CHAPTER XI

BRYOZOA, BRACHIOPODA, PHORONIDA, AND ENTEROPNEUSTA

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THE BRYOZOA OF THE GULF OF MEXICO

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Bryozoans are abundant organisms everywhere in the seas, from the polar regions to the tropics, from the shore line to great depths, but with only a few representatives in fresh water. The individuals are all small, rarely more than one millimeter in length, but their capacity for budding is so great that they often produce colonies of considerable size. With a few exceptions the colonies are all attached, and most of them are encrusting. Some species produce thick nodular masses by the piling up of layer on layer, while still others grow erect in branching bushy colonies to the height of several inches. Within the Gulf, they are abundant, encrusting shells, stones, dead corals and corallines, algae, or anything else that may afford attachment. The individuals are encased in hard chitinous or calcareous walls, and they appear to be of little importance in the food chain of other animals, but their nuisance value in the fouling of ship bottoms and buoys and the covering of oyster beds to the exclusion of young oysters is of considerable economic importance. The rate of budding is so rapid that oyster shells used as cultch on oyster beds may be completely covered in a few weeks to the exclusion of oyster larvae.

Apparently the first mention of Bryozoa from the Gulf is the small list of 7 species by Count de Pourtalès in 1867. Pourtalès then turned the material obtained by him on the expeditions of the U. S. Coast Survey, 1867 to 1869, over to the Swedish zoologist Smitt for further study. The area concerned was that about the Tortugas Islands and the Straits of Florida, and Smitt reported on 95 species, many of them new. In 1914, Osburn discussed 83 species obtained by him in shallow water around the Tortugas Islands, adding 40 species to Smitt's list. In 1928, Canu and Bassler reported on more than 40 dredgings made by the U. S. Fisheries Steamer *Albatross* and added 36 more species, most of them new to the Bryozoa of the Gulf. This makes a total of only about 170 species known from this great area, depending more or less on just where the boundary line is drawn and also on the indefinite nature of some of Smitt's records.

From the neighboring West Indian and Caribbean waters, Busk (1884) listed 5 species from near Puerto Rico, and in 1909, Levinsen mentioned a few species from the Virgin Islands. Osburn (1927) reported on a small collection of 23 species taken by Dr. C. J. van der Horst at Curaçao Island; in 1940, on his own collection of 124 species from the southern shores of Puerto Rico; and in 1947, on 107 species recovered by the Allan Hancock Atlantic Expedition off the southern shores of the Caribbean Sea. All of these reports will be useful in the study of the Bryozoa of the Gulf. The reports by Canu and Bassler (1928) and Osburn (1940) contain descriptions and references for all of the Gulf species.

The Bryozoa of this region are strictly warm-water species, many of them known to be circumtropical in distribution, and of the 170 species recorded, 105 have a wide range in other seas. Only 35 have not been recorded outside of the Gulf, and some of these will undoubtedly be found elsewhere.

It might be supposed that the Gulf species would show a close relationship to those of the Pacific across the narrow region of Central America, but such is not the case. It is true that 93 of the 170 Gulf species occur also in the eastern Pacific, but nearly all of these are species of wide distribution, and only 16 have been found only in the Gulf and the near waters of the Pacific. It would appear that most of the species have been evolved since the waters of the Atlantic were last closed off from the Pacific.

In the different groups of Bryozoa the numbers of known species are as follows:

Cyclostomata: 8 species recorded from within the Gulf and 10 more from the adjoining West Indian region; many more undoubtedly occur.

Ctenostomata: only 5 species within the Gulf and 8 more in the West Indian area, but the only references to this group are those of Osburn, 1914, from the Tortugas, and 1940, from Puerto Rico.

Cheilostomata: about 155 species within the Gulf with many more from around the West Indian Islands and the Caribbean Sea.

Very little of the great area of the Gulf has been explored biologically, and our knowledge of the fauna is limited almost entirely to that of the coastal shelf reaching from the Straits of Florida to the Mississippi Delta. Here the dredgings have practically all been above the 100-fathom line. Intensive collection has been done in only a few places; for the Bryozoa, only around the Tortugas Islands. In all of the western part of the Gulf and around to Yucatán even the shallow waters are untouched, the deeper waters are also unknown territory, and careful collecting from the shore lines to the abyssal regions will undoubtedly yield a wealth of information.

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BRACHIOPODA OCCURRING IN THE GULF OF MEXICO

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Brachiopods are rare or uncommon animals in most parts of the modern world. They occur in abundance in a few places only, such as off southern Australia, New Zealand, and parts of Japan. They occur in lesser variety in the northern Atlantic, the Arctic, Antarctic, and Mediterranean. They are thus worldwide in distribution. Although rare at the present time, brachiopods were abundant in the past. Paleozoic seas abounded in brachiopods, but in the Mesozoic era, although numerous, they began to lose ground to the Mollusca. Furthermore, in the Mesozoic era their family representation became reduced; this was the great time for the Rhynchonellacea and was the time of upsurge of the Terebratulacea, or looped forms.

Following the Mesozoic era, Tertiary time saw a further reduction of brachiopods as the Mollusca continued to expand. Tertiary brachiopods are generally not abundant, but areas where they are common are New Zealand, southern Australia, and Japan. They are also fairly common in the Mediterranean and West Indies regions. It is interesting to note that these areas of abundance correspond closely with modern distribution. Recent brachiopods are similar to Tertiary ones, and their roots can be satisfactorily traced into the Tertiary and on into the Mesozoic in several instances.

The brachiopods found so far in the Gulf of Mexico are mostly types inherited from the Tertiary of the Middle Atlantic and West Indian regions. The latter influence is very strong, and most of the Gulf species are the same as those occurring in the waters around the West Indies. These Gulf species are *Glottidia pyramidata* (Stimpson), *Crania pourtalesii* Dall, *Cryptopora gnomon* Jeffreys, *Chlidonophora incerta* (Davidson), *Terebratulina cailleti* Crosse, *Gryphus cubensis* (Pourtalès), *G. bartschi* Cooper, *G. bartlettii* (Dall), *Argyrotheca barrettiana* (Davidson), *A. lutea* (Dall), *A. schrammi* (Crosse and Fischer), *Dallina floridana* (Pourtalès).

The species recorded from the Gulf, except for *Glottidia*, occur in West Indian waters. A number of brachiopods that have West Indian affinities are also known from the south side of the Florida Keys. Both of these areas have yielded species not yet recorded from Gulf waters, but any of these species may yet be found in the Gulf with more intensive searching. These are *Thecidellina barretti* (Davidson) 1866, *Eucalathis* n. sp., *Platidia seminula* (Philippi) 1836, and *Pantellaria echinata* (Fischer and Oehlert).

The information recorded in this paper was derived from the records published by W. H. Dall supplemented by data with specimens in the national collection of Recent brachiopods. Dall's Annotated List of the Recent Brachiopods in the Collection of the United States National Museum, with Description of Thirty-three New Forms gives data for most occurrences up to 1920. Unfortunately, several of the Gulf species in the national collections have no bathymetric data, and several have no geographic information other than their origin in the Gulf. I am indebted to Dr. Harry B. Whittington, Harvard University, for additional data on Gulf brachiopods in the collections of the Museum of Comparative Zoology, Harvard University.

Glottidea pyramidata (Stimpson)

Lingula pyramidata Stimpson. Am. Jour. Sci., ser. 2, vol. 29, 1860, p. 444.

This species has the characteristic form of the familiar *Lingula*, but it is small, about 15 millimeters long and has a pale yellow or light brown color. It has been taken from Tampa Bay, Cedar Keys, and Marco on the Gulf coast of Florida. The specimens from Marco are from 1 to 3 fathoms. Like *Lingula*, this genus is a shallow-water dweller.

Crania pourtalesii Dall

Crania anomala var. *pourtalesii* Dall. Bull. Mus. Comp. Zool., Harvard, vol. 3, 1871, p. 35, pl. 1, figs. 7a-b.

Crania is rare in North American waters, and only a few specimens of this species are known. It forms a low cone attached to corals or masses of rock. The color is pale yellow, and the shell measures about 8 millimeters. A specimen from Campeche Bank, latitude 23°18′, longitude 87°02′, is the only one from the Gulf.

Cryptopora gnomon Jeffreys

Cryptopora gnomon Jeffreys. Nature, Dec. 2, 1869, p. 136.

This is the only member of the Rhynchonellacea known from the Gulf of Mexico. It can be recognized by its small size (2 to 3 mm. long), rounded triangular outline, sharply pointed beak, and glossy, translucent shell. The interior of the brachial valve has a high median septum. It occurs off Cape San Blas in gray mud at 196 fathoms; also, at 210 fathoms off the Mississippi River.

Chlidonophora incerta (Davidson)

Megerlia ? incerta, n. sp., Davidson. Proc. Roy. Soc., vol. 27, 1878, p. 438.

This shell may be recognized by its nearly circular form, nearly white color, and finely ribbed surface. It has an unusually long pedicle with frayed end. Inside the brachial valve the loop forms an incomplete ring. The species is a deep-water form in most of its known occurrences. It was taken at 1,181 fathoms in the Gulf between the delta of the Mississippi River and Cedar Key.

Terebratulina cailleti Crosse

Terebratulina cailleti Crosse. Jour. Conchyl., vol. 13, 1865, p. 27, pl. 1, figs. 1–3.

Small, oval, pale yellow in color, and finely ribbed are features characterizing this species. The ribbing at the beak and umbo is somewhat beaded. The interior of the brachial valve is provided with a stout loop in the form of a ring attached to two short descending branches. It was taken in 399 fathoms off Arrowsmith Bank, Yucatán; also, 640 fathoms in Yucatán Strait.

Gryphus cubensis (Pourtalès)

Terebratula cubensis Pourtalès. Bull. Mus. Comp. Zool., Harvard, vol. 1, No. 6, 1867, p. 109.

This is a large brachiopod which attains a length of over 45 millimeters. It is generally yellowish in color and has a somewhat triangular outline. The anterior margin is rectimarginate. The brachial valve has a short loop consisting of two descending lamellae and a narrow connecting band. Taken at 119 fathoms, latitude 26°31′, longitude 85°03′ (Harvard collection). National Museum specimens without specific data.

Gryphus bartschi Cooper

Gryphus bartschi Cooper. Smithsonian Misc. Coll., vol. 91, No. 10, 1934, pl. 1, figs. 1–8.

This species is smaller than *G. cubensis* (Pourtalès), has a smaller foramen, and is less triangular in outline. It is of an orange-yellow color. It is from Bay of Florida and was taken at 101 fathoms.

Gryphus bartlettii (Dall)

Terebratula bartlettii Dall. Amer. Naturalist, vol. 16, 1882, p. 885.

Large size, white or salmon color, and a strongly and broadly plicated anterior commissure distinguish this species from the others. No definite locality in the Gulf is recorded by Dall.

Argyrotheca barrettiana (Davidson)

Argiope barrettiana Davidson. Proc. Zool. Soc., Feb. 1866, p. 103, pl. 12, fig. 3.

This is a small brachiopod (about 9 mm. wide) but an unusually beautiful species. It is somewhat rectangular in outline, wider than long, and with 20 strong, rounded radial costae. Most distinctive of the species is its coloration. The elevated costae are pale, straw-yellow, but the interspaces are crimson. It has been taken at 101 fathoms in the Gulf but the exact locality not recorded.

Argyrotheca lutea (Dall)

Cistella lutea Dall. Bull. Mus. Comp. Zool., Harvard, vol. 3, 1871, p. 20, pl. 1, figs. 5, 5a; pl. 2, figs. 4–8.

This species is somewhat less transverse than the preceding and differs in its straw-yellow color. It has been taken from 30–40 fathoms off Tortugas.

Argyrotheca schrammi (Crosse and Fischer)

Argiope schrammi Crosse and Fischer. Jour. Conchyl., vol. 14, 1866, p. 269, pl. 8, fig. 6.

Argyrotheca schrammi is a small species (about 5 mm. wide) with about 10 strong, rounded costae which are opposite on each valve, thus forming a scalloped edge. Specimens may be uniformly red but also may be marked like *A. barrettiana*. Ones so marked are termed *A. schrammi rubrotincta* (Dall). The species is reported from off Tortugas

and Yucatán Strait at 540 fathoms (Harvard collection).

***Dallina floridana* (Pourtalès)**

Waldheimia floridana Pourtalès. Bull. Mus. Comp. Zool., Harvard, vol. 1, 1868, p. 127.

This is a large (20 mm. long), yellow species having a strongly triangular outline and a deep fold in the anterior commissure. The loop is long, broad, and complicated. The National Museum specimens have no other data than Gulf of Mexico.

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PHORONIDA

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There seems to be no record of adult phoronids in the Gulf of Mexico, hence it is not possible to identify the species represented by the actinotroch larvae which occur during the winter months in the neritic waters of the Gulf of Mexico. These larvae have been seen in plankton tows in Louisiana bays and have at times been common in tows taken from the dock in the ship channel at Port Aransas. Some larvae have been carried through metamorphosis to the juvenile phoronid stage, but this is still too immature to identify them even to genus. While it would not be surprising to find that the same species known to occur in the Beaufort area also occurs on the Gulf coast, this is not adequate for assigning a name to the actinotroch larva of the Gulf coast. The Beaufort species, together with additional larvae, is described by Brooks and Cowles (1905). Recently, Marcus (1949) has described the morphology and embryology of a form in Santos, Brazil, which she identifies with the north European *Phoronis ovalis*. This species is reported to live in burrows in shells of *Thais floridana*. While phoronids have not been observed in this situation on the Gulf coast, this Brazilian record suggests an intensive search might be profitable.

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ENTEROPNEUSTA

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The balanoglossids of the Gulf of Mexico are incompletely known; determination of various finds in coastal waters are contingent upon revisionary work in the genera concerned. A large species of *Balanoglossus*, some specimens exceeding 50 centimeters in length, is common in the vicinity of Englewood, Florida. A similar, if not identical, species occurs in the Grand Isle region, especially near the eastern end of the island in the mud flats. A small acorn worm, belonging to the genus *Saccoglossus*, occurs in the clean sand flats at Rockport, Texas. Found at Dry Tortugas, and to be expected elsewhere in the Gulf in coarse coral sand, is *Ptychodera bahamensis*, a species occurring generally in the Caribbean region.