

Mission Mountains as high as 3800 ft., in the ponds bordering Flathead Lake, and in Swan Lake.

Estey's pond covers some 10 or 15 acres, three miles from the Biological Station, and a mile from Flathead Lake. In August, 1900, the shores of this pond were literally covered with dead shells, and great quantities of live ones in the water.

It was here that a very interesting experiment was performed with these shells and a large frog. A dead shell was tossed in front of the frog, close to his nose. The shell was immediately seized, and an unsuccessful attempt made to swallow it. It was disgorged by the aid of the fore feet. A second attempt gave the same result. This was continued until the frog had seized the eighteenth dead shell, when he seemed to weary of the sport, and took a rest. After this he would seize only now and then, and only those in easy reach. After the 23d shell had been seized he no longer made any effort, and a good sized pile of shells was made with no result. Other attempts on other frogs gave practically the same result, with a slight variation in the number.

Planorbis parvus Say.

In August, 1897, while camped on the bank of the Pend d' Oreille river a couple of miles below the outlet at Flathead Lake, some sand siftings produced a dozen or more of these small shells.

(*To be continued.*)

THE SHELL-BEARING MOLLUSCA OF RHODE ISLAND.

BY HORACE F. CARPENTER.

[*Continued from page 96.*]

203. *Modiolus modiolus* Linné.

Mytilus modiolus Linn., Wood, Don. Chem., DeKay. *Modiola modiolus* Turt., Gld., Perkins, Dall.

Shell large, thick and solid, oblong-ovate; beaks at the anterior end which is narrow; posterior broad, rounded; hinge margin straight, ascending from the beaks at an angle of forty-five degrees to the centre, then curving downward to the posterior end; basal margin arched a little upwards near the centre, gaping at this point for the passage of a byssus; epidermis dark brown, thick, folding

over the margin; interior pearly, of a livid color. Length four and a half inches; height two and a quarter; breadth two inches.

It inhabits the ocean in deep water, attached to the larger seaweeds, and is thrown up on ocean shores in storms, the seaweeds being torn from the rocks by the action of the waves and dashed upon the beach. Sometimes these shells attain a length of six inches and are subject to great variety of form, being almost always distorted in some manner. In young specimens, the epidermis at the lines of growth is prolonged into filaments.

205. *Modiolus plicatulus* Lam.

Shell transversely oblong-ovate, elongated, narrowed at the anterior and broadened at the posterior; beaks at the anterior end; hinge margin straight, ascending for two-thirds the length of the shell, then curving downward and rounding at the posterior to meet the basal margin; surface ornamented with numerous radiating, sometimes undulating, prominent ribs; a broad elevated ridge runs from the beaks to the posterior end of the basal margin, dividing the shell into two nearly equal parts; on the upper half of the shell thus divided, the ribs are large and coarse, but on the lower half they are very fine, merely lines on a smooth surface; exterior silvery white, covered by a thin varnish epidermis of a brown color, rayed with zones of yellow, green and black; interior silver white; margins crenulated. Length three inches, height one and a quarter, breadth nine-tenths.

This species, with the exception of *Mya arenaria* and perhaps *Ilyanassa obsoleta*, is the most abundant mollusk in R. I. It inhabits everywhere in mud, peat bogs, salt marshes and in the banks of rivers. It is found up the Blackstone nearly to Pawtucket, where the fresh water is continually pouring over the falls, as well on the shores of the bay and ocean. Its station is everywhere above low water, and they cluster so thickly together as to frequently form banks a foot or two in depth imbedded near high water, forming beds sometimes hundreds of feet in length by ten to twenty in width. When found completely buried in mud, they are generally preserved in good condition, but if taken under any other circumstances, the epidermis is found to be badly eroded, not only at the umboes, where shells usually exhibit this peculiarity if at all, but all over the surface. They may be gathered in any quantity in Providence, in the banks of the river road, above Red Bridge.

Genus *Crenella* Brown, 1827.

There are five species, one of which inhabits New England.

206. *Crenella grandula*, Totten.

Syn: *Modiola glandula* Tott. Gld.; *Mytilus decussatus* Stimp.; *Crenella decussatus* Forbes & Hanley, DeKay.

Shell small, thin, rounded oval; beaks small, separated at the anterior end, and at one half the height of the shell; surface with minute lines of growth, crossed by numerous fine radiating ribs which increase in number as they recede from the beaks; epidermis brownish-yellow; interior pearly; margins sharp and crenulated. Length one quarter of an inch, height nine-twentieths, breadth three-tenths.

This species was discovered by Col. Joseph G. Totten in Provincetown Harbor, and described in Silliman's Journal, Vol. xxvi, p. 367, 1834. It inhabits sandy and soft mud in water from 3 to 60 fathoms, from Sandy Hook to the Gulf of St. Lawrence, and is often found in the stomachs of fishes. It has been dredged in various places between these points, such as Buzzard's Bay, Vineyard Sound, off Block Island, in Massachusetts Bay, Casco Bay and Bay of Fundy. It is found fossil at Montreal.

Genus *Modiolaria* Gray, 1872.

The shells of this genus are small, rhomboidal in shape, and are sculptured by two series of radiating lines, one at each end, leaving a smooth space between.

207. *Modiolaria discors* Linné.

Syn: *Mytilus discors* Linn., Loven, Stimp., Hanley, etc.; *Mytilus discrepans* Mont., Dill., Turt., Flem.; *Modiola discrepans* Lam., Forbes, Gld., Migh., DeKay.; *Crenella discors* Gray, Adams, Forbes and Hanley; *Modiolaria discors* Loven, Binney, Dall, etc.

Shell obliquely-oval, beaks near the anterior end; surface coarsely marked by lines of growth and divided into three fan-shaped spaces, the anterior portion with eight fine lines radiating from the beaks to the basal margin, the middle portion smooth and the posterior with numerous lines radiating in an opposite direction from those on the anterior end of the shell; interior silvery. Length one inch, height thirteen-twentieths, breadth two-fifths.

Circumpolar: from Greenland to Long Island; from Finmark to Great Britain; Bering's Straits to Puget Sound. Inhabits from

low water mark to 100 fathoms, also found in the maws of fishes. Common everywhere north of Cape Cod, rare and local to the south of it. Two other species, also circumpolar in range, the *Modiolaria nigra* and *M. corrugata*, are said to have been found as far south as Buzzard's Bay, but as I have no idea they will ever be found in R. I., I do not include them in these papers.

(*To be continued.*)

GEORGE B. SIMPSON.

George Bancroft Simpson was born in 1841 at Boston, Mass., removed to Waterbury, Conn. at an early age, and in 1861 enlisted in the army for the Civil War. At the close of his service he entered Yale College, but was unable to complete his course for lack of money. In 1868 he came to Albany and began work with his uncle, the late Prof. James Hall, State Paleontologist, as a collector of fossils. Subsequently he took up the drawing of fossils and became highly skilled in this work. Thousands of the fine drawings which have illustrated the *Paleontology of New York* being his handiwork.

He was a devoted lover of nature, and was the author of a useful work on the anatomy of the fresh water clam (*Anodonta fluviatilis*), and had just completed an elaborate treatise on the anatomy, physiology and embryology of *Polygyra albolabris* and *Limax maximus*, at the time of his death, which occurred October 15, 1901.—J. M. C.

PUBLICATIONS RECEIVED.

THE MOLLUSCA OF PORTO RICO. By William H. Dall and Charles T. Simpson. (Extract from U. S. Fish Commission Bulletin for 1900, Vol. I, pages 351–524.)

This work really constitutes a hand-book of the mollusca of the island, as it contains brief descriptions of the genera and species with references to the original descriptions and principal synonymy, illustrated by 6 plates containing 102 figures. The total number of species recorded is 653, of which 42 are new. Excluding the land and fresh water shells and nudibranchs the number of species and well-marked varieties is 530, and an estimate is made of 600 species. "It has been one of the surprises that a number of species originally described from deep water in the Blake report, turned up in less than 100 fathoms in Mayaguez harbor or other localities."



Carpenter, Horace F. 1902. "The shell-bearing Mollusca of Rhode Island (continued)." *The Nautilus* 15, 104–107.

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