

of which it differs in the flatness of its whorls, in its aperture, which is proportionally much longer and narrower, and in being only about half their size. It is much like large specimens of *Physa hypnorum* reversed.

Prof. Agassiz read a paper on the necessity of a thorough revision of the system of classification in Zoölogy now in use. He gave a sketch of Cuvier's system, and showed its many deficiencies in the present advanced stage of science. He thought that a more perfect system was called for, based upon the embryonic development of animals, and the order of their appearance at the various geological epochs. His views were illustrated by many interesting facts. Dr. Gould followed with some interesting observations in confirmation of Prof. A's. views, drawn from his study of the Mollusca. He had noticed among them a structural agreement, according to their position in the scale, with the order of geological succession. Points to which he alluded in illustration were the degree of development of parts, as that of the head, for instance; the development of distinct organs, as of the eyes; and the shape of the shell.

Mr. Desor gave an account of his recent zoölogical investigations among the shoals of Nantucket, whilst on board the surveying steamer Bibb; Capt. Davis having afforded him every opportunity for dredging in depths varying from three to twenty-five fathoms.

Among the radiated animals which thus came under his examination were the following:

HYDROIDIAN POLYPS.

1. PLUMARIA ARBOREA, Desor. Polypidom arbuscular, irregularly branched; branches long and pinnate, the pinnæ leaning to one side. Cells pyriform, with a plain margin, very close together, on the internal side of the branches. From 4 to 6 inches high. Dredged on the Shoals of Nantucket, ten miles east of Sancati Head, from a depth of fourteen fathoms.

2. SERTULARIA FILICULA, Ellis. From 2 to 3 inches high.

Found in great quantity on Nantucket Shoals, adhering to stones and shells, at depths varying from six to twenty-four fathoms.

3. *SERTULARIA ARGENTEA*, Ellis. Varies in size from 3 and 4 inches to 1 foot and a half. Common at depths of from three to five fathoms; also found frequently on the beaches around Cape Cod, where it is thrown by the waves.

4. *SERTULARIA PLUMEA*, Desor. Polypidom very fine, like down; stem very little branched. Cells opposite, very close. Differs from *S. rosacea*, Johnst., in being much less branched. Height 1 inch. Dredged from twenty-two fathoms near South Shoal.

5. *LAOMEDEA DICHOTOMA*, Lin. From half an inch to an inch high. Attached to stones and shells. Found at a depth varying from ten to fifteen fathoms, near South Shoal.

ASCIDOIDIAN POLYPS OR BRYOZOA.

6. *FLUSTRA TRUNCATA*, Lin. Very abundant near South Shoal, at depths varying from fifteen to twenty-two fathoms.

7. *CELLULARIA TURRITA*, Desor. Polypidom dense, like a bush; stem orange colored, divided into a great number of branches, so that each stem looks like a small tower or pyramid. Found in depths varying from three to fifteen fathoms. Thrown in great quantity on the beaches of the islands of Nantucket and Martha's Vineyard.

8. *CELLULARIA DENSE*, Desor. Polypidom very dense, bushy: divided into a great many branches, which are brittle when dry. Somewhat allied to *C. avicularia*, Pallas, but differs in the form of the cells, which are more simple. Dredged from a depth of twenty-two fathoms near the South Shoal.

9. *LEPRALIA VARIOLOSA*, Johnst. Very abundant on the Shoals of Nantucket, at depths of from ten to twenty-five fathoms, where it covers almost every stone and shell. Its color is of a bright red, but it fades very soon after being brought to the surface.

10. *MEMBRANIPORA TENUIS*, Desor. Cells lobate, more elongated than in *M. pilosa*, Pallas, with a plain margin of a pale pink

color. Abundant in Muskeget Channel at a depth of from three to five fathoms.

ECHINODERMS.

11. *ASTERACANTHION FORBESI*, Desor. Rays about two and a half times as long as the disk is broad. Differs from *A. rubens* in its more cylindrical rays, and in its spines, which are not pointed, but obtuse and canaliculate along the avenues. Color reddish brown. Dredged from a depth of eight fathoms in the Vineyard Sound.

12. *ASTERACANTHION RUBENS*, Müll. Found at all depths, from low water mark to twenty-five fathoms.

13. *ASTERIAS SPONGIOSA*, Fabr. Frequent among barnacles, at depths of from five to fifteen fathoms.

14. *OPHIOCOMA ACULEATA*, Müll. Frequent among barnacles, at the same depth as the preceding species, and commonly associated with it.

15. *ECHINARACHNIUS PARMA*, Rumph. Found in great quantity among the Shoals of Nantucket, at an average depth of from six to twenty fathoms. Of a bright red color, but turns green after death. *E. atlanticus*, Gray, is nothing but a young individual of this species.

16. *ECHINUS GRANULATUS*, Say. Found scattered at all depths from low water mark to twenty-five fathoms. Of a beautiful green color at the greatest depths.

17. *SIPUNCULUS BERNHARDUS*, Forbes. Frequent in the Vineyard Sound, at the depth of from six to twelve fathoms. Found generally in the shells of *Buccinum trivittatum*, Say, which are very common in this locality, at that depth.

18. *CUCUMARIA FUSIFORMIS*, Forbes. But one specimen was found, white, tinted with pink on the back. It was dredged near South Shoal, from a depth of twenty-two fathoms.

Mr. Desor described also two new species of Sponges.

19. *SPONGIA URCEOLATA*, Desor. Cup-shaped, with a lobated margin; perforations very minute. Diameter 1 inch. It is of a

bright red color, but turns black after death. Dredged in the harbor of Edgartown, from a depth of four fathoms.

20. SPONGIA SULPHUREA, Desor. A large species, massive, variously crooked and bent, often annular. Surface covered with many scar-like impressions, at the bottom of which are seen small perforations. It is of a bright yellow color when alive, like sulphur, but turns black after death. Found in great abundance in the Vineyard Sound at a depth of from six to ten fathoms, attached to stones or old shells.

Among the twenty species here enumerated, nine only are mentioned in Gould's Report on the Invertebrata of Massachusetts, seven are entirely new, and four have not been found before on this side of the ocean. Most of the species seem to be exclusive inhabitants of the deep waters, with the exception of the two very common species of Echinoderms, (*Echinus granulatus* and *Asterias rubens*,) which are found at all depths.

Mr. Desor offered for the acceptance of the Society, the original specimens of the above-described species.

Mr. Burnett read a long and interesting paper on the "Hibernation of Insects, and its relation to their Metamorphoses." After some preliminary remarks on the relations of the functions of animal organisms to the season of the year, and the laws regulating the phenomena of hibernation, he came to the consideration of these laws as particularly manifested in the economy of insects. In the course of his observations this autumn upon the *Noctuidæ*, he had noticed that the ova of one species, *Clisiocampa americana*, the common Tent Caterpillar, instead of remaining all winter, as has been supposed, exposed to the cold and storms in an undeveloped state, begin at once to undergo the embryonic changes. He found in every egg which he opened, a young caterpillar with the vitelline sac attached to it, the vitelline duct entering upon the back. He had observed the same thing in several other species of *Noctuidæ*, and therefore infers its probable existence in all. He