought the occurrence of Limneæ so high, was extraordinary, and contained the key to some interesting events.

The President stated that it was remarkable that, as yet, so few remains of the Fossil Elephant had been found.

The teeth are comparatively common, although often in a state of partial decay ; but no perfect skull of the elephant has as yet been discovered, and it is very desirable for geologists to notice even any portions of the skull, and to direct their attention, when possible, to these remains.

Dr. Samuel Kneeland, Jr., presented specimens of the rock and calcareous substance, which form the reef at Pernambuco, Brazil, and gave an account of the reef.

This reef is one of the greatest curiosities of its kind, being quite straight for several miles along the coast, parallel to, and a little distance from, the shore ; it is from thirty to sixty yards wide, perfectly level, covered with water only at high tide ; the surface is deeply channelled in all directions, giving refuge to myriads of small fishes, crabs, and echini, specimens of which he presented to the Society several years since.

It is composed of obscurely stratified hard sandstone ; the surf beats heavily against the outer side, leaving a smooth and safe harbor on the inside of the reef, though with strong currents. This reef is so regular in its width, and so level, that it is difficult to believe it to be the work of Nature ; it looks like the work of a skilful engineer.

In 1836, Dr. Darwin in his "Researches in Geology and Natural History," says, — "With respect to the origin of the reef, I believe a bar composed of sand and pebbles formerly existed beneath the water, when the low land, on which the town now stands, was occupied by a large bay ; and that this bar was first consolidated, and then elevated." He gives another slightly different explanation, which he thinks equally probable, namely, "that a long spit of sand had its central part consolidated, and then, by a slight change in the set of currents, the loose matter removed, so that the hard nucleus alone was left."

Notwithstanding the heavy beating of the ocean against it, there is no record of the least decay. Dr. Darwin attributes its protection "to a layer of calcareous matter, formed by the successive growth of several kinds of organic bodies, chiefly serpulæ, balani, and nulliporæ, but no true corals ;" he considers it a process analogous to the formation of peat, and, like the latter substance, preserving from degradation the matter on which it rests.

These specimens show the obscurely stratified quartzose rock, with great numbers of small grains and pebbles firmly cemented to its surface; and it would seem that the whole rock was formed by the gradual solidification of particles thus cemented together, the solid rock encrusted with the deposits of the marine animals above-mentioned, many of their tubes being preserved, and their orifices opening in all directions; there are, also, several specimens, which, from their lightness, seem to contain little or no sandy or quartzose material, being almost entirely made up of the exuviæ and calcareous excretions of serpulæ, balani and nullipores, whose tubes and tortuous excavations are everywhere seen; when fresh, some of the colors were of a beautiful sea-green, and red; and the latter color is, even now, very distinct in some portions; some of the excavations in the reef were lined with coriaceous growths and tubes, some of which are preserved in the dry state, giving to the sides the feel of the thickest and softest velvet; in these excavations, which were of a foot or two in depth, numerous small fishes of most brilliant colors were darting about, which Mr. W. O. Ayres determined to be principally young chætodons.

Dr. Darwin says that no true coral enters into the composition of this reef; but Dr. Kneeland exhibited two specimens which he had obtained there, much resembling Meandrina cerebriformis.

It seems altogether the most probable that this reef has been elevated after its consolidation, according to the first supposition of Dr. Darwin; such processes, we know, are constantly going on, and particularly on the eastern coast of the American continent. This reef is a striking instance of the advantages resulting to man from the myriads of marine architects; and he thought these specimens would be interesting, as showing some of the steps in the process of erection and preservation. There is reason to believe that this reef has no necessary connection with coral formations; but is probably fringed with coral at its base towards the sea, from which source may have come the specimens of Meandrina exhibited.

Dr. Kneeland read extracts from a communication from Dr. Gorrie, of Appalachicola, on the change of level between the

Gulf of Mexico and the coast of West Florida. Dr. G. shows that this coast of Florida has changed in different directions twice within the period of the now existing mollusca of the gulf. At present, the land is slowly sinking; the bar of the West Pass of the Bay of Appalachicola, within the memory of those now living there, never had more than twelve feet of water upon it; vessels drawing fourteen feet, now sail over it safely; oyster beds, twenty years ago uncovered at every low tide, are now never or very rarely laid bare; all along the bay the roots of pines are now daily washed by the tide, which, a few years ago, were flourishing above high-water mark; at various places on the coast may be seen roots and trunks of cypresses and other trees, in an erect position, extending to the depth of several feet into the Gulf of Mexico; these submerged forests, every year, increase perceptibly in extent.

There is abundant evidence that a change from dry land to sea, and again to dry land, has taken place in West Florida. The rate of the present descent of the land, when examined for a series of years, seems quite uniform; the facts observed indicate that the change for the last twenty years is between eight and nine inches, or an average rate of three and a half feet in a century.

On motion of Dr. Storer, it was voted that the President be requested to draw up such resolutions as he may think proper, in reference to the death of the late Mr. Teschemacher, to be read at the next meeting.

Mr. J. C. White was elected a resident member.

December 21, 1853.

The President in the Chair.

The President, in accordance with a vote passed at the preceding meeting, offered a series of resolutions relative to the death of the late James E. Teschemacher, together with a notice of his life and writings, as follows:

Our Society has experienced a great loss in the death of Mr. Teschemacher, one of its most valuable members, and we must turn aside a moment from the path of science to pay a tribute to his memory. This gentleman, who joined our Society in the year 1835, and has since that time been an able associate in our labors, and a large contributor to the advancement of science in our country, has suddenly terminated his mortal career, at the age of sixty, from a disease of the heart.

Our Society, moved by the great merits of Mr. Teschemacher, and the loss we have experienced from his death, do therefore

Resolve, 1*st*. That a record be made in our transactions of the high estimation in which we hold the private qualities and scientific labors of Mr. Teschemacher, as manifested in his excellent papers on Botany, Mineralogy, some departments of Geology, and particularly in his able and practical investigations of the carboniferous formations. We also regard his productions on the composition and improvement of soils, as a valuable and permanent contribution to the agriculture of the country.

2*d*. That the President of the Society be requested to prepare some notice of the life and labors of our learned associate.

3*d*. That a copy of these resolutions, with the preamble, and the appended notice of his productions, be presented to his family, to the scientific journals of the country, and the daily paper which publishes the proceedings of this Society.

NOTICE OF J. E. TESCHEMACHER.

James Engelbert Teschemacher (of Hanoverian extraction on the paternal side) was born in Nottingham, England, on the eleventh day of June, in the year 1790. At the age of fourteen he commenced his commercial career in a mercantile foreign house of eminence, in London, where he evinced application and business talents of a high order; and amid the extensive transactions of mercantile life, in which during a long series of years he was engaged, his fine comprehensive mind ever remained unshackled by any of the less elevating habits sometimes contracted in commerce. At an early period of his life he imbibed a taste for studying out of Nature's beautiful book, thus acquiring that purity, and love of truth, so constantly pervading all his thoughts and writings.

In the year 1830, Mr. Teschemacher accepted the offer of a partnership in a house of considerable standing in Havana, and proceeded to Cuba with highly advantageous prospects, but these prospects faded on his approach, and he returned to England. After a brief space, he made up his mind to repair to the United States, with his family ; reaching New York, February 7th, 1832, he finally settled in Boston, where, during the space of twenty-two years, he was unremitting in his exertions for his family. Of his untiring zeal and enthusiastic devotion to science, we need not speak ; his hours of leisure, it may be naturally inferred, were few, but those few were employed, (apparently as a recreation), in the severer branches of study, which frequently form the labor of a life, even with those who make science their occupation. Truly may he be said to have improved the talents committed to his charge.

The above notice was accompanied by a list of Mr. Teschemacher's contributions to the Society's publications, and the following papers published elsewhere :

An Address before the Boston Society of Natural History.
An Address before the Horticultural Society.
An Address before the Harvard Natural History Society.
An Essay on Guano.

Letters from Lord Ellesmere, Prof. Owen, and Sir John Richardson, addressed to the President, were read to the Society.

A communication was received from Dr. H. R. Storer, resigning his office of Curator of Herpetology. It was accompanied by a letter from Dr. W. I. Burnett, and one from Dr. Thomas H. Webb, relative to the collection of Dr. Webb, now on deposit with the Society.

On motion of Dr. Storer, it was voted that the reptiles belonging to this collection, together with the reptiles lately presented to the Society by Dr. Cragin, be referred to Prof. Wyman; the Shells to Dr. Gould; the Insects to Dr. Harris; the Fossils to Prof. Rogers; and the Mammals to Prof. Wyman.

On motion of Dr. Gould, it was voted that a letter, acknowledging the receipt of this collection, and informing Dr. Webb of its disposal, be transmitted to him.

Prof. Wyman exhibited, under the microscope, specimens of the eyes of *Amblyopsis spelœus*, the so-called "blind fish," from the Mammoth Cave of Kentucky.

In a dissection made several years since, he had failed to detect any organ of vision. Subsequently, Müller Telkamph, of Berlin, discovered minute black points, visible, with the aid of a lens, through the skin, but found no nerve or transparent media; Müller compared them to the eye dots of the invertebrate animals. The same organs have been again recently detected by Dr. J. C. Dalton, Jr., of New York, and they were likewise noticed by Prof. Owen, in his lectures on the Comparative Anatomy of Fishes.

Through the kindness of Mr. Charles Dean, of Cambridge, Dr. Wyman had recently received a specimen of Amblyopsis, in good preservation. After careful examination, he found no trace of the eye dots externally; but, in a mass of areolar tissue, occupying the usual position of the orbit, and deeply buried in this tissue, so as to preclude contact with the skin, he detected two dark points, one on each side, symmetrically placed. They were of an oval form, one of the poles being directed towards the integument, whilst, by the other, it was attached to a delicate filament of nerve. This nerve was traced on both sides as far as the cranial walls, but its connection with the optic lobes was not ascertained. A few muscular fibres were seen in contact with each eye dot, but there was no insertion into it, as they all passed beyond it.

Under the microscope the eye dot was seen to consist of a thin, external sheath, continuous with that which covered the nerve. Within the sheath was a layer of pigment cells, of hexagonal form, investing the whole organ, and darkest at the two poles. No opening for the admission of light was seen ; but, in two instances, there was visible either near the anterior part of the eye dot, or even connected with it, a lenticular shaped body, consisting of an external membrane, including cells, the nuclei of which were conspicuous.

Morphologically considered, the eye dot, with its nerve, appears to represent that portion of the organ of vision which is developed in connection with the nervous centres. The external sheath, though very thin, may represent the sclerotic coat, and the pigment layer the choroid. Having no connection with the skin, we should not expect to find those parts, among them the crystalline lens, which are in other animals developed by a folding in of the integument, yet a lens appears to exist.

Prof. Owen regards the eye of the Amblyopsis as a modified cutaneous follicle, but in the specimen just described, it was wholly independent of the skin.

There is nothing in the structure of the eye of Amblyopsis which would lead to the supposition that it could assist in forming a distinct image. The nervous filament, if it entered the interior of the eye, would be protected by the pigment from being acted upon by light.

Dr. Cabot stated that on approaching the water in which these fish are contained, they do not appear aware of any change in light or darkness ; but, on touching the water, they immediately retreat in the opposite direction.

Prof. Wyman said the whole head was presumed to be remarkably sensitive, it being covered with papillæ, supplied with nerves from the fifth pair. The organ of hearing had not been investigated particularly, but nothing unusual had as yet been noticed.

The President stated that he had suspected these fish would be found to have some structure analogous to an eye, and that the fact of its not being developed might be owing to a want of stimulus through a series of generations.

Dr. Charles T. Jackson exhibited a series of specimens, illustrating the economic geology of North Carolina, and of portions of Georgia and Tennessee. The districts described by him were, —

I. That of Deep river, in Chatham and Moore counties, where a most interesting coal field of the Oolitic or Liassic period exists, and appears to be parallel to, if not a continuation of, the coal formation of the same geological epoch, near Richmond, Virginia. The coal of Deep river is of the most bituminous variety of caking and gas-making coal, highly desirable for the use of gas works in the cities of the Atlantic coast. Specimens of the coal and of the fossil plants and shells characteristic of this coal-field, were exhibited.

1st. A beautiful and delicately-formed plant, not yet recognized or described, found in the shales accompanying the grindstone grit of the lower part of the basin, obtained near Jones's Mills, by Dr. Scott, of Raleigh.

2d. Zamites, (?) foliage, from the shales higher up in the series.

3d. Shells of the genus Possidonia, probably, (P. mya and P. minuta.)

Specimens of the bituminous coal from the gulf of Deep river.

Dr. Jackson also described numerous black and brilliant rhomboidal scales of fishes, which probably belong to the genus Catopterus, of Redfield, and abound in the fire clays and shales immediately contiguous to the coal. No dorsal spine or tail of this fish has yet been discovered at this locality, so as to enable the Ichthyologist to pronounce, with certainty, on the genus.

Teeth and the coprolites of Sauroid fishes, and of Saurian reptiles, have been found in great abundance in the shales and fire clays of this coal-field.

Dr. McClennahan has also found the ribs of Saurian reptiles, and some curious forms resembling Chelonians, but destitute of bony structure, so as to leave it doubtful whether they are real fossils, or only imitative forms.

Dr. Jackson described the order of succession of the rocks of this coal-field, as follows, beginning with the lowermost rocks of the series, and ascending.

1st. A coarse conglomerate, or mill-stone, resting unconformably upon talcose slate rocks, which dip to the north-westward, while the conglomerate dips to the south-eastward.

2d. A fine-grained gray sandstone, called grindstone grit, containing beds of slate or shale, filled with fossil plants.

3d. A thick bed of shale.

4th. Beds of fire-clay, with balls of iron ore (argillaceous carbonate of iron.)

5th. Coal.

6th. Parting shales.

7th. Coal, and alternating layers of fire-clay coal and shale, repeated several times.

The strata, on the north side of Deep river, dip, generally, to the south-eastward, at angles of twenty, thirty, and, rarely, forty-five degrees, the prevailing dip being about twenty or twenty-five degrees. On the south side of the river, the strata rise on the McIver and Nicker estates, and there present a broken outcrop, on one side dipping to the north-west, and on the other to the south-eastward.

From extensive borings, with the Artesian auger, it has been ascertained that the strata in the plain of Egypt plantation, are quite horizontal, so that the coal bed is there found at the depth of three hundred and sixty-one feet, and may be extracted by mining operations, in a large area, by means of gangways and chambers.

The extent of the outcrop, as shown by numerous pits, is sixteen miles.

The high dip of twenty degrees, on the margin, ceases at a moderate depth, so that in less than a half mile from the outcrop, the strata are horizontal. This, with the convergence of the lines of dip, at both extremities of the coal-field, indicates that the coal is, in the usual form, of a long trough-shaped basin; but thus far, the Southern outcrop of the coal has not been discovered. Indeed, the character of the stratification is such that it may be long before the coal is found on the south-eastern side of the basin, since the general direction of the strata in that direction, so far as they have been traced, is horizontal with numerous flexures, or bends, so that, after nearing the surface, it may plunge again to a depth.

On analyzing the coal, raised by the Artesian auger, at Egypt plantation, it was found that the pure coal (without regarding the earthy matters mixed with the borings, or the ashes of the coal) contained 41.4 per cent. of gas-making bitumen, and 58.6 per cent of solid carbon, or coke. It is not probable that there will be more than about 5 per cent. of ashes in the solid coal. When shafts are sunk, and gangways opened, in this coal-field, there can be no doubt that good gas coal will be obtained in abundance. The bed, perforated by the auger, is five feet in thickness; and the beds opened in the neighborhood, at the Farmville locality, deducting a thin layer of parting shale, are seven feet thick. We have yet to wait for the opening of slack-water navigation of Deep river, before this coal can be brought to market. This, it is hoped, will be done early next spring.

Several coal companies are making preparations to work these mines, and the coal has been proved to be good, by trial at the Williamsburg Gas Works, in New York.

Dr. Jackson presented to the Society a copy of his Report on the Deep river Coal Mines, to which he referred for detailed descriptions of each locality. He also presented a copy of his Report on the North Carolina Copper Mines.

II. Specimens of the black oxide of copper, from the newly opened mines of Polk county, Tennessee, were also exhibited, and the mines were described.

These singular deposits of black copper ore, occur in three large veins, included mostly between the strata of mica-slate rocks, having a north-easterly and south-westerly direction.

The black oxide of copper varies in width from a foot to twenty or thirty feet, and its depth from the surface is about ninety feet. There is every reason to believe that this ore was produced by the decomposition of a mixture of copper and iron pyrites, which form the floor of the deposit. Specimens of this ore, having a scoriæform appearance, like the lavas and scoriæ of volcanoes, were obtained from the Tennessee, Niwassee, and Cherokee mines.

By assaying cargo samples, it was found that the Tennessee ore yielded 26.6 per cent. of copper, and the Niwassee 22.8 per cent.; but specimens may be obtained which contain from 40 to 50 per cent.

The quantity of ore sent to market from these mines, may be judged of by the fact that no less than one hundred and fifty wagons are constantly employed in transportation of it to Dalton, the nearest point where the railroad approaches the mines. Several powerful companies are now actively at work developing the copper mines of East Tennessee, and there can be no doubt that a very large supply of copper will be obtained.

Dr. Jackson referred the Society to his forthcoming Reports for further details concerning these mines.

He had also examined the gold mines of Lumpkin county, Georgia, which are about to be opened extensively. The most remarkable geological feature in this region is, the great depth to which the talcose slate rocks are decomposed.

The strata stand at an angle of from seventy to seventy-five degrees from the horizon, and the atmospheric water, and other decomposing agencies, have operated upon the rocks to the depth of more than eighty feet, so that the rocks may actually be dug away by the pickaxe and shovel to that depth. The gold is contained, mixed with brown oxide of iron, in this rock, and has heretofore been washed out after the rude Californian method, the coarser gold only being saved. The company, now organized, intend to establish extensive and good gold mills, so as to save the finer gold, and to work larger quantities of the ore, or decomposed rock.

Specimens of the gold-bearing rocks of several North Carolina mines, were also exhibited, and the most important mines were described. Namely, the McCulloch, Gold Hill, Capps, and Union county gold mines, all of which are of great value, and will give ample returns to the enterprising companies, that have opened them.

There are several of the old gold mines in North Carolina, now reopened for copper, and they give promise of proving more valuable for that metal, than they ever were for gold. Among those now about to send copper ores to market, is the McGinn mine, near Charlotte, in Mecklinburg county. Some other similar mines are already in process of being opened, and promise well.

Dr. Jackson, lastly, exhibited two specimens of crystallized tabular quartz, from Rutherford county, North Carolina, which contained considerable quantities of water within them. He proposed breaking open one of them for the purpose of analyzing the water, to ascertain if it contained any silex in solution. The drusy, or crystalline nature, of the interior of specimens like those which he had seen broken open in Dr. Andrews's cabinet, in Charlotte, seemed to prove that they were once filled with a solution of silica, which had crystallized upon the inside of the cavities.

Mr. Sprague called the attention of the Society to a remarkable cluster of the cones of the common pitch pine, so closely compacted as to conceal the branch, and also to a stem showing the commencement of their growth, presented to the Society by a lady.

Dr. Jackson presented his "Report on the Copper Mine of the North Carolina Copper Company."

A "Mémoire sur les Phénomènes Erratiques de la Suisse," etc., by Mr. E. Desor, was received from him.

BOOKS RECEIVED DURING THE QUARTER ENDING DECEMBER 31.

Proceedings of the Academy of Natural Science of Philadelphia. Vol. VI. No. 10. pp. 375—394. *From the Academy of Natural Science.*

Explication de la Carte Géologique de la France, rédigé sous la direction de M. Brochart de Villiers. Par MM. Dufrenoy et Elie de Beaumont. 4to. Tome I. Paris, 1841.

Transactions of the Linnæan Society of London. Vol. XXI. Part 2. 4to. London, 1853. *From the Linnæan Society.*

Proceedings of the Linnæan Society of London. No. 51. pp. 201—220. 8vo. Pamph. London. *From the Linnæan Society.*

List of Members, &c., of the Linnæan Society of London. 8vo. Pamph. 1852. *From the Linnæan Society.*

Annals of Science. No. 20. Cleveland. *Exchange.*

Gelehrte Antzeigen. Akademie der Wissenschaften. 34, 35. 4to. München, 1852. *Exchange.*

Chemismus der Vegetation. Von A. Vogel, Jr. 4to. Pamph. München, 1852. *Exchange.*

Report of Commissioners of Patents for 1851. Part 1, Arts and Manufactures. Part 2, Agriculture. 8vo. Washington, 1842. *From the Patent Office.*

Denkschriften der Kaiserlichen Akademie der Wissenchaften. Band 3, 4. Long 4to. 1852. *From the Akademie der Wissenchaften.*

Sitzungsberichte der Kaiserlichen Akademie der Wissenchaften. Band VIII. IX. 8vo. 1852. *From the Akademie.*

Die Feierliche Sitzung der Kaiserlichen Akademie der Wissenschaften, am 29 Mai, 1852. 8vo. Pamph. *From the Akademie.*

Verzeichniss der im Buchhandel Befindlichen Druckschriften der Kaiserlichen Akademie der Wissenschaften in Wien. Mai, 1852. 8vo. Pamph. Wien, 1852. *From the Akademie.*

Proceedings of the American Philosophical Society. Vol. V. No. 49. 1853. 8vo. Pamph. Philadelphia. *From the American Philosophical Society.*

North American Silva. By Thomas Nuttall. 3 vols. 8vo. Philadelphia, 1853. *From the American Philosophical Society.*

Report of J. D. Andrews on the Trade and Commerce of the British North American Colonies, and the Trade of the Great

Lakes and Rivers. 8vo. Congressional Document. Washington, 1853. Maps to the same. 8vo. *From the Author.*

Mémoires de la Société Royale des Sciences de Liége. Tome VIII. 8vo. Liége, 1853. *From the Société Royale.*

Silliman's Journal of Science and Arts. Vol. XVI. No. 48, for November, 1853. *From the Editors.*

Account of two remarkable Indian Dwarfs. By J. Mason Warren. 8vo. Pamph. Boston, 1851. *From the Author.*

Verhandlungen der Zoölogisch-Botanischen Vereins in Wien. 1, 2. Band. 8vo. 1852–3. *From the Zoölogisch-Botanischen Verein.*

Annals of Science for October, 1853. No. 21. *Exchange.*

Annual Report of the Superintendent of the Coast Survey. 8vo. Washington, 1851. *From A. D. Bache.*

Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften. Band X. 8vo, Pamph. 1852. *From the Akademie der Wissenschaften.*

Proceedings of the Academy of Natural Sciences of Philadelphia. Vol. VI. No. 11. pp. 395—432. *From the Academy of Natural Sciences.*

List of Infusorial Objects in the neighborhood of Salem, Mass., &c. By Thomas Cole. 8vo. Pamph. Salem, 1853. *From Mrs. Cole.*

Report on the Coal Lands of Egypt, Belmont, Evans, Palmer, and Wilcox Plantations of Deep River, N. C. By C. T. Jackson, M. D. 8vo. Pamph. New York, 1853. *From the Author.*

Annals of the Massachusetts Charitable Mechanics Association. By J. T. Buckingham. 8vo. Boston, 1853. *From the Charitable Mechanics Association.*

Abstract from the Returns of the Agricultural Societies, for 1845–6. 8vo. Pamph. Boston. *From Charles L. Flint.*

Transactions of the Agricultural Societies of Massachusetts. 1847–8–9–51. 8vo. Boston. *From Charles L. Flint.*

Received from the Courtis Fund.

Annals and Magazine of Natural History. Vol. XII. No. 70, for October, 1853. No. 71, for November, 1853. No. 72, for December, 1853. London.

Manual of the Botany of the Northern United States, by Asa Gray, M. D. 8vo. Boston, 1848.

History of Infusorial Animalcules. By A. Prichard. 8vo. London, 1852.

Système Silurien du Centre de la Bohème. Par Joachim Barrande. 2 vols. 4to. Prague et Paris, 1852. Recherches Paléontologiques. Trilobites.

Received in Exchange for Duplicates.

Report on the Geology of Cornwall, Devon, and West Somerset. By H. De la Beche. 8vo. London, 1839. *From the American Academy.*

Comptes Rendus Hebdomaires des Séances de l'Académie des Sciences. Tomes XXX. et XXXI. 4to. Paris, 1850. *From the American Academy.*

Mémoires présentées par divers Savans à l'Académie Royale des Sciences de l'Institut de France. Tomes VI. et IX. 4to. Paris 1836 et 1846. *From the American Academy.*

Geological Relations of the Secondary Strata in the Isle of Arran. By A. Sedgwick and R. I. Murchison. 4to. Pamph. London, 1828. *From the American Academy.*

Oration on Life, &c. of Lafayette. By J. Q. Adams. 8vo. Washington, 1835. *From the American Academy.*

Mémoires de la Académie Royale des Sciences de l'Institut de France. Tomes XVII., XVIII. 4to. Paris, 1840–42.

Receuil de Voyages et de Mémoires publié par la Société de Géographie. Tome II. Séconde Partie.

Theory and Practice of Warming and Ventilating Public Buildings, &c. 8vo. London, 1825.

History of the Pyrites. From the French of J. F. Henckel. 8vo. London, 1757.

Experiments and Observations on Natural Philosophy. Vol. III. By Joseph Priestley. 8vo. Birmingham, 1786.

Annales des Mines.

Deposited by the Republican Institution.

Book of Nature. By F. Schoedler. Translated by H. Medlock. 8vo. Philadelphia, 1853.

Personal Sketches of his own Time. By Sir J. Barrington. 8vo. Boston, 1853.

Junius. Edited by H. S. Woodfall. Vol. I. 12mo. (Bohn's Standard Library.) London, 1850.

Lives of Painters, Sculptors, and Architects. Vols. I.–II. (Bohn's Standard Library.) 12mo. London, 1850–1.

Vasari's Lives of Painters, Sculptors, and Architects. Vols. III., IV., V. (Bohn's Standard Library.) 12mo. London, 1851.

Woodfall's Junius. Vol. III. (Bohn's Library.) 12mo. London, 1850.

J. T. Headley. Second War with England. 2 vols. 12mo. New York, 1853.

S. W. Williams. The Chinese Empire and its Inhabitants. 2 vols. 12mo. New York, 1853.

L. S. Noble. Life and Works of Thomas Cole. 12mo. New York, 1853.

B. J. Lossing. Pictorial Field Book of the Revolution. 2 vols. 8vo. New York, 1851.

J. J. Smith and J. F. Watson. American Historical and Literary Curiosities. Long 4to. New York, 1852.

Orations and Speeches of Edward Everett. 2 vols. 8vo. Boston, 1850.

Correspondence of the American Revolution. Edited by Jared Sparks. 4 vols. 8vo. Boston, 1853.

Addresses and Speeches by Robert C. Winthrop. 8vo. Boston, 1852.

History of New England. By John Winthrop, with Notes by James Savage. 8vo. 2 vols. Boston, 1853.

Lives of the Queens of Scotland. By Agnes Strickland. 3 vols. 12mo. New York, 1853.

Harper's Family Library. Vols. I.—CLXXXVII. 12mo. New York.

Nile Notes of a Howadji. 12mo. New York, 1852.

Monette, J. W. History of the Discovery and Settlement of the Valley of the Mississippi. 8vo. 2 vols. New York, 1848.

The Howadji in Syria. By G. W. Curtis. 12mo. New York, 1852.

Memoirs of the Life and Writings of Dr. Chalmers. 4 vols. 12mo. New York, 1853. By William Hanna.

Memoirs of the Life of Sir J. Mackintosh. By his Son, R. J. Mackintosh. 2 vols. 8vo. Boston, 1853.

Shakspeare's Works. Collier's edition. Vols. I. and VIII. 12mo. Boston, 1853.

Histoire de la Géologie de 1834 à 1845. Par le Vicomte d'Archiac. 3 vols. 8vo. Paris, 1847.

Quarterly Journal of the Geological Society of London. Vols. I.—VIII. 8vo. London, 1845-52. Also Nos. 33-35. Vol. IX.

INDEX TO VOL. IV.

N. B. New genera and species are in *italics*.

ADDENDUM.

Dr L. W. Clarke, of Clifton, Lake Superior, was elected a Corresponding Member at the meeting of April 2d, 1851; and Mr. W. H Stevens, of the same place, at the meeting of April, 16th, 1851.