BIJDRAGEN TOT DE KENNIS DER FAUNA VAN CURAÇAO.
Resultaten eener Reis van Dr. C. J. VAN DER HORST in 1920.

THE BRYOZOA OF CURAÇAO

BY

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(With 7 textfigures.)

For the reason that no records for this group of animals have been made anywhere near that region, the Bryozoa collected by Dr. C. J. VAN DER HORST are of great interest. The collection is quite limited in the number of species, as might have been expected on account of the inconspicuous nature of most of them. Only the specialist in the group, accustomed to collect these minute animals and familiar with their habits of growth, occurrence and appearance, need ever expect to take a very complete series of them. Most of the species in the collection appear to be there incidentally, attached to shells, corals, etc., and were later found on close inspection. A considerable number of the species are represented by only one or two specimens and the examination of debris under the binocular microscope yielded several species in the form of minute portions of colonies. No doubt the bryozoan fauna of the waters about Curaçao includes several times as many species as appear in this report.

It is a typical collection of the tropical seas as far as it goes. Most of the species represented here are found in the Florida waters, where they have been recorded by SMITT (1872—73) and OSBURN (1914). LEVINSEN (1909) has listed incidentally a few of the species for the region about the Virgin Islands (at that time the Danish West Indies). Otherwise, practically nothing is known of the Bryozoa in all that vast region which includes the West Indies, the Caribbean Sea and the Gulf of Mexico.

The collection comprises 23 species, of which three appear to be new and which have been named *Membrendoecium compressum*, *Schizopodrella horsti* and "*Lepralia*" *antillea*. The range of certain other species has been extended, especially that of *Schizopodrella floridana* Osburn and *Rhynchozoon tuberculatum* Osburn, hitherto known only from the Tortugas Islands, Florida, (OSBURN, 1914).

The illustrations for the new species were drawn by Mr. HENRY W. OLSON.

Class **BRYOZOA** Ehrenberg.

Order CTENOSTOMATA Busk.

Family VESICULARIIDAE Hincks.

Genus **Bowerbankia** Farre, 1837.

Bowerbankia gracilis Leidy, var. *caudata* Hincks (1877).

Bowerbankia gracilis, Leidy, 1855, p. 152.
Valkeria caudata, Hincks, 1877, p. 215.
B. gracilis and the variety *caudata*, Osburn, 1912, p. 253 and 1914, p. 218.

Spanish Water, Curaçao, April 7 and May 25, 1920, a few small specimens on oyster shells attached to mangrove roots.

No erect, free branches were observed. Most of the zooecia show the caudate process characteristic of *caudata*, though, as in all specimens I have ever examined from the North American coast, some

individuals lacked this structure. All the specimens I have seen from tropical waters, Tortugas Islands, Porto Rico and Curaçao are small and with the creeping branches only. The species reaches a much larger development in the temperate waters from the Carolina coast to Cape Cod and again grows smaller toward the northward.

Genus **Zoobotryon** Ehrenberg, 1831.

Zoobotryon pellucidum Ehrenberg, 1831.

Spanish Water, Curaçao, April 4, 1920, one small colony among other bryozoan species on a mangrove root.

This a widely distributed species in warm waters, having been recorded from the Mediterranean Sea, Red Sea, Zanzibar, South Australia, Cape Verde Islands and the West Indies. In the latter region it was recorded by SONDER (Coll. BINDER) from Trinidad Island as a plant (*Ascothamnion trinitatis*); the Isle of Pines (Miss PHILIPPS), and the Tortugas Islands, Florida (OSBURN). The writer has a specimen also from Port Lavaca, Texas, collected by Dr. R. H. PAINTER.

Order CHEILOSTOMATA Busk.

Suborder ANASCA Levinsen.

Family AETEIDAE Smitt.

Genus **Aetea** Lamouroux, 1812.

Aetea sica (Couch), 1844.

Spanish Water, Curaçao, on *Porites furcata,* a minute colony, barely sufficient for identification.

This very small, but widely distributed species has hitherto been known in American waters from OSBURN's record only, Tortugas Islands, Florida, 10 fathoms on shells.

Family MEMBRANIPORIDAE Busk, 1854.

Genus **Nichtina** Canu, 1900.

Nichtina tuberculata (Bosc) 1802.

Encrusting *Sargassum* stems and especially the floats in Latitude 33 N., Longitude 40 W., March 23, 1920.

This is the *Membranipora tuberculata* and *M. tehuelcha* of various authors. HARMER (1926, pp. 208—209) gives the synonymy and a full discussion of the genus and species.

This species is likely to be found wherever the stems of *Sargassum* happen to be drifted by ocean currents. It is the characteristic Gulf-weed species and I have never noted any other species on floating *Sargassum.*

Genus **Membrendoecium** Canu and Bassler, 1917.

Membrendoecium compressum n. sp. (textfigs. 1 and 2.)

Spanish Water, Curaçao, April 19, two colonies, 12 mm. in diameter on *Porites furcata* and several smaller colonies on a gastropod shell. April 14; May 18 and May 20, on *Maeandra strigosa.*
Caracas Bay, Curaçao, April 30, small colonies on three small gastropod shells.

Zoarium encrusting on corals and shells, light yellowish brown in color and often several layers in thickness.

Zooecial wall well calcified, especially so in the older stages, closely set and entirely lacking interopesial areas. The calcified margin slopes evenly and rather steeply to the aperture on the sides and anteriorly, rather smooth on the outer border but with progressively larger granulations toward the inner border until the edge of the aperture appears to be finely crenulate. The aperture is pyriform or irregularly ovoid, widest posteriorly and often widening rather suddenly just posterior to the operculum. Posterior to the aperture the marginal lamina is usually inflated slightly, giving this portion

a different appearance from the rest of the lamina. The zooecia are so closely set that no indication of an interopesial area appears in any of the specimens.

The small oval avicularia, with a somewhat triangular mandible, are interzooecal in position, closely crowded in between the zooecia and in such a position that each avicularium appears at first to be seated upon the base of the zooecium in front of it.

The ooecia are endozooecial.

Zooecial length, .30—.40 mm., av. .35 mm.

Zooecial width, .20—.30 mm., av. .26 mm.

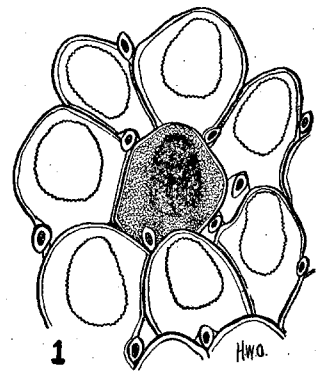

Fig. 1. *Membrendoecium compressum,* n. sp., portion of colony showing relation of zooecia and avicularia.

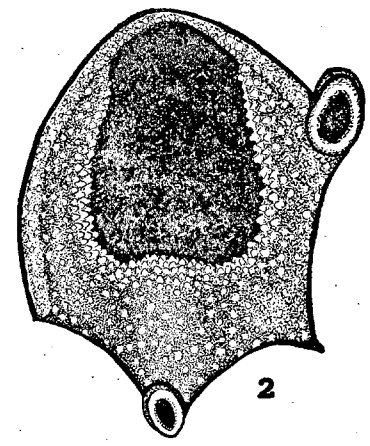

Fig. 2. *Membrendoecium compressum,* n. sp., a single zooecium, much enlarged, showing details of structure.

This species is evidently closely related to *Amphiblestrum papillatum* Busk (1884, p. 66, Pl. XXXIII, fig. 1) from the Philippine Islands, selected by CANU and BASSLER as the genotype of Membrendoecium. It differs from *papillatum*, however, in the fact that the zooecia are not disjunct and the zoarium is not unusually thin and delicate. CANU and BASSLER have recently described seven fossil species from the American Tertiary and Quaternary (1920, pp. 119—123 and 1923, p. 36), several of which lack the interopesial areas, but the present species cannot be placed under any of them. It is an interesting fact that the genus was in Tertiary time much more abundantly represented and widely spread than at present and that the two known species of recent time appear to be widely separated remnants of what may have been a world wide distribution.

Family FARCIMINARIIDAE Busk, 1852.

Genus **Nellia** Busk, 1852.

Nellia oculata Busk, 1852.

Spanish Water, Curaçao, May 14, 1920, a small portion of a colony just sufficient for identification, adhering to a specimen of *Maeandra clivosa.*

In American waters it has previously been noted from the Tortugas Islands, Florida (SMITT and OSBURN); Texas and St. Thomas Island (LEVINSEN), and off Brazil (BUSK). It has a circum-tropical distribution, various localities about Australia, the Philippines and the East Indies, Mergui Archipelago, Ceylon, Andaman Islands, Aru Islands, Laccadive Islands, Zanzibar, British East Africa and the Sudanese Red Sea. CANU and BASSLER (1920, p. 196) have also recorded it from the American Tertiary.

Family ONYCHOCELLIDAE Jullien, 1881.

Genus **Smittipora** Jullien, 1881.

Smittipora abyssicola (Smitt) 1873.

Spanish Water, Curaçao, May 14, 1920, on *Maeandra clivosa.*

Only the encrusting stage was represented and this did not differ from the Florida specimens in my collection. The ooecium is endozooecial and there are two large lateral and two distal multiporous rosette plates.

SMITT (1873, p. 6) described the species from Florida as *Vincularia abyssicola* and OSBURN (1914, p. 195) found it again at the Tortugas Islands. CANU and BASSLER (1920, p. 225) overlooked the latter record in stating that "SMITT's species has not yet been rediscovered". THORNELY (1905, p. 111) listed it for Ceylon, under the genus *Onychocella.* HARMER (1926, p. 260) records the species from various stations of the Siboga Expedition, from Singapore, Queensland, Torres Straits, and also

from St. Vincent, West Indies. HARMER regards the genera *Rectonychocella* and *Velumella* of CANU and BASSLER (1917, pp. 25—26) as synonymous with *Smittipora*. If this view is substantiated, the genus had a rather wide distribution in the American Tertiary.

Family EPISTOMIDAE Gregory, 1903.

Genus **Synnotum** Pieper, 1881.

Synnotum aegyptiacum (Audouin) 1826.

Loricaria aegyptiacum Audouin 1826, p. 243.
S. aviculare Pieper and various later authors. See Harmer, 1926, p. 398, for synonymy.

Spanish Water, Curaçao, April 14, 1920, one very small colony attached to a *Holoporella albirostris* on *Porites furcata.*

This very inconspicuous species is widely distributed in the warmer waters of all seas.

Family BICELLARIELLIDAE Levinsen, 1909.

Genus **Bugula** Oken, 1815.

Bugula neritina (Linnaeus), 1758.

Spanish Water, Curaçao, April 14, 1920, one small portion of a colony in debris among shells and corals.

This species, which is known from all warm seas, has been recorded in American Atlantic waters by VERRILL at Fort Macon, North Carolina and the Bermuda Islands and the writer has found it abundant at Beaufort, N. Carolina and the Tortugas Islands, Florida.

Suborder ASCOPHORA Levinsen, 1909.

Family SAVIGNYELLIDAE Levinsen, 1909.

Genus **Savignyella** Levinsen, 1909.

Savignyella lafonti (Audouin), 1826.

Spanish Water, Curaçao, April 7, 1920, a few minute specimens on an oyster shell attached to a mangrove root.

This is a very widely distributed species in warm waters, but it has been previously recorded for the West Indian region only by OSBURN (1914, p. 197) who found it abundant at the Tortugas Islands, Florida. However, the species is so small that it might easily escape any except a microscopic examination and it is probably distributed throughout the West Indies.

Family ESCHARELLIDAE Levinsen, 1909.

Group Schizoporellae Canu and Bassler, 1917.

Genus **Schizopodrella** Canu and Bassler, 1917.

Schizopodrella (Schizoporella) unicornis (Johnston), 1847.

Spanish Water and Caracas Bay, Curaçao, April 5 to May 25, 1920, encrusting mangrove roots and oyster shells attached to the roots.

Some of the colonies were young, consisting of only one layer of zooecia, while others were many layers in thickness. The older colonies usually showed the dark reddish or purplish brown which is so characteristic of Floridan specimens. Some of the ooecia show a mucro on the top, similar to that figured by SMITT (1873, Pl. VIII, fig. 169) for his *Hippothoa mucronata.* The latter can hardly be a variation of *unicornis*, however, if SMITT was correct in determining tubercles on the oral margin as the bases of oral spines. *S. unicornis* has a very wide distribution and occurs abundantly everywhere along the North American Coast.

Schizopodrella (Schizoporella) floridana Osburn, 1914.

Spanish Water, Curaçao, April 14, 1920, two portions of older colonies among corals and shells.

This material agrees fully with my description of specimens from the Tortugas Islands, Florida

(1914, p. 205, text-figs. 17—18). I have specimens also from Tarpon Springs and the Captive Islands, Florida, but the present record extends the range of the species much farther. It may prove to be a characteristic species of the West Indies.

CANU and BASSLER have recorded it for the American Miocene of Florida and North Carolina (1923, p. 106, Pl. 16, figs. 11—15). They remark that their fossil material differs „slightly in its rimule not placed at the level of the frontal." This may be merely a matter of development, as a reexamination of my material shows varying conditions according to the stage of calcification, covering all the conditions illustrated by CANU and BASSLER. The apparent absence of the large interzooecial avicularia in the fossils may be due to scanty material as these are often absent in recent specimens.

Schizopodrella horsti, n. sp. (textfigs. 3, 4 and 5).

Spanish Water, Curaçao, May 18, 1920, two colonies, one living, 2 cm. in diameter, and one dead and much worn, 1 cm. in diameter, on a fragment of clay pottery.

Zoarium flat and encrusting, forming a rather smooth, reddish yellow layer; older colonies may be several layers in thickness.

Zooecia disposed in lines radiating from the center of the colony. The surface of the frontal is glistening, rough and free from pores except for a single row of large lateral pores, separated by strong ribs, which is a constant feature in all stages of calcification. The front wall becomes very thick with age.

A single elongate, pointed avicularium, directed nearly straight backward, is located at one side

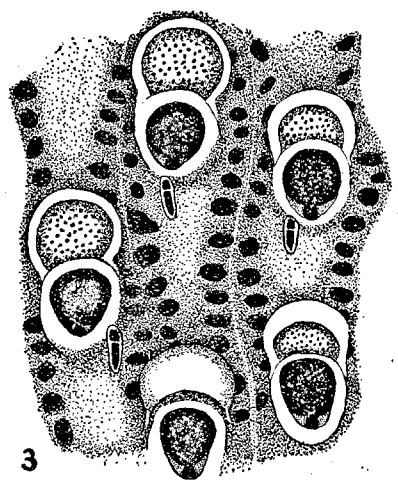

Fig. 3. *Schizopodrella horsti*, n. sp., portion of colony in a somewhat advanced stage of calcification. The zooecia show different stages of secondary calcification.

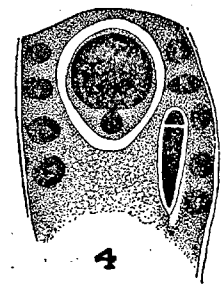

Fig. 4. *Schizopodrella horsti*, n. sp., portion of a younger zooecium, more enlarged, showing the form of the primary aperture, typical form and position of the avicularium and the peristome at a less advanced stage than in fig. 3.

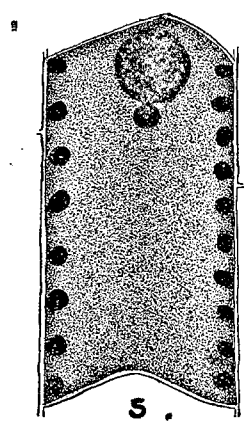

Fig. 5. *Schizopodrella horsti*, n. sp., frontal of a zooecium as viewed from beneath.

of the midline, its base about opposite the hind border of the aperture. In younger stages the avicularia are somewhat raised, but tend to become immersed in the calcification of the frontal in older individuals.

The aperture is evenly rounded in front and on the sides, somewhat straighter on the hind border, with a deep, rounded sinus which is partially constricted off by the hinge teeth. With the secondary calcification, which occurs very early, a secondary peristome, oval in outline is built up, completely surrounding the aperture and sinus and forming a strong rib on the front of the ooecium. The slightly chitinized operculum closes the ooecial aperture.

The ooecia are hyperstomial, occurring on nearly every zooecium, large, hemispherical, with numerous very small pores, and somewhat embedded in the frontal wall of the adjoining zooecium. In older stages the ooecia become almost entirely immersed in the secondary calcification and overgrown by a layer which obscures the porous frontal wall.

There is a single line of communication pores, regularly placed, 8 to 11 in the lateral, 2 to 3 in the distal walls.

Measurements:

Zooecial length, .48—.65 mm., av. .55 mm.
„ width, .28—.40 mm., „ .31 mm.
Aperture, length, .16 mm., including the sinus.
„ width, .12 mm.
Avicularium, length, .20 mm.

This species is dedicated to the collector, Dr. C. J. VAN DER HORST.

Genus **Stephanosella** Canu and Bassler, 1917.

Stephanosella (Schizoporella) biaperta (Michelin), 1845.

Caracas Bay, Curaçao, April 10, 1920, a minute young colony attached to a coralline alga.

A very widely distributed species. SMITT records it from the Florida Strait and OSBURN from the Tortugas Islands in the West Indian region.

Genus **Stylopoma** Levinsen, 1909.

Stylopoma (Schizoporella) spongites (Pallas), 1766.

Curaçao, on an old bottle (no further data), a young colony of a few zooecia.

A wide ranging species in warm waters; SMITT records it from Florida, OSBURN from the Tortugas Islands, LEVINSEN from St. Thomas and St. John in the Virgin Islands and VERRILL from the Bermudas. It is probably found throughout the West Indian region.

Group Hippoporae Canu and Bassler, 1917.

Genus **Lepralia** Johnston, 1847.

Lepralia antillea, n. sp. (textfigs. 6 and 7).

Phylactella labrosa Osburn, 1914, p. 213.

Spanish Water, Curaçao Island, April 19, one colony on an oyster shell, and May 18, 1920, eight colonies on a broken piece of pottery.

Zoarium encrusting, forming a coarse, grayish layer on shells, corals, etc., in older stages becoming multilaminar, the secondary layers piling up on the primary one irregularly with the zooecia turned in various directions.

Zooecia very large, broad, prominent, gibbous, deep, coarsely and heavily calcified, well separated even in older stages of calcification by deep grooves. The whole of the frontal is coarsely punctured by large tremopores which have funnel-shaped openings with raised borders, giving the whole surface a much roughened appearance.

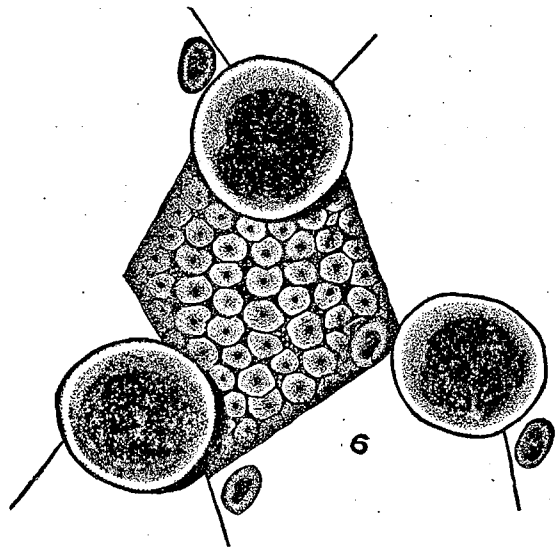

Fig. 6. *„Lepralia" antillea,* n. sp., showing details of structure.

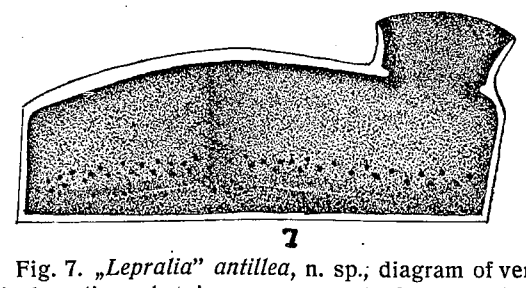

Fig. 7. *„Lepralia" antillea*, n. sp., diagram of vertical section, showing arrangement of communication pores, relations of aperture and peristome etc.

A minute rounded avicularium, somewhat raised and with a heavily calcified border is present at the lateral angle of the zooecium, occasionally on both sides or frequently wanting entirely. The

avicularian chambers extend downward between the contiguous zooecia, giving, at a higher level of horizontal section, the appearance of diatellae.

The aperture is large, rounded, with a pair of small, sometimes scarcely evident, cardelles, which are situated slightly back of middle. The poster is large, broad and similar in shape to the anter, but is slightly smaller. The aperture averages as wide as long, but there is considerable variation in its form. The operculum is well chitinized. A rounded thick walled peristome usually surrounds the aperture, often projecting strongly above the body of the zooecium at nearly a right angle to it. In some cases the peristome is raised still higher on the sides into flaring projections, while in other cases the whole rim is raised and flares outward into a broad infundibulum. Usually, however, the peristome merely surrounds the aperture with a prominent heavy border.

Communication pores are numerous and irregularly distributed in the lateral and distal walls. There are no diatellae.

Measurements:

Zooecial length, .80—1.10 mm., av. 1.00 mm.
„ width, .60—.80 mm., av. .70 mm.
Aperture, length, .21 mm., width .19—.21 mm.

Ooecia are wanting on all my specimens and I have dissected numerous zooecia without discovering any evidence of endozooecial egg chambers. For this reason it seems impossible to place the species definitely in any of the newer genera and I have followed the custom by listing it under the old genus *Lepralia* where it would have been placed without question a few years ago. It has certain marked resemblances to *Hippodiplosia* Canu, 1916, and may eventually be placed under this genus when ooecia are discovered. It bears a very close external resemblance to *Cyclicopora laticella* Canu and Bassler (1920, p. 427, pl. 55, fig. 6), of the American Tertiary, though the avicularia present slight differences in form and position, but the presence of cardelles and the absence of multiporous rosette plates definitely remove it from *Cyclicopora*.

My scanty material from the Tortugas Islands, Florida was incorrectly determined. I have a specimen also taken by myself off Guanica Harbor, Porto Rico, in 1915. The species is probably distributed throughout the Antillean region. None of the colonies is large, rarely over a centimeter in diameter, though on account of the large size of the zooecia they are rather conspicuous.

Group Microporellae Canu and Bassler, 1917.

Genus **Microporella** Hincks, 1877.

Microporella ciliata (Linnaeus), 1758.

Spanish Water, Curaçao, May 19, 1920, one colony on the under side of *Maeandra clivosa.*

It is one of the few species that is likely to be found almost anywhere from tropical to polar seas and has been taken wherever the Bryozoa have been studied on the east coast of North America from Greenland southward. It is also known as a fossil in Tertiary and Quaternary deposits from various parts of the world (see CANU and BASSLER, 1923, p. 120).

Family SMITTINIDAE Levinsen, 1909.

Genus **Smittina** Norman, 1903.

Smittina trispinosa (Johnston) var. *spathulosa* (Smitt), 1873.

Caracas Bay, April 4, one colony on *Maeandra strigosa.*
Spanish Water, Curaçao, May 5, 1920, one colony on a fragment of pottery.

This species has a very wide distribution and may be found almost anywhere from the tropics to the polar seas. It shows great variation and a number of varieties have been given names. The specimens from Curaçao present three kinds of avicularia; 1st., short spatulate or nearly oval, such as are usually present on the variety *nitida* (VERRILL); 2nd., long spatulate, as long as the zooecia, and 3rd., the very narrow elongate type common on some of the Florida specimens, as illustrated by

SMITT (1873, Pl. X, fig. 200). The pointed triangular avicularia characteristic of the typical variety *trispinosa* (JOHNSTON) were not observed on the Curaçao material.

Family RETEPORIDAE Smitt, 1867.

Genus **Rhynchozoon** Hincks, 1891.

Rhynchozoon tuberculatum Osburn, 1914.

Spanish Water, Curaçao, April 19, 1920, on *Siderastrea radians*, on a gastropod shell and encrusting a bottle; also on May 18, on a fragment of clay pottery, several small colonies, all of which agree closely with my Florida specimen, taken at 18 fathoms.

In my original description I stated (1914, p. 200), "the peristome appears to bear a minute, short-elliptical avicularium, but I am not able to distinguish a mandible in my specimen". It may be added from the Curaçao material that a short-triangular mandible is present; the outer posterior rim of the peristome in older zooecia rises to include the avicularium on its inner surface; the zoarium is white in color and somewhat glistening. The zooecia are quite small (length .35 mm., width .23 mm.), and the colonies also, as the largest I have seen are not more than 4 mm. in diameter.

It is naturally a pleasure to record this species again, as it was described from a single specimen and has not been noted since.

Family HIPPOPODINIDAE Levinsen, 1909.

Genus **Hippopodina** Levinsen, 1909.

Hippopodina feegeensis (Busk), 1884.

Spanish Water, April 4, and Caracas Bay, Curaçao, April 10 and 19, several colonies on shells.

LEVINSEN (1909, p. 353—354) has redescribed BUSK's *Lepralia feegeensis*, with excellent figures (Pl. XXIV, figs. 3a to 3f), showing the different positions of the avicularia. The Curaçao specimens agree fully with LEVINSEN's description. On the same colony may be found avicularia as figured by BUSK (1884, Pl. XXII, fig. 9) in front of the aperture and pointing inward, and as shown by LEVINSEN (l. c. fig. 3d) with the mandibles pointing backward and inward, while occasional variants have them at the side of the aperture pointing straight forward or backward, and a single one was noted directly proximal to the aperture pointing transversely. Both long and short mandibles were observed.

The species has been previously recorded from the Philippine Islands and Hongkong by BUSK and from Singapore and St. Thomas, West Indies, by LEVINSEN.

Family PHYLACTELLIDAE Canu and Bassler, 1917.

Genus **Mastigophora** Hincks, 1880.

Mastigophora pesanseris (Smitt), 1873.

Spanish Water, Curaçao, April 19, 1920, a small colony of 20 zooecia on a gastropod shell and another of the same size encrusting a bottle (no data).

CANU and BASSLER (1923, p. 172) indicate their doubt as to the generic position of *pesanseris*, "according to the operculum, WATERS (1909, p. 169) classified it in the *S. cecili* group (*Arthropoma*); according to the form and position of the avicularia LEVINSEN classified it in *Mastigophora* (*Escharina*). He believed that the ovicell is endozooecial. If this observation is verified it will be necessary to create a new genus for this species". There are three ooecia on the second specimen, but I cannot determine that they are endozooecial. At any rate, without more evidence I prefer to leave the species in *Mastigophora*.

Family CELLEPORIDAE Busk, 1852.

Genus **Holoporella** Waters, 1909.

Holoporella albirostris (Smitt), 1873.

Spanish Water, April 8, 14 and 19 and May 5 and 25, and Caracas Bay, Curaçao, April 10. Numerous colonies attached to corals, shells and coralline algae.

This widely distributed species appears to be very characteristic of the warm waters of the

east coast of America. The large avicularia described by SMITT (1873, p. 70) are rare on Curaçao specimens. The ooecium, which appears not to have been described or figured, is smooth, imperforate, hemispherical, rather widely open and cucullate. It is raised above the base of the succeeding zooecium and its borders are continued around the sides of the aperture to the rostrum. CANU and BASSLER (1923, p. 175) have listed it from the American Oligocene, Miocene and Pliocene.

Holoporella turrita (Smitt), 1873.

Spanish Water and Caracas Bay, Curaçao. Numerous colonies on corals of various species.

Most of the colonies are small, ranging from 5 to 15 mm., but one colony encrusting the side of a *Siderastrea siderea* measured about 120 by 100 mm. All the specimens show the characteristic light brick-red color, with the lighter tips of the „turrets" surrounding the apertures of the zooecia.

The species is abundant in Florida waters and CANU and BASSLER (1923, p. 179) have listed it from the Pleistocene of the Panama Canal Zone.

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